



Outdoor environmental education: turning back to the environment at a time of climate and nature emergency

Greg Mannion, Claire Ramjan, Stacey McNicol, Matthew Sowerby & Paul Lambert

To cite this article: Greg Mannion, Claire Ramjan, Stacey McNicol, Matthew Sowerby & Paul Lambert (2025) Outdoor environmental education: turning back to the environment at a time of climate and nature emergency, *Environmental Education Research*, 31:9, 1916-1938, DOI: [10.1080/13504622.2025.2538030](https://doi.org/10.1080/13504622.2025.2538030)

To link to this article: <https://doi.org/10.1080/13504622.2025.2538030>



© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group



Published online: 28 Jul 2025.



Submit your article to this journal [↗](#)



Article views: 916



View related articles [↗](#)



View Crossmark data [↗](#)

Outdoor environmental education: turning back to the environment at a time of climate and nature emergency

Greg Mannion^a , Claire Ramjan^b , Stacey McNicol^a , Matthew Sowerby^a  and Paul Lambert^a 

^aFaculty of Social Sciences (Education), University of Stirling, Stirling, Scotland, United Kingdom; ^bSchool of Education, University of Glasgow, Glasgow, United Kingdom

ABSTRACT

Outdoor experiences form a core part of environmental and sustainability education programming but the extent of provision and support is under-researched. This research links a reconsideration of outdoor environmental education (OEE) with survey data from school and early years staff about provision and professional learning in Scotland, UK. Analysis of the survey provides an in-depth view of outdoor duration, focus and locations of excursions, residential and non-residential trips into school grounds, local areas in 2006, 2014, and 2022. Whilst the duration of school provision has seen a reduction, in early years, provision had increased. Importantly, we show associations between increased provision and higher levels of professional learning and confidence. In the light these findings, we consider the need for a renewal of OEE more widely. We offer a theoretical consideration of the ontological bases needed to support a more relevant and place-responsive outdoor environmental educational at a time of climate and nature emergency.¹

ARTICLE HISTORY

Received 13 March 2025
Accepted 18 July 2025

KEYWORDS

Outdoor environmental education; education for sustainable development; new materialism; relational ontology; nature emergency

SUSTAINABLE DEVELOPMENT GOALS

SDG 13: Climate action;
SDG 4: Quality education

Introduction

For decades, experiential learning, especially in nature, has been positioned as a critical part of formal and informal environmental education and education for sustainable development (see, for example, Bögeholz 2006). Despite rising concerns about environmental issues, we do not know much about the duration and extent of outdoor experiential learning in formal education and when and how it connects to sustainability and environmental issues. Across many countries, OEE exists in practice *via* diverse terms and policy formulations. It is now important to know if these forms of OEE provision are increasing or decreasing, and how prepared and confident teachers are to provide it at a time of climate and nature emergency (CNE) (IPPR Environmental

CONTACT Greg Mannion  greg.mannion@stir.ac.uk  Faculty of Social Sciences (Education), University of Stirling, Stirling, Scotland, United Kingdom.

© 2025 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group
This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way. The terms on which this article has been published allow the posting of the Accepted Manuscript in a repository by the author(s) or with their consent.

Justice Commission 2022). The empirical element of our contribution, therefore, is to offer an in-depth view of duration of 'outdoor learning' provision in one country, Scotland, where it forms part of 'Learning for Sustainability' as a curricular entitlement for all pupils (aged 3-18). Our analysis shows the need for professional learning in support of OEE. We also make a parallel theoretical contribution around what ontological bases might better support a renewal of OEE at a time of CNE.

The definition and debates around OEE sit in diverse subfields, making it difficult to circumscribe a comprehensive view in one article. It is worth noting, however, that in the past, both outdoor education (OE) and environmental education (EE) have struggled to become 'mainstream' parts of school curricula. For some time, there has been a perception of OE as low status, extra-curricular, and concerned with training in technical adventure activities (Brookes 1989). Where links between outdoor experiences and environmental education do exist, provision is often captured by a variety of sub-fields such as 'place-based' or 'nature-based' (Lloyd et al. 2018; Mann et al. 2022), 'place-responsive' (Wattchow and Brown 2011; Stewart 2020; Mannion 2020), 'land-based education' (Tuck, McCoy, McKenzie 2014), 'adventure education' (Goodman 2024), 'field studies' or 'field trips' (Dale et al. 2020) and other approaches. With increasing use of the term 'education for sustainable development' (ESD), the longstanding emphasis on 'outdoor' is often subsumed or lost. 'Place-based education', 'outdoor learning', and 'nature' do not receive any mentions in the UNESCO (2020) document, for example. In their stead, we have increasing emphasis on the Sustainable Development Goals, and generic ESD 'competencies' (such as systems thinking, collaboration, critical thinking, self-awareness, and problem-solving competencies). In this context, and post Covid pandemic, OEE is called upon to renew (Quay et al. 2020). Importantly, there is also ongoing, if not growing discomfort with place-ambivalent, anthropocentric tendencies in OEE *via* positioning character building and socioemotional growth as a core aim, while ignoring concerns with nature and environmental issues, Indigenous and Traditional knowledge, gender diverse perspectives, and young people's views (for example, Gray and Mitten 2018; Stewart 2020, Children's Parliament (Scotland) 2022).

In 2012, Kopnina (2012) pointedly showed that we have in the last decade 'turned away from the environment'. Reid (2020) describes this turn as itself having an 'anthropocentric bias' (ibid, pp. 845) in policy as well as in environmental education practice. Despite this, there are some signs of renewal of OEE and a countering of this bias which we see as part of a *turn back to the (outdoor) environment* in environmental education. There are examples of critical and creative practices in the return to palpable and tangible outdoor places in, for example, climate change education (Fox and Thomas 2023; Nxumalo and Montes 2023), conservation action projects (Chawla 2024), and making school grounds climate-ready places of learning (Bellomo 2020; O'Dwyer 2021). OECD advisers (Nusche, Rabella, Lauterbach 2024) reposition outdoor environmental education as one 'nature-based solution' that will enable response making to the CNE (Intergovernmental Panel on Climate Change (IPCC) 2014). In this context, we argue that it is time to more robustly understand and support provision of OEE as part of a 'turn back' to the environment as a less human-centric response to the climate and nature emergency (CNE).

The remainder of this article is structured as follows. First, we introduce the policy context of the survey component. Next, we briefly look back at the past, and suggest

some ways forward drawing on posthuman and new materialist theorisations. We then reflect on some relevant issues in the sub-field of professional learning in OEE. Thereafter, we focus on the empirical contribution based on three surveys of duration, location, and focus of school ground provision, local outdoor excursions, day trips, and residential visits conducted in May and June in 2006, 2014, and 2022 in Scotland, UK. We show the prevalence of the connection between outdoor events and 'Learning for Sustainability', a cross-curricular theme in the study context. We also provide evidence on teachers' levels of confidence and experience in professional learning in outdoor and sustainability education. The findings provide one context for our theoretical position. It is now clear that many new contributions in OEE provide a relational and place-responsive ontological basis for their work pushing the field in new directions. We argue that based on this family of relational ontologies, new outdoor pedagogies, alongside professional learning can together help address the quality and level of provision and help response making at a time of CNE.

Policy context

In Scotland, 'Learning for Sustainability' (LfS) (One Planet Schools Working Group 2012) is a curriculum term that comprises three related areas: Outdoor Learning, Education for Sustainability, Education for Global Citizenship. LfS and 'Outdoor Learning' (Learning and Teaching Scotland 2010) are promoted as an entitlement and deliverable across 'all curriculum areas' (8). The General Teaching Council for Scotland's (2012) standards position the values of sustainability, equality, and justice as central to being a teacher. Despite the value of real-world learning contexts for Learning for Sustainability (LfS), gaps exist between espoused and actual practices (Christie et al. 2014).

Across the UK, children and young people have called for more outdoor provision in relation to climate and biodiversity crises (Children's Parliament 2022). Ward et al. (2023) also highlight the need to 'enhance opportunities for outdoor learning so they are more frequent and broader in scope' (5). Set against this aim, Scotland has sustained concerns for attainment. There has been extensive funding for closing the 'attainment gap' – a persistent gap in attainment between pupils from the richest and poorest households (see Sosu and Elis 2014). Our data on schools suggest the push for an attainment agenda has led to a shift away from a focus on outdoors and LfS for schools, especially in areas of deprivation.

Few countries have comprehensive empirical data on the prevalence, duration, and location of outdoor educational activity in schools. The diversity of language policy terms such as 'outdoor education', 'outdoor learning', 'out-of-school learning', and 'learning outside the classroom' leads to a less than clear context for comparing survey findings internationally. In Scandinavia, terms such as *uteskole* (Norway) or *udeskole* (Denmark) are commonly used to describe a grassroots approach in which teacher-led outdoor learning is more widespread. In Canada (see Asfeldt et al. 2022), Hungary (Füz 2018), and England (Prince and Diggory 2024) empirical data on outdoor provision do exist, but are less comparable with our data because of differences in methods and curricular structures. In Denmark, about one-fifth of state schools spend at least half a day every night engaging in outdoor learning (Barfod et al. 2021). Similarly, in Norway, nearly 87% of schools reported practicing *uteskole*, with over

two-thirds incorporating it into their curriculum for at least half the school day every fortnight (Lauterbach et al. 2024). As this article clarifies, the provision in Scotland lags well behind such levels. More research is needed to inform and compare the role of OEE in curriculum practices internationally.

