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Growing among Trees: a 12-month process evaluation of school based outdoor learning interventions

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ABSTRACT

A wealth of evidence shows that exposure to the natural environment and nature-based learning can benefit children's physical, mental, social, and emotional health. Despite this, children are spending less time in nature and nature-based learning remains an underutilised pedagogical tool. Several barriers are frequently reported by teachers, including curriculum and time pressures, confidence, safety, cost and access to training and resources. There is a need to better understand and address these common concerns if nature-based learning is to be implemented more widely. Growing among Trees was a 12-month pilot project where community forest and woodland outreach interventions were delivered in urban schools. This process evaluation gathered data from various stakeholders (including pupils, teachers, and intervention providers) before, during and following the interventions delivered at each school. This study provides important insight into how school-based outdoor learning interventions could be implemented to increase the likelihood that they are replicable and sustainable.

Introduction

A wealth of evidence shows that exposure to the natural environment and nature-based learning can benefit children's physical, mental, social, and emotional health (Maller & Townsend, 2006; Pretty et al., 2009; Rickinson et al., 2004; Schneller et al., 2017). Immersion in nature can have a positive impact on health, wellbeing, creativity, attention capacity and one's ability to connect with others (Becker, Lauterbach, Spengler, Dettweiler, & Mess, 2017; Bølling, Otte, Elsborg, Nielsen, & Bentsen, 2018; Deighton et al., 2013; Gustafsson, Szczepanski, Nelson, & Gustafsson, 2012; Wells, 2000). Children who take part in outdoor learning commonly report having a positive and enjoyable experience, and teachers report that being outdoors facilitates pupil learning (Christie, Beames, & Higgins, 2016; Marchant et al., 2019; Maynard, Waters, & Clement, 2013). The enriching experience of outdoor learning can also lead to significant improvements in children's mood and wellbeing, which are sustained across the academic year (Harvey et al., 2020).

Despite this, children are spending less time in nature and nature-based learning remains an underutilised pedagogical tool (Hunt, Stewart, Burt, & Dillon, 2016; Marchant et al., 2019). It has been argued that children growing up in the UK today are more disconnected from nature than any previous generation (Bragg, Wood, Barton, & Pretty, 2013; Harvey et al., 2020). The People and Nature Survey for England suggests 18% of children spend time in nature less than once per week (Office for National Statistics, 2021). Concerns over safety, traffic and crime, as well as increasing reliance on

technology have been put forward to explain children's diminishing access to nature (Fiennes et al., 2015; Marchant et al., 2019). As such, Marchant et al. (2019) argue that school settings hold the greatest potential to provide children with access to the natural environment.

In recent years, there has been a growing investment in school-based outdoor learning programmes in England (with, for instance, Natural Connections Demonstration Project, and Nature Friendly Schools). Despite this increasing recognition at a policy level, outdoor learning remains an underutilised tool (Marchant et al., 2019; Van Dijk-Wesselius, van Den Berg, Maas, & Hovinga, 2020). There are several barriers which are commonly reported by teachers, which lead to a reluctance to take advantage of outdoor learning. Teachers commonly report lacking confidence due to a lack of experience and knowledge, and feel that national curriculums do not endorse outdoor learning for the majority of teaching activities (Marchant et al., 2019; Oberle, Zeni, Munday, & Brussoni, 2021; Van Dijk-Wesselius et al., 2020). Other barriers include a lack of time and inspiration, a fear of losing control of pupil behaviour, and equipment or weather constraints (Bentsen, Jensen, Mygind, & Randrup, 2010; Edwards-Jones, Waite, & Passy, 2018; Fägerstam, 2014; Oberle et al., 2021; Van Dijk-Wesselius et al., 2020). There is a need to better understand and address these common concerns if nature-based learning is to be implemented more widely.

Growing among Trees was a 12-month pilot project where community forest and woodland outreach (CFWO) interventions were delivered in urban schools. The aim of the project was to create a model for efficient, effective, transformational change in urban schools, which gives pupils the opportunity for everyday connection with trees and woods. The pilot was testing what works well (and what does not) through delivery of community forest and woodland outreach projects with nine urban schools. This evaluation gathered data from various stakeholders (including pupils, teachers and the Growing among Trees intervention providers) before, during and following the interventions delivered at each school. Through combining data from these multiple perspectives and by examining the implementation of a variety of outdoor learning interventions delivered across nine diverse settings, this study sought to gain valuable evidence for how school-based outdoor learning interventions could be implemented to increase the likelihood that they are replicable and sustainable.