Whither outdoor environmental education?

Where we have been...

For decades, curriculum-linked outdoor experiential learning has been associated *in principle* with the development of values and attitudes towards conserving and improving the environment (Sandell, & Öhman 2010). In outdoor education, despite core definitions of *intent* to improve human-environment relations (Mallette et al. 2024), the *outcomes* often identified focus on improvements in children's physical activity level, mental health and well-being, engagement, and social outcomes (Miller et al. 2021). Similarly, despite climate and nature emergencies, Fox and Thomas (2023) note that only a handful of contributions in outdoor education journals reflect environmental concerns. Despite the subordination of environmental concerns in outdoor educational provisions, there are well-evidenced calls for outdoor provision to do the opposite (Mallette et al. 2024).

OEE has the power to advance environmental literacy, including environmental skills, dispositions, knowledge, and behaviors (Stern, Powell and Ardoin 2008). Nearly 20 years ago, Wells and Lekies (2006) argued that access to experience in nature (as against domestication) would afford a *pathway* for an adult to later become more environmentally active. Time outdoors participating in activities during childhood can catalyze and sustain an interest in nature and the willingness to protect it (Chawla 2020). Studies in many other subfields suggest that outdoor experience has a role in environmental education provision. Collins et al. (2025) showed that outdoor experience supports improved inclusive scientific learning. Many sub-fields in outdoor educational research uphold the link to improved relations with the environment, such as greening school grounds (Bell and Dyment 2008), field trips (Dale et al. 2020), school gardening (Malberg and Wistoft 2018), conservation action (Gal 2024), place-based, community-oriented civic programs (Ardoin et al. 2018), environmental citizen science (Roche et al. 2020; Ballard et al. 2024), and nature-based excursions (Ballantyne, Anderson and Packer 2010; Mannion et al. 2013). Despite this extensive evidence base, most outdoor and nature-based educational research focuses on outcomes *for the human*, including their health, well-being, and cognitive gain. Sustained anthropocentric OEE seems out of sync with the time of CNE, and, we suggest, is therefore poorly positioned to help with response making.

Where we might go ...

A number of recent studies on OEE share posthuman, new materialist, or ecological sensibility. Our next argument is to show how they can help us address the historic tendency towards anthropocentrism (Clarke and Mcphie 2020). Empirical studies show

that this tendency can be countered by attending to the role of the more-than-human (Puig de la Bellacasa 2017; Lynch and Mannion 2021), working with nature as a co-teacher (Goodman 2024), in collaboration with animals (Pedersen 2019) and in the *friluftsliv* tradition (Mikaels 2018). These studies exemplify a return to the environment. Similarly, Mannion et al. (2013) define a 'place-responsive pedagogy' wherein the educator seeks to harness the agencies of the more than human into the teaching event, and learning accrues *by means of* the environment. Riley, Jukes and Rautio (2024) show a politics of 'place' affords new forms of care and speculative action *via* multispecies pedagogies at a time of mass extinction. This is partly achieved through *attunement* to the outdoor place by critically decentering humans (Lynch and Mannion 2021; Jukes and Reeves 2020; Sidebottom and Mycroft 2024), reciprocal responsivity (Mannion 2020), decolonial critique (Goodman 2024), and taking action with and for places (Chawla 2024). In summary, there is evidence that a family of posthuman, new materialist², and other relational ontologies are being used to provide a principled basis for urgently needed pedagogies in environmental education. Some authors (for example, Mannion 2020) also provide a more in-depth analysis of *how* such relational ontologies support and connect to pedagogies, though it is beyond the scope here to summarise all of these links. For our purposes, we note that emerging outdoor environmental pedagogies based on a diverse family of posthuman, new materialist and place-responsive ontologies seem well placed to enable a 'turn back to the environment' *via, inter alia*, a decentering of the human, enhanced attunement to the 'more-than-human', and opportunities for actions for nature.

In particular, a relationally supported OEE helps with a repositioning of the human amongst other species and within the felt agencies of a place. The entanglement and proximity between human and 'more-than-human' in outdoor places enables interspecies meaning making (see Ribó 2024), as an ethical, processual reconfiguration of environmental intelligibility itself (Ceder 2018). Based on relational ontologies, arguments are emerging in environmental education on how outdoor pedagogies ask us to live and learn more ecologically. For Affifi, education itself is such an ecology, 'organizing itself through reciprocal relationships between ways of seeing, thoughts, emotions, habits, material structures and other beings and processes' (Affifi 2023, 876). Within such an entangled relational ontology, we note that the *outcomes* of OEE will also be relational (Morse 2021). At an interspecies level, OEE helps us learn 'from and with our co-species' (Paulsen 2023). Since problems with human-nature relations are connected to a perception of human supremacy and exceptionalism (Riley 2020; Ruck and Mannion 2021), in OEE experiences, our entanglements within a place provide distinctive opportunities for *reciprocal* response-making amid the contingencies of, for example, weather, undulating terrain, and chance encounters with other species. Going outdoors makes it potentially more apparent that humans co-participate alongside other entities in the ongoing creation of new ways of being and relating in concrete, proximal, tangible, embodied, aesthetic, semiotic, and sensorial ways. It appears time spent outdoors – a core element of OEE – can help make our ecological ontological position clearer in ways that are difficult in indoor spaces where changes in light, heat, and other contingencies are backgrounded by many of the conveniences of our urbanised and digitally-mediated ways of life.

Professional learning for OEE

Research on in-service professional learning, a term which includes formal and informal learning, training, and professional development for teachers, has identified some key features of programmes (Jones 2023; Darling-Hammond et al. 2017; but see Asterhan and Lefstein 2024 for critiques). These include features such as sustained support over time, learning with peers, and alignment with learning goals and student outcomes (Cordingley et al. 2015). In effect, there are ‘known features’ in professional learning programming that are likely to lead to changes in practice and impact student outcomes in any area, including in education for sustainable development (ESD) and outdoor environmental education. That said, Forde and McMahon (2019) highlight that impactful, career long professional learning must respond not only to external, policy initiatives, but also take account of the ‘deeply contextualised nature of professional practice’ (idib. pp. 141). We too feel this is particularly relevant if we are to help teachers in local settings if they are to make effective pedagogical responses the CNE.

In school, educators can find professional learning in cross-curricular areas such as ESD quite challenging when faced with an overcrowded curriculum and competing demands on their time. Within pre-service teacher education, too, we know that there is a lack of attention to and explicit linking with sustainability (Imara and Altinay 2021). Where professional programs do address ESD, it is seen as effective to address the topic across local, regional, and global scales and to provide co-teaching opportunities (Isac et al. 2022). In the absence of a local contextualization, ‘global’ sustainability issues can indeed appear nebulous and distant. Similarly, ESD competencies – such as ‘systems thinking’ (Frisk and Larson 2011) – can appear complex and require interdisciplinary responses for educators (Rushton and Walshe 2025). In addition, the political and ethical aspects of the subject area (for example, climate justice) make learning contentious for teachers themselves as well as for their pupils. Overall, our findings show that pre- and in-service teachers³ find the acquisition of sustainability content knowledge and pedagogical content knowledge challenging (Isac et al. 2022). However, taking a co-learning, dialogical, and practice-focused approach can ameliorate these challenges (Boeve-de Pauw et al. 2022).

Similarly, in research on professional learning for outdoor provision, Kerr (2020) showed that teacher networks and ‘co-teaching’ support positive changes. Pedersen (2017) used a Community of Practice (CoP) approach in HE and found that those with an existing interest in the topic gained more. Ernst (2014) identified how some specific barriers need to be addressed, such as access to suitable natural landscapes (Wishart & Rouse 2019). Passy and Blackwell (2022) highlight that consistent culturally and personally responsive ‘training’ was key to enabling shifts in practice outdoors. Without this kind of collaborative professional learning, teachers often feel ill-prepared to execute outdoor lessons (Palmberg et al. 2017).

In outdoor educational practice, we know that there is a limited integration of environmental concerns and ESD (Aksland and Rudgren 2020). Unless specifically addressed, professional learning for ESD may not help enhance outdoor provisions and *vice versa*. Research shows that the role of a place is critical in professional development, which combines outdoor and environmental education pedagogies. In professional learning for OEE, collaborative planning and execution of excursions

to natural environments over time are effective features for adopting a place-responsive approach (Mannion et al. 2013). Reconnaissance site visits; discussing ideas with experts and peers; making repeat trips with learners; creating purposeful, meaningful activities before, during, and after visits; and noticing what triggers the interests of learners in settings can all promote the harnessing of place-based agencies into pedagogies (Mannion et al. 2013; Lynch and Mannion 2021).