Materials and methods

Interventions

Growing among Trees engaged nine schools in Islington, Greenwich, and Reading, comprising six primary, one secondary, and two special schools. The project was delivered by a consortium of five practitioners: Trees for Cities (project lead), Nature Nurture CIC, The Garden Classroom, Sensory Trust and Green Schools Project. The quantity and type of interventions delivered varied between each participating school. Primary schools 1–3 received a breadth of interventions, whereas schools 4–6 received just one intervention. The single secondary school received several interventions, whereas both special schools received a single intervention. The varied level of delivery that took place at each school allowed comparisons to be drawn between schools. These comparisons explored whether varying levels of delivery resulted in differing outcomes to pupils, teachers, and schools. The level of delivery at each school and a description of each intervention delivered is presented in Appendix A.

Participants and procedures

A 12-month process evaluation examined the experiences of teachers, pupils, and intervention providers at various stages throughout the project. A project monitoring framework was used to collect the required information and utilised a breadth of data sources (including meeting and observation notes, focus groups and interviews). Observations were conducted throughout each

intervention and in-situ feedback was collected from participants (teachers, pupils, and providers). This captured the participant's views of each intervention, the impact of each intervention, any unforeseen benefits, any areas for further development, and any barriers that were either perceived or explicitly reported. Following the conclusion of the entire programme of interventions, teachers from each participating school took part in a semi-structured interview. Interviews explored the impact of the project on the school, the teachers, and their pupils. Further, they examined any issues that arose throughout the project, any barriers which this project helped to overcome, and any barriers which were present before the project and remained. To conclude the data collection, each partner organisation took part in a focus group. These focus groups sought to understand the implementation of the Growing among Trees project. Specifically, they probed the factors that supported or hindered delivery, and the replicability and sustainability of the pilot.

Method of analysis

Data were analysed using inductive thematic analysis and followed the principles outlined by Braun and Clarke (2006, 2014). At a basic level, thematic analysis is 'a method for identifying patterns ("themes") in a dataset, and for describing and interpreting the meaning and importance of those' (Braun, Clarke, & Weate, 2016, p. 192). Braun et al. (2016) note a strength of thematic analysis is that it suits a wide range of qualitative research questions—It can provide analyses of people's experiences, identify processes which underlie or influence a behaviour, reveal patterns in people's practices related to their views and perspectives, and can determine ways an issue or topic is represented. Terry, Hayfield, Clarke, and Braun (2017) explain that the flexibility of thematic analysis position it as a suitable technique for a wide range of data types (i.e. focus groups, interviews and observations). There were six stages to the analytical procedure. In step 1, the researcher collated, transcribed, read, and re-read the data. Throughout this process the researcher became familiar with the data and created notes of preliminary themes of interest throughout the process. Following this process (in step 2), the transcripts were systematically coded through a process of line-by-line reading and highlighting of interesting features within the data. During step 3, codes were collated into themes and supporting quotes were attached to each theme. In the following stage (step 4), each theme was reviewed and refined. Certain themes were retired if they did not possess adequate data to support their inclusion. At stage 5, each theme was further refined, provided a definition and given a name of reference. Finally (in stage 6), each theme and supporting evidence (in the form of quotes) were shared among intervention providers for debate, further refinement, and confirmation. At this stage, leading quotes were selected which best elucidated the topic of interest, and these were used to explain and interpret each theme.

Results

Project impact and improvement processes

The outcomes achieved at each school reflected the level of delivery that took place. Schools that received a higher level of delivery reported a number of positive outcomes, whereas those that received minimal delivery reported just a few, albeit important, benefits. Tables 1-3 show the outcomes and insights (themes) generated at the primary, special and secondary schools respectively, described below:

Pupils and teachers across all six primary schools reported a breadth of positive emotions following the activities, such as happiness, appreciation, and excitement. The sessions were influential in sparking creativity and imagination among pupils and the interventions engaged pupils and staff in a way that staff felt was unique to outdoor learning. As a result, teachers in all schools reported that the level of engagement achieved through the outdoor sessions delivered by Growing among Trees practitioners enhanced the learning experience for pupils.

Table 1. Summary of interventions and outcomes at each primary school (PS).

School	Delivered Interventions	Themes
PS1	(1) 4 half day sessions with pupils (2) Forest School teacher training (3) Tree Identification (4) Tree Planting (5) Tree Assembly	(1) Positive affect (students and teachers) (2) Boosting creativity and imagination (3) Strong engagement (4) Enhanced learning experience, skill, and knowledge development (5) Excitement for future sessions and knowledge application
PS2	(1) 6 half day Wild Teaching sessions with pupils (2) Audit of species and defining Wild Teaching zones (3) Tree Planting Workshop	(1) Positive affect (students and teachers) (2) Boosting creativity and imagination (3) Strong engagement (4) Enhanced learning experience, skill, and knowledge development (5) Pedagogical impact (6) Improvement processes
PS3	(1) 5 half day Wild Teaching sessions with pupils (2) Wild Assembly (3) Audit of species and defining Wild Teaching zones (4) Tree Planting Workshop (x2) (5) Wild Teacher Training	(1) Positive affect (students and teachers) (2) Strong engagement (3) Enhanced learning experience, skill, and knowledge development (4) Excitement for future sessions and knowledge application (5) Pedagogical impact (6) Improvement processes
PS4	Urban Forest School teacher training	(1) Positive affect (teachers) (2) Strong engagement (3) Excitement for knowledge application (4) Pedagogical impact
PS5	Urban Forest School teacher training	(1) Positive affect (teachers) (2) Strong engagement (3) Pedagogical impact
PS6	Audit of species and defining Wild Teaching zones	(1) Positive affect (teachers) (2) Strong engagement (3) Pedagogical impact

Table 2. Summary of interventions and outcomes at each special school (SpS).

School	Delivered Interventions	Themes
SpS1	(1) Audit of natural assets	(1) Increased recognition of benefits (2) Improvement processes
SpS2	(1) Audit of natural assets	(1) Improved awareness of provision (2) Improvement processes

Table 3. Summary of interventions and outcomes at each secondary school (SS).

	Delivered Interventions	Themes
SS1	(1) Launch assembly (2) Tree Planting (3) Teacher training (4 sessions)	(1) Positive affect (students and staff) (2) Strong engagement (3) Enhanced learning experience, skill, and knowledge development (4) Pedagogical impact (5) Improvement processes

"[The pupils] were so focused, [displaying] fine motor skills, communication skills, using tools, sharing, collaborating, and working together. I was watching their faces, they were so determined, and everyone joined in. They were completely engrossed in making music [using] gross motor skills. There was some real talent emerging. These activities are important for writing too. It gives them so many ideas, it helps them to be more creative. They were inspired by nature, by music, by the trees." – Primary school teacher

Throughout the outdoor learning activities, pupils and teachers were excited to apply what they had learned. The practitioners saw evidence of this throughout their time at the schools. The interventions had a wide-ranging, immediate impact on teaching in all the high delivery primary schools. In certain cases, the learning benefitted teaching practices, with one school adapting

sessions to a nursery class. In another school, the Growing among Trees session generated a boost in attendance, which was linked to the level of engagement and enjoyment that the sessions had achieved. In all schools, the skills and practices learned were shared across the whole school. One school took the decision to use the natural space created for regular teaching outdoors.

> "You have all been so supportive and the attendees are full of praise and excitement following the sessions. [The practitioner] has even taught me a new game which we adapted and played with nursery on Tuesday." – Primary school teacher

> 'They decided that they would use this space as the "mini-beast safari" at least one morning a week. They made a note of the equipment I had so they could source similar. In a "penny drop" moment [the Deputy Head] noted: "we don't need to go to a woodland elsewhere as we have that right here in our school grounds".'—Growing among Trees practitioner

Through thematic analysis of the observation notes and feedback from teachers, pupils and practitioners, several processes were identified that required careful adjustment to increase the impact of the interventions. These processes fit into three categories: operational planning (logistics of time and equipment), teacher engagement, and support to increase teacher confidence in replicating interventions to the same high standard. Teachers suggested that the provision of bespoke, practical teaching resources would help guide them in replicating the activities. This would complement teacher training and facilitate the transition from practitioner-led to teacher-led delivery so that activities could continue beyond the duration of this project.