Survey methodology

Our survey research employed a repeated, cross-sectional approach designed to track changes in outdoor education provision (see below) in Scotland. Data were collected in 2006, 2014, and 2022 to provide a comprehensive view of the state of outdoor learning over the past two decades. The survey was designed to capture detailed information on individual outdoor learning events, such as location, duration, focus, and curriculum areas involved. Teachers and practitioners provided this information by using a recall method to document outdoor learning events during a specified survey period. The methodology also aimed to gather qualitative data on the impact of outdoor education, including its influence on student engagement, teacher confidence, and the effects of the Covid-19 pandemic on outdoor provision.

The outdoor learning events surveyed could be connected to any subject, in school grounds, off-site, residential, or non-residential. Thus, the survey captured events such as outdoor mathematics, geographical fieldwork, visits to farms, parks, and residential centre stays. We excluded physical education lessons and scheduled break times for schools, reflecting the nomenclature and curricular framing in Scotland.

The survey was administered to a randomly selected sample of schools, ensuring broad representation across factors such as school size, location (urban vs. rural), and socioeconomic context. Despite challenges, such as low response rates in 2022, the survey yielded a significant dataset, with approximately 200 outdoor learning events recorded across 25 schools in 2022. This longitudinal approach allowed for a comparison of over 1200 outdoor learning events across the three survey years. All three surveys were undertaken at a similar time of year, namely, in May and June, when OEE activities, including residential, were more common. Our evidence on prevalence should be understood as contingent on the summer timing of the surveys.

In both schools and the early years, the survey gathered data on the duration of outdoor learning events. In the early years, a diarized approach was used to track how much time children spent outdoors throughout their day. In schools, teachers report the duration of *each outdoor event*. The data collection process relied on teacher self-reporting, which, despite being based on estimates, was considered accurate by most participants when the survey was reflexively evaluated. In 2022, we additionally asked responding teachers about their preparedness and *confidence* in teaching outdoors and in providing for 'Learning for Sustainability'.

Ethical considerations

Ethical practice was ensured by obtaining informed written consent from each participating local authority, head teacher, and individual practitioner. Schools and early

year settings were associated with individual codes and offered submissions *via* an online portal, ensuring that establishments were not identifiable or traceable. The approach was reviewed and supported by the University of Stirling’s General University Ethics Panel. See Mannion et al. (2015) and Mannion et al. (2023) for further details on the methodology and analysis.

Survey findings

Duration of outdoor provision: early years

In the early years, practitioners provided estimates of the number of children outdoors and the time they spent there at various time points across the day. This was then calculated as a percentage of the total time available for children to spend in the nursery. It was found that in 2006, children spent 23% of their available time outdoors, which increased to 36% in 2014 and was seen to rise again from 2022 to 39% (see Figure 1).

Our data reflect a wider improvement in provision outdoors in early years in England, where 72% of inspection reports mentioned outdoor activities (Prince and Diggory 2024). Comparable data come from Slovenia, where children spend 23% of their time outside in warmer months (Kos and Jerman 2013). Moser and Martinsen (2010) found that children in Norway spend an average of 70% of their time outdoors in the warmer months and 31% of their time outside in colder months in early year settings.

Duration of outdoor provision: primary schools

For schools, using all event records in all three surveys, we aggregated the total time that children were recorded as having spent outdoors. We then divided that number by the total role of the school to provide us with an average measure of ‘minutes per pupil per week’. It was found that on average, children spent 19 min per week outdoors in 2006. This increased substantially to 30 min per pupil per week. However, in 2022, only 7 min per pupil per week was recorded (Figure 2).

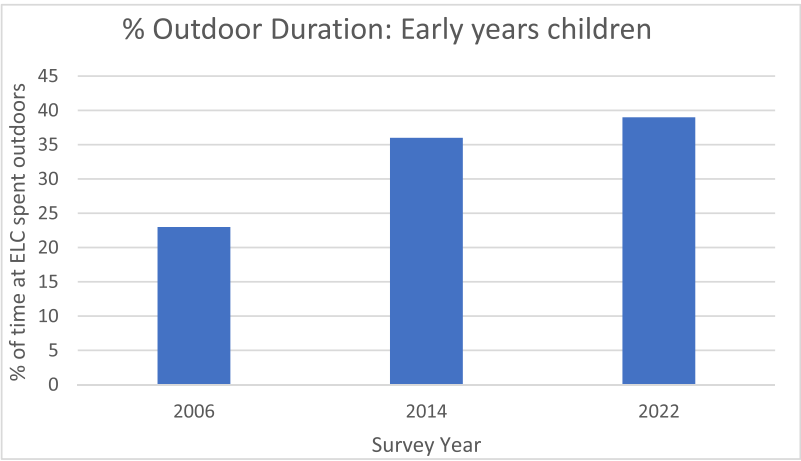


Figure 1. Percentage of available time spent outdoors – early years (Source: Mannion et al. 2023).

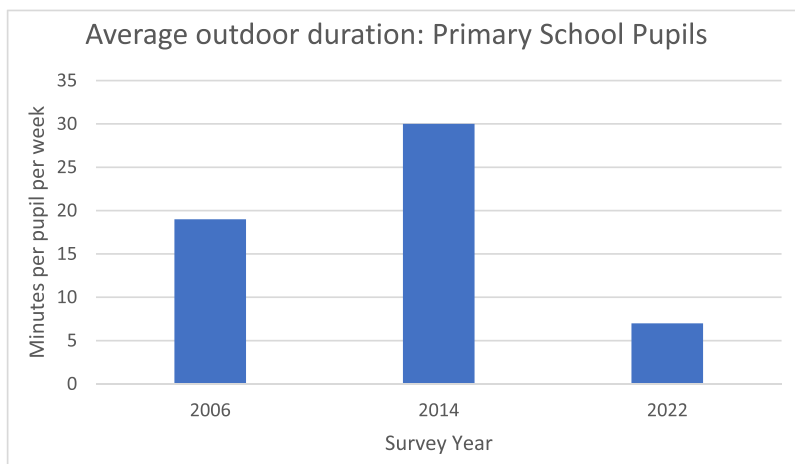


Figure 2. Average duration of outdoor provision for primary school pupils (Source: Mannion et al. 2023).

Some of this decline in 2022 is likely to be due to schools being unable to take children off-site due to Covid restrictions, but the decline is only fully explainable by a substantial reduction in events within school grounds.

In England, for comparison, the *Learning in Natural Environments* survey (Natural England 2012) saw demonstration schools deliver up to 70min per pupil per week for summer periods after receiving support. The *TEACHOUT* study (see Nielsen et al. 2016) showed that a control group for their study was providing over 98min per pupil per week (or 1.64hrs), which is over 14 times the Scottish duration figure for 2022. In 2014, in Scotland, we suggested that an achievable target for the average outdoor learning duration across schools would be approximately one hour a week (60min per pupil per week). In 2022, the actual provision of randomly sampled schools was seven minutes, showing that there has been a stark decrease.

Location of outdoor events: early years

In the early years, practitioners were asked to report the location of outdoor events. These events included events within the ground and further afield.

Figure 3 shows that while outdoor provision in the early years remained the most common, the majority of provision beyond took place in woodlands. This has increased from 2.4% (2014) to just below 13% by 2022, a five-fold increase. This aligns with our perceived sense of sustained interest and training in outdoor learning in woodland-type environments.

Location of outdoor events: primary schools

Primary school teachers were asked to provide information on the location of outdoor events, whether on the school grounds, beyond, or in residential events.

As Figure 4 shows, in primary school settings, from 2006 to 2014 pre-Covid, there was a notable increase in the *proportion* of some locations for activities taking place within school grounds and in residential centres, with a representative decrease in visits beyond the school grounds. As expected, residential provision is reduced. In

Location	2006	2014	2022
Within grounds	90.80%	94.80%	85.06%
Farm/Farmland	0.60%	0.80%	1.15%
Public park	1.60%	1.80%	0%
Urban/civic area	4.50%	0.80%	1.15%
Woods/forests/wildlife area	2.50%	2.40%	12.64%

Figure 3. Location of outdoor events (early years settings) (Source: Mannion et al. 2023).

Location	2006	2014	2022
Within School Grounds	25%	39%	38%
Beyond School Grounds	60%	36%	55%
Residential	15%	25%	7%

Figure 4. Location of outdoor events (primary school settings) (Source: Mannion et al. 2023).

Location Type	% 2014	% 2022
Public park/garden/green space	15%	12%
Urban area	13%	1%
Wildlife area/Nature reserve/National park	11%	1%
Woodland	1%	18%
Other	1%	21%

Figure 5. Location of outdoor events beyond the school grounds (primary school settings) (Source: Mannion et al. 2023).

response, schools looked at more local destinations. 87% of the primary school activities took place up to 1 km from the school, and at no or very little cost in 2022.