> "Many of the teaching staff said although they recognise the value of learning outside the classroom, they do not have the time to research relevant [teaching] resources. Even when they have tried to do so, they are 'swamped' by all the resources that are available online." – Growing among Trees practitioner

Two significant barriers arose throughout the delivery at the special schools: lack of natural resources and lack of teacher confidence. At one school, the level of natural resource was limited, and staff lacked confidence to make the school grounds more natural due to the perceived health and safety risks to pupils. Without natural assets, this school faced real challenges to delivering outdoor learning.

> "The school grounds are very limited and not natural. Staff confidence was very low when it comes to using the outdoors. They also raised concerns about going off site to nearby spaces and the challenges this would present. The roads surrounding the school are busy and provide many distractions for the students." - Growing among Trees practitioner

Given these barriers, it was deemed necessary to deliver sessions within the school grounds. This school needed clear guidance on how to create a more natural environment that would help build teacher confidence to teach outdoors.

The secondary school that took part in this project received several interventions and achieved a number of benefits. The interventions engaged pupils and staff in a way that staff felt was unique to outdoor learning and the creativity generated in primary schools was applicable to older children. Resonating with the feedback from primary schools, there was evidence of impact on teaching practices emanating from the secondary school interventions. The interventions provided teachers with the knowledge and confidence to apply a new way of teaching and this school was inspired to embed outdoor learning as an essential component of teaching children with special educational needs within mainstream education.

> "I now feel confident to lead outdoor learning/nature connection sessions with groups of young people. My newly developed knowledge and understanding of nature connection pedagogies, theories and ideas has equipped me with the knowledge and skills necessary to deliver a much broader range of outdoor learning opportunities than I currently offer my students." – Secondary school teacher

The interventions delivered in the secondary school, like those delivered in primary and special schools, identified several processes that required careful attention to ensure the benefits of outdoor learning could be realised. In one instance, a teacher lacked confidence in replicating activities without hands on guidance on how to deliver them with pupils present. Echoing findings from other schools, the secondary school felt they lacked equipment, specifically clothing and footwear, to teach in a natural environment and felt children would behave badly or disengage during outdoor lessons. These barriers lowered teacher confidence to teach outdoors.

Sustainability and replicability of outdoor teaching

The likelihood that nature-based learning would continue beyond the pilot varied based on the number of interventions that took place at each school. In the primary schools that received several interventions, there were several indicators that suggest outdoor learning will continue. The activities had helped teachers overcome perceptions they held about outdoor learning. Initially, some teachers did not see the value of outdoor learning and worried that children would behave badly when taking part in unfamiliar activities. As the project progressed, it became clear to teachers that these perceptions were unfounded.

> "Before it started I was apprehensive, but when the practitioner was doing activities and I saw how independent and how capable [the pupils] were, it made me realise that I could have pushed the boundaries a little bit more with them." - Teacher

Initially, some teachers lacked confidence in taking children outdoors. During the early stages of the interventions, the practitioners provided extensive support to teachers and mainly delivered the sessions themselves with teachers watching and learning. Over time, the practitioners gradually reduced the level of support as teachers become more able and confident. This structured approach was essential for building teacher confidence.

> "I've always been really keen on outdoor education but I've become really nervous about how to actually implement it. I personally wasn't confident in taking them outside. But I've learned how easy it is to do it. And I've learned to be more resilient as a teacher." - Teacher

Some specific challenges lowered teacher confidence during the early pupil interventions, for example, getting pupils dressed quickly in wellies and waterproofs. Over time, however, these issues were resolved as pupils and teachers became more familiar with what was required. The process of overcoming challenges as they occurred through a supportive delivery approach was vital for helping teachers build confidence to overcome initial barriers.

> "I remember that chaotic first day of putting on their wellies and their waterproofs. But it was amazing to see that they actually did get so quick at it, they were so independent. And it makes me feel like it's something that we can now do as teachers. I feel confident about how to plan for it, about little mistakes that happen when you're outside. I think we can use those as teachable moments. It's definitely helped me with confidence and understanding of how it can apply to everything." - Teacher

Robust planning and preparation, by practitioners and teachers, was fundamental to the success of the interventions. During the early stages of delivery, practitioners lacked time for forward planning and preparation, which was detrimental to the activities. Over the course of the pilot, however, the practitioners and teachers swiftly integrated early learning to improve their planning and preparation for future interventions. Practitioners need sufficient time to work with teachers to prepare so that the limited time available for delivery of interventions is best utilised.

There was a strong expectation that outdoor learning would be embedded beyond the project at the high delivery primary schools. This sustainability stemmed from the positive experience generated in each of the schools, the smoother delivery over time, and the altered perceptions of school staff. There was a strong sense, however, that bespoke teaching resources (such as lesson plans)

would be vital to help the transition from facilitated to independent delivery. Despite becoming more confident in teaching outdoors themselves, teachers felt these resources would be a useful bridge to help them remember and apply what they had learned.

The findings from the schools that received a low number of interventions were mixed. The teachers had a positive experience, however, the longer-term sustainability of outdoor learning at these schools is uncertain. At one school, teachers felt they were struggling to maintain their current teaching provision and would try to continue with outdoor learning when normality returned to schools (post-pandemic), whereas others expressed a desire to continue the programme. There was, however, one school that stood out. Having taken part in Forest School teacher training, staff at this school regarded outdoor learning as a solution to the Covid-19 problem, rather than an additional burden, and had already begun to implement outdoor learning with children of key workers who had continued to go to school throughout the pandemic.

> "Even though we only had our key worker children in, we used the practitioner's teachings and resources. We actually had a week of outdoor learning with the teacher who was on the training. Every afternoon she did a small activity in our playground." – Teacher

The bespoke resources that were sent to the school to help them transition to independent delivery had an immediate impact on practice. This school now saw outdoor learning as integral to their long-term plans and there was a tangible impact arising from the intervention. The intriguing comparison between this school, which saw outdoor learning as a solution to the Covid-19 situation, and the other schools that received minimal interventions, which saw it as another challenge in an already daunting situation, requires further comment. Strong buy-in from the highest level of decision making at this school may have been influential as it helped them overcome barriers throughout the project. The deputy head explained that staffing was a substantial barrier for them, however, this was overcome by a strong and visible commitment from the senior leadership team. Furthermore, delivering the interventions locally helped to minimise the staff time required and ensured that the project could be easily planned with limited staff resource.

> "In September, I'm hoping that we see schools back to greater normality. The vision is that this is a whole school project moving forward and the principles of Forest School learning and everything that Growing among Trees has given us is something that I would like to see disseminated [across] the whole school so that we become more forest school focused in everyday learning." - Teacher

Pilot enablers and areas for improvement

Three main factors facilitated the delivery of the pilot and led to the wide-ranging outcomes reported above. These were 1) a whole school approach, 2) partnership working, and 3) the evaluative process. Firstly, the Growing among Trees partners valued the whole school approach to supporting schools to introduce or increase outdoor learning in natural spaces. The level of buy-in across the school was paramount to the success of the programme and increased the likelihood that outcomes would be sustained.

> "I've seen what happens when you have that level of buy-in across the schools, so that marks this project as very distinct. It's certainly the way forward, because I can see huge whole school impact, which is very much as a result of the whole school approach." – Growing among Trees practitioner

Secondly, there were positive outcomes from working in collaboration. This approach allowed partners to share learning in response to challenges and adapt delivery in other schools.

> "This shared knowledge, the urban focus and then the dedicated skills of people who have such in depth knowledge; that's been a fantastic collaboration. Being able to utilise the skills of other partners has been great." – Growing among Trees practitioner

Thirdly, the evaluative process, whilst demanding, was perceived to be valuable for improving the delivery of interventions. In-depth note taking and reflection empowered practitioners to adapt the delivery approach and enhance the experience of schools, teachers, and pupils.

> "I wish I had written more after each session, because it is such a beneficial and enriching experience to do that. That's definitely worth [doing] going forward. Not only is it really rich from the evaluation perspective, but also in terms of developing and improving the project." – Growing among Trees practitioner

This pilot also identified two factors that could streamline the delivery of outdoor learning interventions in future. These were, 1) planning time, and 2) the partnership structure. Firstly, the pilot would have benefitted from greater lead-in time for planning and preparation. Given the amount of pre-term and pre-school year planning that takes place in schools, a September start date for the project meant schools struggled to plan the interventions into their existing plans for that academic year. Earlier engagement with schools would reduce the risks of this lag and enable more activities to take place within each school.