We also asked teachers to provide more detailed information about the types of locations beyond the grounds (Figure 5).

We noticed a reduction in the proportion of time spent in urban areas and in time spent in nature reserves/national parks. One location type that has seen a proportional increase, from 6% to 18%, is woodlands, although this represents a fall in *actual* child hours spent in woodlands.

After Covid in 2022, the persistence of the use of the immediate surroundings and some local areas is important to reflect upon. Kos and Jerman (2013) found that in the Slovenian experience, easy access to a natural place such as a forest increased the time spent there.

The focus on 'learning for Sustainability'

In primary schools, we asked respondents to identify whether the outdoor events connected to any of the specified cross curricular themes: 'Enterprise in Education', 'Education for Citizenship', 'Learning for Sustainability', 'International Education' and 'Sustainable Development' (labelled for ease in summary terms below) (Figure 6).

In 2022, teachers identified the curriculum theme 'Learning for Sustainability' as linked to outdoor provision in 28% of the events. In 2014, teachers reported that in the majority of these sustainability-oriented lessons, pupils were taking a more 'active' and 'collaborative' approach to learning than for events in general (Mannion et al. 2015).

Teachers reported that the majority of lessons outdoors did not directly or intentionally address 'sustainability'. It should be noted that while outdoor provision may often include considerable time in greenspaces and nature, there may not necessarily be any connection to environmental issues or concerns. 'Education for Citizenship' – known to be relevant to environmental education goals (Ardoin et al. 2023) – was 8% in 2022 (down from 25% in our earlier survey in 2014). Our analysis shows that outdoor learning in schools Scotland is not just showing decline, it is moving away from an orientation to sustainability, and the citizenship dimension.

Educator confidence

Participants in the 2022 survey ($n=108$) were asked how *confident* they were with learning outdoors and the delivery of Learning for Sustainability. 86 participants responded, of which 24 were from early year settings and 62 were from primary schools.

Figure 7 shows that participants across both sectors reported feeling confident about outdoor learning. Confidence was somewhat higher for early year practitioners, with 9 out of 10 participants here suggesting they have some confidence in learning outdoors. Confidence in Learning for Sustainability was reported to be lower in both the early and primary years.

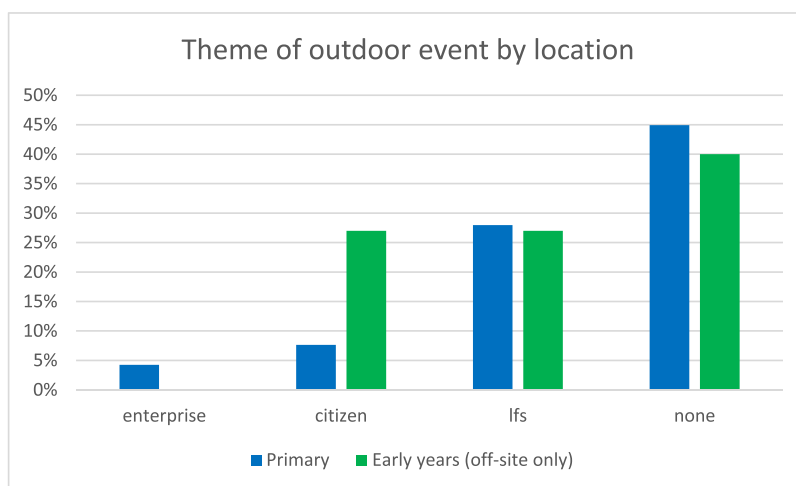


Figure 6. Average duration in hours of primary non-residential events across each theme in 2022 (Source: Mannion et al. 2023).

Context	Confident taking learning outdoors	Confident in Learning for Sustainability
Early years	92%	71%
Primary	63%	40%

Figure 7. Reported confidence in ‘taking learning outdoors’ and in delivering ‘learning for Sustainability’ (n=86) (Source: Mannion et al. 2023).

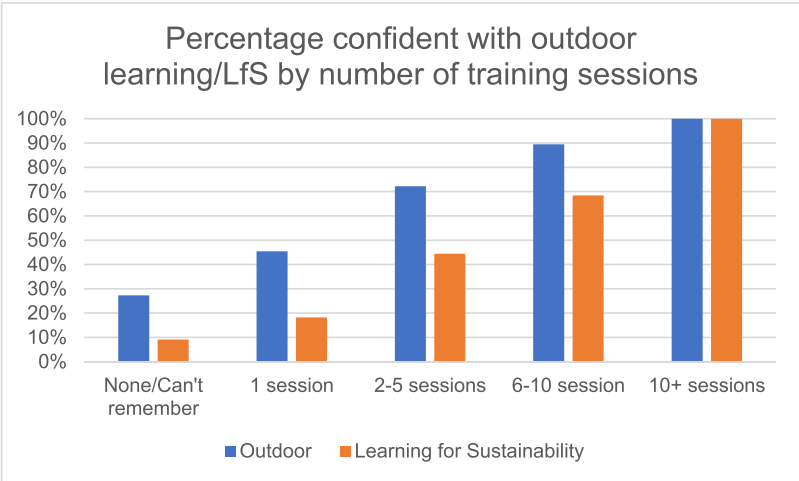


Figure 8. Reported confidence in OL and LfS by professional learning sessions received (Source: Mannion et al. 2023).

Engagement in professional learning

In 2022 we also asked practitioners to tell us how many professional learning (or training) sessions they had experienced in their careers. We broadly define training sessions as approximating a ‘half-day’ session of any type. For example, we included attending a workshop with a visiting expert, peer-to-peer discussions, and online and face-to-face training sessions.

Cross-tabulating the data for professional learning with those from reported confidence levels (Figure 8 below) for both outdoor learning and LfS shows a similar pattern.

Figure 8 shows us that as practitioners engage in more instances of professional learning (where an instance is a half-day or similar), confidence rises in both outdoor provision and Learning for Sustainability. This supports the view that professional practice changes with sustained learning over time (Cordingley et al. 2015).

Findings summary

In 2022, there was a noticeable decrease in outdoor learning provision by schools but an increase by early years settings. In 2022, though COVID restrictions continued to hold some sway in both sectors, we cannot take this as the sole factor. The notable decline in schools’ outdoor learning provision may be associated with lower confidence

in school sector staff and/or a lack of sustained professional learning in both the outdoor and LfS areas of the curriculum. In the early years sector, by comparison, practitioners' higher levels of engagement in professional learning in these areas are associated with the growing provision over time.

Limitations

The survey has some specific strengths and limitations that should be considered. A key strength was that our survey provided event-by-event data for provision during the same period of each survey year. This will ensure consistency and in-depth findings, but may mean that the provision reported is elevated compared to other times of the year. Second, our random sample is relatively small, and there is a small chance that participants took part because outdoor learning was of interest in the school, which again could have elevated reporting compared to other schools. Increasing the response rate in future research would provide more generalizable results. Comparisons between our findings and those of other countries are also challenging, as different countries have different nomenclatures and arrangements.

Discussion

Cross-sectional survey evidence shows that outdoor learning provision has changed over time. The survey is unique in that teachers provided data on an event-by-event basis for each 'lesson' or trip outdoors in any setting (excluding physical education) over an eight-week period in the warmer months in three snapshot years across over 1200 individual outdoor events or trips.

Our analysis suggests that there have been two main changes in outdoor learning provisions in Scotland. In the early years, we attempted to explain the increase in duration. The multifactorial support for outdoor provision here is likely linked to financial investment in the sector, extensive policy advice, inspection regimes, and the support of parents and the public. Another key factor is apparent: we evidenced that in the early years sector, practitioners also experienced *professional learning on outdoor provision and 'Learning for Sustainability'*. This was in contrast to the school sector, where a similarly strong ESD and outdoor learning policy is in place, though a shift towards a school-based attainment agenda may have nullified this to some degree (see below).

In schools, curricular legitimacy has been in place since 2010 (Learning and Teaching Scotland 2010). We think it is consequential that school-based staff received lower levels of professional learning. In our study, educator confidence in the delivery of LfS and OL appears to increase with professional learning, as does duration. Given that there is support for the *policy* stance to increase provision (White and King 2015), our findings suggest that the decline in schools' *practice* can be addressed *via* a research-informed and systematic approach to offering more opportunities for professional learning. This will require substantial input given the need for programs to be sustained over time to lead to changes in practice.

The diverging experiences seen in the two educational sectors – primary and early years – invite an analysis. In early years, building design meant there was greater

proximity between indoor and outdoor spaces, and approaches to facilitating learning may generally be more supportive of all forms of outdoor provision. In contrast, in primary schools, learning is frequently more structured, class-based, and classroom located. In early years and schools in Scotland, policy imperatives were equally strong but perhaps less well embraced as a priority in schools. In the early years, the Scottish Care Inspectorate stated that children should have *daily* opportunities outdoors to explore the natural environment (see Perlman et al. 2020). As noted by Waite (2020), the more direct and explicit a policy is, the more likely it is to impact provision. In contrast, Christie et al. (2014) suggested that the sophistication and ambition of policies across a wider variety of ends in schools may be too overwhelming and complicated.

Outside of policy, new alignments between setting types, catchment areas, and socio-cultural contexts have an impact. It is now commonplace for parents in Scotland to expect outdoor provision in the early years, but this would have been less the case a decade ago. However, in all three survey years, we saw lower socioeconomic catchment schools providing less time outside for learning than other schools. Since 2014, there has been sustained pressure on schools to respond to the poverty-related 'attainment gap'. By inference, the differing sectoral cultural, policy, and cultural contexts can be seen to filter effects, perhaps lowering the provision in schools already known to struggle to get outdoors. In the early years, explicit policy, robust, and widespread professional learning, aligned with wider cultural expectations, will likely have supported increases in provision, while in schools, these supports are less well aligned and other curriculum goals dominate.

Evidence indicates that, *inter alia*, better policy alignments and an expanded and robust approach to pre- and in-service professional learning for all sectors are needed for system-wide change. This is particularly true for schools. Outdoor time will also be needed as part of professional learning. Barrable et al. (2022) suggest that outdoor experiences for teacher education students will help develop confidence. Christie et al. (2019) also identify 'high quality professional learning' as an important route to developing teacher confidence in Learning for Sustainability. Our findings echo Nundy et al. (2009), who reported that a structured program of support for schoolteachers will securely build self-efficacy and teacher confidence in learning beyond the classroom. For system-wide changes, in-service provision will be more impactful than addressing pre-service provision alone. This is because pre-service teacher education programs bring a small number of new staff members into the system annually. For robust system-wide improvement, we recommend *on-going, in-service* professional learning in these areas for all staff, alongside targeted pre-service teacher education that looks to build skills, confidence and critical theoretical awareness in all teachers linking outdoor provisions and learning for sustainability. Literature shows that pre- and in-service programmes should include the known features of professional learning for OEE, be based on relevant theoretical frameworks, and address the known barriers to changing practice around outdoor and ESD areas in a linked manner.

Concerns about climate change and natural emergencies have been growing. In tandem, schools are increasingly called upon to address learner well-being alongside attainment and increasing detriments as a result of this emergency. Hence, the goals of raising attainment and developing resilience can be seen as both supporting and

competing with the provision for learning for OEE. Tensions exist with respect to what is prioritized, what kind of OEE we want in schools, and for what ends. Critics show that some outdoor provisions might not address environmental education's goals by 'connecting young people with nature' (Fletcher 2017; Larson et al. 2022), while promoting environmental stewardship (Ruck and Mannion 2021) or addressing the SDGs (Kopnina 2012) are also seen as problematic. In response to this, we offered one compelling direction based on a relational ontological argument for a more coherent OEE and the forms of professional learning that might support it during the CNE.

Conclusion

Our analysis suggests increases in early years and decreases in school-based outdoor learning provision in Scotland, within which sustainability concerns are grounded. Taken together, evidence from the literature and the survey suggests that career-long professional learning opportunities (amid an ecology of other supports) will help to support teachers build their confidence and understanding, leading to increased outdoor learning provision. Our theoretical insights suggest that professional learning in OEE can usefully draw from a diversity of relational ontological frameworks to enable teachers to gain vocabulary, knowledge, and skills related to both outdoor and sustainability issues to build their confidence in these areas.

This study underscores the need for support for longer durations and more consistent curriculum-linked outdoor learning opportunities in schools. The push and pull factors intermingling in local settings alongside wider cultural contexts (see Mannion et al. 2023) mean that a wide range of support is needed to overcome known barriers. Barriers to an OEE response in Scotland, such as limited time, access to outdoor areas, crowded curricula, resources, and concerns about health and safety, continue to hinder the regular integration of outdoor experience into the curriculum. Moreover, cultural factors such as ethnicity, gender, and socioeconomic background must be considered to ensure that outdoor learning is accessible and inclusive for all students; place responsiveness will need to be set alongside cultural responsiveness. Our analysis and consideration of the OEE field show that an expansive systematic approach to professional learning within a wider ecology of support for school-based OEE will be key parts of the solution.

Given the advantages of outdoor provision in environmental education and ESD, it is critical to employ a robust, theoretically informed position that brings these together. To this end, we showed that a family of connected place-responsive, post-humanist, feminist, multispecies, Indigenous, Traditional, and new materialist pedagogies offer a way forward. They support a move away from a concern *solely* with knowledge as content (knowing that or about nature), or as decontextualized skill (critical thinking) or a concern with building the self (human-centrism, such as becoming more physically active, self-confident, self-efficacious, or even 'connected to nature'). In response, we have argued for a more place-responsive OEE based on relational ontologies. One benefit of this would be the potential for increased concern for the environment based on less anthropocentric views or human exceptionalism or supremacy.

Anthropogenic climate change, with its associated extreme weather events and biodiversity loss demands, has altered human-nature reciprocity. CNE teaches that ecological and relational ontologies are not optional *worldviews*. The re-‘turn’ to the environment is to go back to where we have always been ontologically speaking. Being in and engaged in the world relationally is not a perspective to merely select, though it may be necessary to surface this experientially *via* emerging OEE pedagogies.

Understanding that no separate and discrete *worldviews* exist in which individuals act through autonomous agency but that *worlding* emerges through relational agency, teaching, and learning in outdoor experiential education can generate an intrinsic sense of responsibility to attend to more equitable relationships with Other(s) for/with/in these Anthropocene times. (Riley 2020, 88, italics added for ‘worldviews’).

At the time of CNE, we see value in linking professional learning for outdoor, environmental, and sustainability education. There are practical cost and time savings in taking such an approach, but also policy alignments, synergies in end goals, and calls from young people for this to occur. We have signposted how alignments in a range of new materialist and posthumanist relational ontologies can provide a principled basis for a more place-responsive OEE. This would support both professional learning and effective practice in OEE in contemporary times.

In summary, our theoretical argument, linked to our empirical findings, has been that relational ontological principles can inform a renewal of OEE at a time of CNE. With professional learning in support, we argue that such a renewal can move us towards new *relational* ways of being, knowing, and doing (see Quay 2017), with other generations beyond school (Mannion 2020), and with more than human entities and other species (Pedersen 2019; Kervinen et al. 2024) we share the planet with. A relationally principled, place-responsive OEE can provide opportunities for harnessing more than human agencies in outdoor pedagogies in critical ways. Place-responsivity can help us understand how local and extra-local contexts connect (for example, climate change and biodiversity loss). In doing so, a more place-responsive OEE offers scope to critically and distinctively support the goals of ESD and EE, addressing some of the complexities of the wicked problems that characterize the CNE in meaningful ways for learners.

Notes

1. Climate change is insufficient as a term. Instead, to capture connections to biodiversity loss, the mass extinction of species extinction and other environmental impacts we refer to the “climate and nature emergency” (CNE) through there are critiques of this emphasis from a postcolonial and Indigenous perspective (Whyte 2020).
2. We are aware our argument around new materialism is not so ‘new’. Outdoor educational experience has been to date often theoretically underpinned by a pragmatist-oriented concern with being an engaged participant in the *world* (Quay 2017). For Dewey, educational experience is an undergoing of an environment. Murris (2017) extends earlier pragmatist framings seeing learning as *worlding*, positions children as *part of the world* they share with other human and more-than-human others.
3. Research on pre-service learning for outdoor environmental and sustainability education highlights its importance and considers the issues involved. Our focus in this study is

on in-service teachers who represent a much larger proportion of the workforce with greater more immediate influence over practice.

Acknowledgements

We wish to acknowledge the contributions of many schools, teachers, and local authorities, who helped provide evidence of their practice

Author contributions

CRedit: **Greg Mannion**: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing – review & editing; **Claire Ramjan**: Investigation, Project administration, Writing – original draft, Writing – review & editing; **Stacey McNicol**: Formal analysis, Methodology; **Matthew Sowerby**: Methodology, Project administration, Writing – review & editing; **Paul Lambert**: Formal analysis, Methodology, Writing – review & editing.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This project was supported by funding from NatureScot with partners: Scottish Forestry, Historic Environment Scotland, Loch Lomond and The Trossachs National Park Authority and the Cairngorms National Park Authority. NatureScot is a public body of the Scottish Government responsible for the care of natural heritage sites.

ORCID

Greg Mannion  <http://orcid.org/0000-0003-2233-9278>
 Claire Ramjan  <http://orcid.org/0000-0002-1599-7195>
 Stacey McNicol  <http://orcid.org/0009-0005-1726-500X>
 Matthew Sowerby  <http://orcid.org/0009-0000-4061-200X>
 Paul Lambert  <http://orcid.org/0000-0002-3045-4172>

Data availability statement

The data set can be made available by the corresponding author by arrangement.