> "If we'd started engaging with a school around Easter time, looking to start [delivery] in September, we might have had more opportunity to get those days to plan it. Maybe there's a way of doing some preparation work with a school determined before the next academic year. I spoke to the first school early in September, but they couldn't fit in until end of May." – Growing among Trees practitioner

Secondly, the structure of the pilot was complex as it aimed to test a range of interventions delivered by different partners within a short period of time. Future iterations should simplify the delivery model by adopting the processes that worked well, and by setting a structured delivery timetable. This would enable greater comparison and co-operation between different schools, interventions, and approaches. This would allow greater scope for cross-school delivery and collaboration, rather than mainly an exchanging of feedback and recommendations.

> "It would be good if we were all working to a similar timetable . . . if all partners were beginning (delivery) in September, and then they did the training, because you can't really compare winter workshops with summer works in terms of teacher buy-in." – Growing among Trees practitioner

Discussion

This process evaluation sought to understand what works well (and what does not) when attempting to deliver community forest and woodland outreach interventions in urban schools. By combining data from key stakeholders (i.e. pupils, teachers and intervention providers) before, during and following interventions, this study provides important insight into how school-based outdoor learning interventions could be implemented to increase the likelihood that they are replicable and sustainable. Firstly, a delivery framework comprising three key elements (in order: 1) identify current provision and scope to increase, 2) upskill teachers, 3) co-deliver pupil interventions) is a promising approach to delivering replicable and sustainable outdoor learning interventions. During delivery, the practitioners learned that a phased approach of delivery, co-delivery and supported delivery with bespoke teaching resources was effective at overcoming a lack of teacher confidence. This finding offers a potential solution to this widely reported barrier (low confidence) to outdoor education (Marchant et al., 2019; Oberle et al., 2021; Van Dijk-Wesselius et al., 2020). Research conducted elsewhere has also highlighted a need for a structured approach to upskilling teachers (Christie et al., 2016). Christie and colleagues argued that outdoor learning should begin in the school grounds and move into community outdoor spaces gradually, as teacher confidence improves.

Secondly, as highlighted by Christie et al. (2016), interventions that are delivered as (hyper) local to the school as possible can help reduce key barriers, such as staff time and resources, which can be mitigated against by minimising travel time. Special schools faced additional barriers to leaving the school grounds and therefore delivery within school grounds is considered preferable, both from a logistical perspective and to increase staff confidence. Several studies have shown that factors such

as transport, time, resources and other curriculum pressures hinder teacher confidence, therefore a hyperlocal approach at least in the first instance, could help manage these concerns (Edwards-Jones et al., 2018; Rickinson et al., 2004; Van Dijk-Wesselius et al., 2020).

Thirdly, ensuring strong buy-in from the senior leadership team, taking a whole school approach, and ensuring sufficient lead-in time for planning and preparation, could be crucial for maximising the impact of interventions and the sustainability of nature-based practices at a given school. This finding supports that of Marchant et al. (2019), who discovered that teachers highly valued support from senior leaders and governors and desired outdoor learning to be adopted through all levels of school staff. Senior staff support, as well as wider support from parents and guardians, could be a crucial ingredient to improve teacher confidence and motivation, and increase uptake of outdoor education (Barfod, 2018; Marchant et al., 2019; Rickinson, 2012).

Fourthly, adopting a cooperative approach and embedding a process of regular monitoring of interventions can facilitate an ongoing process of learning and collaboration. This can ensure that each intervention can be delivered most effectively and that each subsequent intervention learns from previous insight and adaptions. This finding may be particularly relevant to the current pilot, which involved several partners delivering several varied interventions at different timescales. A partnership approach allowed a culture of testing, learning and sharing to be adopted. With this in mind, intervention providers could benefit from monitoring barriers and enablers routinely and sharing these with wider colleagues in the field at every opportunity. This could help mitigate the barriers and obstacles to outdoor learning.

Conclusions

Nature based learning has the potential to improve academic engagement and attainment by increasing attention, cognitive ability and feelings of mental and physical energy (Huynh, Craig, Janssen, & Pickett, 2013; Payton et al., 2008; Ryan et al., 2010), whilst also improving individual wellbeing (Harvey et al., 2020). However, it remains an underutilised pedagogical tool. Commonly reported barriers may be fuelling a reluctance to introduce outdoor learning into current teaching practices. This study, however, highlights that such barriers are not insurmountable. A structured approach to upskilling, delivered as hyperlocal as possible, with senior leadership support and regularly monitoring and evaluation can help embed outdoor learning in a way that is replicable and sustainable.