References

- Affifi, R. 2023. "Ecologising Education beyond Angels and Villains." *Environmental Education Research* 29 (6): 875–888. <https://doi.org/10.1080/13504622.2022.2108768>.
- Aksland, C., and S.-N. C. Rundgren. 2020. "5th-10th Grade in-Service Teachers' Pedagogical Content Knowledge (PCK) for Sustainable Development in Outdoor Environment." *Journal of Adventure Education and Outdoor Learning* 20 (3): 274–283. <https://doi.org/10.1080/14729679.2019.1697713>.
- Ardoin, N. M., A. W. Bowers, N. W. Roth, and N. Holthuis. 2018. "Environmental Education and K-12 Outcomes: A Review and Analysis of Research." *The Journal of Environmental Education* 49 (1): 1–17. <https://doi.org/10.1080/00958964.2017.1366155>.

- Ardoin, N. M., A. W. Bowers, and E. Gaillard. 2023. "A Systematic Mixed Studies Review of Civic Engagement Outcomes in Environmental Education." *Environmental Education Research* 29 (1): 1–26. <https://doi.org/10.1080/13504622.2022.2135688>.
- Asfeldt, M., R. Purc-Stephenson, and T. Zimmerman. 2022. "Outdoor Education in Canadian Post-Secondary Education: Common Philosophies, Goals, and Activities." *Journal of Outdoor and Environmental Education* 25 (3): 289–310. <https://doi.org/10.1007/s42322-022-00102-4>.
- Asterhan, C. S., and A. Lefstein. 2024. "The Search for Evidence-Based Features of Effective Teacher Professional Development: A Critical Analysis of the Literature." *Professional Development in Education* 50 (1): 11–23. <https://doi.org/10.1080/19415257.2023.2283437>.
- Ballantyne, R., D. D. Anderson, and J. Packer. 2010. "Exploring the Impact of Integrated Fieldwork, Reflective and Metacognitive Experiences on Student Environmental Learning Outcomes." *Australian Journal of Environmental Education* 26: 47–64. <https://doi.org/10.1017/S0814062600000823>.
- Ballard, H. L., A. J. Lindell, and C. C. Jadallah. 2024. "Environmental Education Outcomes of Community and Citizen Science: A Systematic Review of Empirical Research." *Environmental Education Research* 30 (6): 1007–1040. <https://doi.org/10.1080/13504622.2024.2348702>.
- Barfod, K., M. Bølling, L. Mygind, P. Elsborg, N. Ejbye-Ernst, and P. Bentsen. 2021. "Reaping Fruits of Labour: Revisiting Education Outside the Classroom Provision in Denmark upon Policy and Research Interventions." *Urban Forestry & Urban Greening* 60: 127044. <https://doi.org/10.1016/j.ufug.2021.127044>.
- Barrable, A., A. Touloumakos, and L. Lapere. 2022. "Exploring Student Teachers' Motivations and Sources of Confidence: The Case of Outdoor Learning." *European Journal of Teacher Education* 45 (3): 356–372. <https://doi.org/10.1080/02619768.2020.1827386>.
- Bell, A. C., and J. E. Dymont. 2008. "Grounds for Health: The Intersection of Green School Grounds and Health-Promoting Schools." *Environmental Education Research* 14 (1): 77–90. <https://doi.org/10.1080/13504620701843426>.
- Bellomo, A. 2020. "Outdoor Experience in Schoolyards Aimed at Widening Learning Opportunities." In *Renewing Middle School Facilities*, edited by M. Fianchini, 33–51. Cham: Springer International Publishing.
- Boeve-de Pauw, J., D. Olsson, T. Berglund, and N. Gericke. 2022. "Teachers' ESD Self-Efficacy and Practices: A Longitudinal Study on the Impact of Teacher Professional Development." *Environmental Education Research* 28 (6): 867–885. <https://doi.org/10.1080/13504622.2022.2042206>.
- Bögeholz, S. 2006. "Nature Experience and Its Importance for Environmental Knowledge, Values and Action: Recent German Empirical Contributions." *Environmental Education Research* 12 (1): 65–84. <https://doi.org/10.1080/13504620500526529>.
- Brookes, A. 1989. "Outdoor Education: Environmental Education Reinvented, or Environmental Education Reconceived?" *Australian Journal of Environmental Education* 5: 15–23. <https://doi.org/10.1017/S0814062600002111>.
- Ceder, S. 2018. *Towards a Posthuman Theory of Educational Relationality*. London: Routledge.
- Children's Parliament (Scotland). 2022. *Children's Parliament Investigates: Learning for Sustainability*. Edinburgh: Scottish Government. <https://www.childrensparliament.org.uk/our-work/learning-for-sustainability/> (Accessed 5th March 2025)
- Chawla, L. 2024. "Young People's Experiences of Participation in Ecological Restoration." *Environmental Education Research* 30 (6): 881–899. <https://doi.org/10.1080/13504622.2023.2203426>.
- Chawla, L. 2020. "Childhood Nature Connection and Constructive Hope: A Review of Research on Connecting with Nature and Coping with Environmental Loss." *People and Nature* 2 (3): 619–642. <https://doi.org/10.1002/pan3.10128>.
- Clarke, D. A., and J. Mcphie. 2020. "New Materialisms and Environmental Education." *Environmental Education Research* 26 (9-10): 1255–1265. <https://doi.org/10.1080/13504622.2020.1828290>.
- Christie, B., P. Higgins, B. King, M. Collacott, K. Kirk, and H. Smith. 2019. "From Rhetoric to Reality: Examining the Policy Vision and the Professional Process of Enacting Learning for Sustainability in Scottish Schools." *Scottish Educational Review* 51 (1): 44–56. <https://doi.org/10.1163/27730840-05101006>.

- Christie, B., P. Higgins, and P. McLaughlin. 2014. "Did You Enjoy Your Holiday?' Can Residential Outdoor Learning Benefit Mainstream Schooling?" *Journal of Adventure Education and Outdoor Learning* 14 (1): 1–23. <https://doi.org/10.1080/14729679.2013.769715>.
- Collins, M. A., V. F. Romero, A. Young, R. Dorph, J. Foreman, C. Strang, A. Pande, and V. Laina. 2025. "The Value of Outdoor Environmental Education Programs for Girls and Youth of Color: Cultivating Positive Dispositions toward Science and the Environment." *Environmental Education Research* 31 (1): 108–133. <https://doi.org/10.1080/13504622.2024.2340502>.
- Cordingley, P., S. Higgins, T. Greany, N. Buckler, D. Coles-Jordan, B. Crisp, L. Saunders, and R. Coe. 2015. *Developing Great Teaching: Lessons from the International Reviews into Effective Professional Development*. Teacher Development Trust. Available from: <https://tdtrust.org/wp-content/uploads/2015/10/DGT-Full-report.pdf> [Accessed 23 July 2025].
- Dale, R. G., R. B. Powell, M. J. Stern, and B. A. Garst. 2020. "Influence of the Natural Setting on Environmental Education Outcomes." *Environmental Education Research* 26 (5): 613–631. <https://doi.org/10.1080/13504622.2020.1738346>.
- Darling-Hammond, L., M. E. Hyler, and M. Gardner. 2017. *Effective Teacher Professional Development*. Palo Alto, CA: Learning Policy Institute.
- Ernst, J. 2014. "Early Childhood Educators' Use of Natural Outdoor Settings as Learning Environments: An Exploratory Study of Beliefs, Practices, and Barriers." *Environmental Education Research* 20 (6): 735–752. <https://doi.org/10.1080/13504622.2013.833596>.
- Fletcher, R. 2017. "Connection with Nature is an Oxymoron: A Political Ecology of 'Nature-Deficit Disorder.'" *The Journal of Environmental Education* 48 (4): 226–233. <https://doi.org/10.1080/00958964.2016.11395>.
- Frisk, E., and K. L. Larson. 2011. "Educating for Sustainability: Competencies & Practices for Transformative Action." *Journal of Sustainability Education* 2 (1): 1–20.
- Forde, C. and M. McMahon. 2019. "Teacher Professional Learning: Building Expertise Over a Teaching Career". In: *Teacher Quality, Professional Learning and Policy*, edited by C. Forde and M. McMahon, 139–166. London: Palgrave Macmillan.
- Fox, R., and G. Thomas. 2023. "Is Climate Change the 'Elephant in the Room' for Outdoor Environmental Education?" *Journal of Outdoor and Environmental Education* 26 (2): 167–187. <https://doi.org/10.1007/s42322-022-00119-9>.
- Füz, N. 2018. "Out-of-School Learning in Hungarian Primary Education: Practice and Barriers." *Journal of Experiential Education* 41 (3): 277–294. <https://doi.org/10.1177/1053825918758342>.
- Gal, A. 2024. "Strengths, Weaknesses, Opportunities and Threats: A SWOT Analysis of a Long-Term Outdoor Environmental Education Program in Israel." *Journal of Outdoor and Environmental Education* 27 (2): 321–339. <https://doi.org/10.1007/s42322-023-00125-5>.
- Gray, T., and D. Mitten. 2018. "Nourishing Terrains: Women's Contributions to Outdoor Learning Environments." In *The Palgrave International Handbook of Women and Outdoor Learning*, edited by T. Gray and D. Mitten, 3–17. London: Palgrave and Macmillan.
- General Teaching Council for Scotland. 2012. *The Standards for Registration: Mandatory Requirements for Registration with the General Teaching Council for Scotland*. Edinburgh: Scotland.
- Goodman, C. H. 2024. "(Re) Making Sense of Place in Outdoor Adventure Education." *Journal of Experiential Education* 47 (1): 111–134. <https://doi.org/10.1177/10538259231177619>.
- Imara, K., and F. Altinay. 2021. "Integrating Education for Sustainable Development Competencies in Teacher Education." *Sustainability* 13 (22): 12555. <https://doi.org/10.3390/su132212555>.
- Intergovernmental Panel on Climate Change (IPCC). 2014. *Climate Change 2014: Impacts, Adaptation, and Vulnerability (Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change)*. New York, NY: Cambridge University Press. <http://ipcc-wg2.gov/AR5/report/final-drafts/>
- IPPR Environmental Justice Commission. 2020. "Faster, Further, Fairer: Putting People at the Heart of Tackling the Climate and Nature Emergency." *Institute for Public Policy Research*, 27 May. <https://www.ippr.org/research/publications/faster-further-fairer>
- Isac, M. M., W. Sass, J. B. D. Pauw, S. De Maeyer, W. Schelfhout, P. Van Petegem, and E. Claes. 2022. "Differences in Teachers' Professional Action Competence in Education for Sustainable

- Development: The Importance of Teacher co-Learning." *Sustainability* 14 (2): 767. <https://doi.org/10.3390/su14020767>.
- Jones, K. 2023. "Introduction". In *Innovation in teacher professional learning in Europe: Research, policy and practice*, edited by K. Jones, G. Ostinelli, and A. Crescentini, 1–5. Abingdon: Routledge.
- Jukes, S., and Y. Reeves. 2020. "More-than-Human-Stories: Experimental co-Productions in Outdoor Environmental Education Pedagogy." *Environmental Education Research* 26 (9-10): 1294–1312. <https://doi.org/10.1080/13504622.2019.1699027>.
- Kerr, K. 2020. "Teacher Development through Coteaching Outdoor Science and Environmental Education across the Elementary-Middle School Transition." *The Journal of Environmental Education* 51 (1): 29–43. <https://doi.org/10.1080/00958964.2019.1604482>.
- Kervinen, A., R. Hohti, P. Rautio, M. H. Saari, T. Tammi, and T. Aivelo. 2024. "Ratty Places–Unsettling Human-Centeredness in Ecological Inquiry with Young People." *Environmental Education Research* 30 (7): 1129–1146. <https://doi.org/10.1080/13504622.2024.2314037>.
- Kopnina, H. 2012. "Education for Sustainable Development (ESD): The Turn Away from 'Environment' in Environmental Education?" *Environmental Education Research* 18 (5): 699–717. <https://doi.org/10.1080/13504622.2012.658028>.
- Kos, M., and J. Jerman. 2013. "Provisions for Outdoor Play and Learning in Slovene Preschools." *Journal of Adventure Education & Outdoor Learning* 13 (3): 189–205. <https://doi.org/10.1080/14729679.2013.769888>.
- Larson, B. M., B. Fischer, and S. Clayton. 2022. "Should we Connect Children to Nature in the Anthropocene?" *People and Nature* 4 (1): 53–61. <https://doi.org/10.1002/pan3.10267>.
- Lauterbach, G., M. Bølling, and U. Dettweiler. 2024. "Education Outside the Classroom in Norway: The Prevalence, Provision, and Nature of Uteskole." *International Journal of Educational Research* 125: 102349. <https://doi.org/10.1016/j.ijer.2024.102349>.
- Learning and Teaching Scotland. 2010. *Curriculum for Excellence through Outdoor Learning*. Edinburgh: Learning and Teaching Scotland.
- Lloyd, A., S. Truong, and T. Gray. 2018. "Place-Based Outdoor Learning: More than a Drag and Drop Approach." *Journal of Outdoor and Environmental Education* 21 (1): 45–60. <https://doi.org/10.1007/s42322-017-0002-5>.
- Lynch, J., and G. Mannion. 2021. "Place-Responsive Pedagogies in the Anthropocene: Attuning with the More-than-Human." *Environmental Education Research* 27 (6): 864–878. <https://doi.org/10.1080/13504622.2020.1867710>.
- Malberg, D. P., and K. Wistoft. 2018. "Wellbeing in School Gardens: The Case of the Gardens for Bellies Food and Environmental Education Program." *Environmental Education Research* 24 (8): 1177–1191. <https://doi.org/10.1080/13504622.2018.1434869>.
- Mallette, A., S. Heaney, B. McGlynn, S. Stuart, S. Witkowski, and R. Plummer. 2024. "Outdoor Education, Environmental Perceptions, and Sustainability: Exploring Relationships and Opportunities." *Journal of Outdoor and Environmental Education* 5: 1–16. <https://doi.org/10.1007/s42322-024-00162-8>.
- Mann, J., T. Gray, S. Truong, E. Brymer, R. Passy, S. Ho, P. Sahlberg, et al. 2022. "Getting out of the Classroom and into Nature: A Systematic Review of Nature-Specific Outdoor Learning on School Children's Learning and Development." *Frontiers in Public Health* 10: 877058. <https://doi.org/10.3389/fpubh.2022.877058>.
- Mannion, G., A. Fenwick, and J. Lynch. 2013. "Place-Responsive Pedagogy: Learning from Teachers' Experiences of Excursions in Nature." *Environmental Education Research* 19 (6): 792–809. <https://doi.org/10.1080/13504622.2012.749980>.
- Mannion, G., L. Mattu, and M. Wilson. 2015. *Teaching, Learning, and Play in the Outdoors: A Survey of School and Pre-School Provision in Scotland*. Scottish Natural Heritage. <https://www.nature.scot/doc/naturescot-commissioned-report-779-teaching-learning-and-play-outdoors-survey-school-and-pre-school>
- Mannion, G., C. Ramjan, S. McNicol, M. Sowerby, and P. Lambert. 2023. *Teaching, Learning and Play in the Outdoors: A Survey of Provision in 2022*. NatureScot Research Report 1313. <https://www.nature.scot/doc/naturescot-research-report-1313-teaching-learning-and-play-outdoors-survey-provision-scotland-2022>

- Mannion, G. 2020. "Re-Assembling Environmental and Sustainability Education: Orientations from New Materialism." *Environmental Education Research* 26 (9-10): 1353–1372. <https://doi.org/10.1080/13504622.2018.1536926>.
- Mikaels, J. 2018. "Becoming a Place-Responsive Practitioner: Exploration of an Alternative Conception of Friluftsliv in the Swedish Physical Education and Health Curriculum." *Journal of Outdoor Recreation, Education, and Leadership* 10 (1): 3–19. <https://doi.org/10.18666/JOREL-2018-V10-I1-8146>.
- Miller, N. C., S. Kumar, K. L. Pearce, and K. L. Baldock. 2021. "The Outcomes of Nature-Based Learning for Primary School Aged Children: A Systematic Review of Quantitative Research." *Environmental Education Research* 27 (8): 1115–1140. <https://doi.org/10.1080/13504622.2021.1921117>.
- Morse, P. 2021. "Flowing Magma Bodies: Towards a Relational Understanding of Imaginative Pedagogical Possibilities." *Environmental Education Research* 27 (8): 1229–1244. <https://doi.org/10.1080/13504622.2021.1926432>.
- Moser, T., and M. T. Martinsen. 2010. "The Outdoor Environment in Norwegian Kindergartens as Pedagogical Space for Toddlers' Play, Learning and Development." *European Early Childhood Education Research Journal* 18 (4): 457–471. <https://doi.org/10.1080/1350293X.2010.525931>.
- Morris, K. 2017. "Reconfiguring educational relationality in education: The educator as pregnant stingray." *Journal of Education* 69: 117–138.
- Natural England. 2012. *Learning in the Natural Environment: Review of Social and Economic Benefits and Barriers*. Natural England Commissioned Report NECR092.
- Nielsen, G., E. Mygind, M. Bølling, C. Otte, M. Schneller, J. Schipperijn, N. Ejbye-Ernst, and P. Bentsen. 2016. "A Quasi-Experimental Cross-Disciplinary Evaluation of the Impacts of Education outside the Classroom on Pupils' Physical Activity, Well-Being and Learning: The TEACHOUT Study Protocol." *BMC Public Health* 16 (1): 1117. <https://doi.org/10.1186/s12889-016-3780-8>.
- Nundy, S., J. Dillon, and P. Dowd. 2009. "Improving and Encouraging Teacher Confidence in out-of-Classroom Learning: The Impact of the Hampshire Trailblazer Project on 3–13 Curriculum Practitioners." *Education 3-13* 37 (1): 61–73. <https://doi.org/10.1080/03004270802291889>.
- Nusche, D., M. Rabella, and S. Lauterbach. 2024. "Rethinking Education in the Context of Climate Change: Leverage Points for Transformative Change." *OECD Education Working Papers* 307: 1–71.
- Nxumalo, F., and P. Montes. 2023. "Encountering Creative Climate Change Pedagogies: Cartographic Interruptions." *Research in Education* 117 (1): 42–57. <https://doi.org/10.1177/00345237231207493>.
- O'Dwyer, A. 2021. "Exploring Climate Change Education outside the Classroom." In *Teaching Climate Change in Primary Schools*, edited by A. Dolan, 138–151. London: Routledge.
- One Planet Schools Working Group. 2012. *Learning for Sustainability: The Report of the One Planet Schools Working Group*. Edinburgh, Scotland: Scottish Government.
- Palmberg, I., M. Hofman-Bergholm, E. Jeronen, and E. Yli-Panula. 2017. "Systems Thinking for Understanding Sustainability? Nordic Student Teachers' Views on the Relationship between Species Identification, Biodiversity and Sustainable Development." *Education Sciences* 7 (3): 72. <https://doi.org/10.3390/educsci7030072>.
- Passy, R., and I. Blackwell. 2022. "Natural Connections: Learning about Outdoor-Based Learning." In *High-Quality Outdoor Learning: Evidence-Based Education outside the Classroom for Children, Teachers and Society*, edited by R. Jucker, J. von Au, 321–334. Cham: Springer International Publishing.
- Paulsen, M. 2023. "Outdoor Environmental Education in the Anthropocene: Beyond in/out." In *Outdoor Environmental Education in the Contemporary World*, edited by Jan Činčera, Bruce Johnson, Daphne Goldman, Iris Alkaher and Michal Medek, 95–108. Cham: Springer International Publishing.
- Pedersen, K. W. 2017. "Supporting Collaborative and Continuing Professional Development in Education for Sustainability through a Communities of Practice Approach." *International Journal of Sustainability in Higher Education* 18 (5): 681–696.