Notes on contributor

Dr Marc A. Harris is the Head of Research at Intelligent Health and Senior Researcher at Cardiff Metropolitan University. Marc is an experienced researcher in public health interventions, physical activity, gamification, alcohol use and image enhancing drug use.

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Appendix A. Delivered interventions

Primary Schools:

School	P1	P2	P3
Intervention provider(s)	The Garden Classroom/ Trees for Cities	Nature Nurture CIC	Nature Nurture CIC
Delivered Interventions	(1) Sessions with pupils (four half days) (2) Forest School teacher training (3) Tree Identification (4) Tree Planting (5) Tree Assembly	(1) Wild Teaching with pupils (6 half day sessions) (2) Audit of species and defining Wild Teaching zones (1) Tree Planting Workshop	(1) Wild Teaching with pupils (5 half day sessions) (2) Wild Assembly (3) Audit of species and defining Wild Teaching zones (4) Tree Planting Workshop (5) Wild Teacher Training
School	P4	P5	P6
Intervention provider(s)	The Garden Classroom	The Garden Classroom	Nature Nurture CIC
Delivered Interventions	(1) Forest School teacher training	(1) Forest School teacher training	(1) Audit of species and defining Wild Teaching zones

Intervention	Delivery Partner	Description
Sessions with pupils	The Garden Classroom	4 x two hour sessions with 10 to 25 children off school site. Content of sessions included getting to know six trees, collecting fallen natural objects, observation-memory games, making a group shelter, using trees to experiment with music and sound and climbing, drawing and observing trees.
Tree Assembly/ Wild assembly	Trees for Cities/ Nature Nurture CIC	20–30 minute assemblies with at least 300 children within school grounds. Assemblies involved looking at the benefits and properties of trees, including existing and new trees in their playground.
Tree Identification	Trees for Cities	30 minute session off school site with 17 children.
Tree Planting Workshop	Trees for Cities/ Nature Nurture CIC	1–2 hour workshops each involving 17 to 60 children planting standard trees and/or whips within school grounds. Workshops supported pupils to gain understanding about the properties of the trees they have planted and how to keep them healthy.
Audit of species and defining wild teaching zones	Nature Nurture CIC	Thorough two hour reconnaissance and species identification off school site and/or within school grounds with discussion on learning zones and ideas.
Wild Teaching	Nature Nurture CIC	Multiple 2.5 hour sessions with 13 to 37 children within school grounds and/or off school site. Each session involved two teachers and two teaching assistants. Content of sessions included sensory introductions to nature, the properties of materials, learning about habitats and making shelters and linking learning with class books such as the Deep Dark Woods and Gruffalo and 'The Enchanted Wood'.
Forest School teacher training	The Garden Classroom	Full day training (7 hours) for ITC Level 1 Award in Forest School Ethos and Principles (with Twilight follow-up in one school), delivered off school site.
Wild teacher training	Nature Nurture CIC	2 x 1.5 hour sessions with teachers and TAs covering barriers and benefits to 'Wild teaching', understanding school needs and an outdoor taster session tailored to school needs and potential of school grounds.

Secondary School

School	SS1
Delivered Interventions	(1) Launch assembly (2) Tree Planting (3) Teacher training (4 sessions)

Intervention	Delivery Partner	Description
Launch assembly	Green Schools Project	1 hour assembly with 270 children, 12 teachers and 3 TAs introducing tree planting, the benefits of spending time outdoors, the importance of nature connection and the climate crisis. Included recruitment of an eco-team.
Tree planting	Trees for Cities	2.5 hour session with 25 children on school grounds to plant nine fruit trees (to create an orchard), with tree identification activities.
Teacher training	Green Schools Project	Four sets of 4 hour sessions off school site with one or two teachers attending. Content of sessions included how to start a forest school programme including nature based experiential activities integrated with the curriculum.

Special Schools

School	SpS1	SpS2
Delivered Interventions	(1) Audit of natural assets	(1) Audit of natural assets

Intervention	Delivery Partner	Description
Audit of natural assets	Sensory Trust	Assessment of school grounds and local sites over 1.5–2 hours. The grounds were explored thoroughly deciding on where activities will take place, what sort of activities will be possible and who would be involved, including looking at sites for tree planting.