- Pedersen, H. 2019. "The Contested Space of Animals in Education: A Response to the "Animal Turn" in Education for Sustainable Development." *Education Sciences* 9 (3): 211. <https://doi.org/10.3390/educsci9030211>.
- Perlman, M., N. Howe, and C. Bergeron. 2020. "How and Why Did Outdoor Play Become a Central Focus of Scottish Early Learning and Care Policy?" *Canadian Journal of Environmental Education* 23 (2): 46–66.
- Prince, H. E., and O. Diggory. 2024. "Recognition and Reporting of Outdoor Learning in Primary Schools in England." *Journal of Adventure Education and Outdoor Learning* 24 (4): 553–565. <https://doi.org/10.1080/14729679.2023.2166544>.
- Puig de la Bellacasa, M. 2017. *Matters of Care: Speculative Ethics in More than Human Worlds* (Vol. 41). Minneapolis: University of Minnesota Press.
- Reid, A. 2020. "Researching Environmental and Sustainability Education Policy: Slumbers and Awakenings." *Journal of Philosophy of Education* 54 (4): 838–865. <https://doi.org/10.1111/1467-9752.12474>.
- Ribó, I. 2024. "Developing More-than-Human Sustain-Abilities in the Ecocritical Classroom." *Environmental Education Research* 30 (9): 1587–1603. <https://doi.org/10.1080/13504622.2024.2341171>.
- Quay, John, Tonia Gray, Glyn Thomas, Sandy Allen-Craig, Morten Asfeldt, Søren Andkjær, Simon Beames, et al. 2020. "What Future/s for Outdoor and Environmental Education in a World That Has Contended with COVID-19?" *Journal of Outdoor and Environmental Education* 23 (2): 93–117. <https://doi.org/10.1007/s42322-020-00059-2>.
- Quay, J. 2017. "From Human-Nature to Cultureplace in Education via an Exploration of Unity and Relation in the Work of Peirce and Dewey." *Studies in Philosophy and Education* 36 (4): 463–476. <https://doi.org/10.1007/s11217-016-9507-6>.
- Riley, K. 2020. "Posthumanist and Postcolonial Possibilities for Outdoor Experiential Education." *Journal of Experiential Education* 43 (1): 88–101. <https://doi.org/10.1177/1053825919881784>.
- Riley, K., S. Jukes, and P. Rautio. 2024. "Relational Ontologies and Multispecies Worlds: Transdisciplinary Possibilities for Environmental Education." *Australian Journal of Environmental Education* 40 (2): 95–107. <https://doi.org/10.1017/aee.2024.23>.
- Roche, Joseph, Laura Bell, Cecília Galvão, Yaela N. Golumbic, Laure Kloetzer, Niek Knoben, Mari Laakso, et al. 2020. "Citizen Science, Education, and Learning: Challenges and Opportunities." *Frontiers in Sociology* 5: 613814. <https://doi.org/10.3389/fsoc.2020.613814>.
- Ruck, A., and G. Mannion. 2021. "Stewardship and beyond? Young People's Lived Experience of Conservation Activities in School Grounds." *Environmental Education Research* 27 (10): 1502–1516. <https://doi.org/10.1080/13504622.2021.1964439>.
- Rushton, E. A. C., and N. Walshe. 2025. "Curriculum Making and Climate Change and Sustainability Education: A Case Study of School Teachers' Practices from England, UK." *Environmental Education Research* 31 (5): 1083–1097. <https://doi.org/10.1080/13504622.2025.2471990>.
- Sandell, K., and J. Öhman. 2010. "Educational Potentials of Encounters with Nature: Reflections from a Swedish Outdoor Perspective." *Environmental Education Research* 16 (1): 113–132. <https://doi.org/10.1080/13504620903504065>.
- Sidebottom, K., and L. Mycroft. 2024. "[Birdsong]: Pedagogies of Attunement and Surrender with More-than-Human Teachers." *Australian Journal of Environmental Education* 40 (2): 143–156. <https://doi.org/10.1017/aee.2024.15>.
- Stern, M. J., R. B. Powell, and N. M. Ardoin. 2008. "What Difference Does It Make? Assessing Outcomes from Participation in a Residential Environmental Education Program." *The Journal of Environmental Education* 39 (4): 31–43. <https://doi.org/10.3200/JOEE.39.4.31-43>.
- Stewart, A. 2020. *Developing Place-Responsive Pedagogy in Outdoor Environmental Education: A Rhizomatic Curriculum Autobiography*. Vol. 17. Cham: Springer.
- Sosu, E., and S. Ellis. 2014. *Closing the Attainment Gap in Scottish Education*. York: Joseph Rowntree Foundation.

- Tuck, E., K. McCoy, and M. Mckenzie. 2014. "Land Education: Indigenous, Post-Colonial, and Decolonizing Perspectives on Place and Environmental Education Research." *Environmental Education Research* 20 (1): 1–23. <https://doi.org/10.1080/13504622.2013.877708>.
- United Nations Educational, Scientific and Cultural Organization. 2020. "Education for Sustainable Development: A Roadmap." <https://en.unesco.org/themes/education-sustainable-development/toolbox>
- Waite, S. 2020. "Where Are we Going? International Views on Purposes, Practices and Barriers in School-Based Outdoor Learning" *Education Sciences* 10 (11): 311. <https://doi.org/10.3390/educsci10110311>.
- Ward, K., R. Birch, T. MacDonald, M. Beresford-Dey, L. Lakin, M. Purcell, and B. Searle. 2023. *Learning for Sustainability: Young People and Practitioner Perspectives*. Edinburgh: Scottish Government.
- Wattchow, B., and M. Brown. 2011. *A Pedagogy of Place: Outdoor Education for a Changing World*. Monash: Monash University Publishing.
- Wells, N. M., and K. S. Lekies. 2006. "Nature and the Life Course: Pathways from Childhood Nature Experiences to Adult Environmentalism." *Children, Youth and Environments* 16 (1): 1–24. <https://doi.org/10.1353/cye.2006.0031>.
- White, R. M., and B. B. King. 2015. "Mapping Opportunities for Learning for Sustainability in Scotland." Report for Learning for Sustainability Scotland, Scotland's UN RCE for ESD. Edinburgh: Learning for Sustainability Scotland. Available online at: <http://learningforsustainabilityscotland.org/wp-content/uploads/2019/09/Dec-2015-Mapping-LfS-opportunities-report.pdf> (accessed March 2025).
- Whyte, K. 2020. "Too Late for Indigenous Climate Justice: Ecological and Relational Tipping Points." *WIREs Climate Change* 11 (1): E 603. <https://doi.org/10.1002/wcc.603>.
- Wishart, L., and E. Rouse. 2019. "Pedagogies of Outdoor Spaces: An Early Childhood Educator Professional Learning Journey." *Early Child Development and Care* 189 (14): 2284–2298. <https://doi.org/10.1080/03004430.2018.1450250>.