

# How Childhood Nature Experience Shapes Teaching

Primary school teachers' childhood experiences in nature and its influence on their teaching practice

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Natural England Joint Publication JP057

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# Foreword

Natural England commission a range of reports from external contractors to provide evidence and advice to assist us in delivering our duties. The views in this report are those of the authors and do not necessarily represent those of Natural England.

This report was commissioned by Natural England to build knowledge and understanding of how childhood experiences influence teaching approaches in later life.

The 2011 Natural Environment White Paper recognised that *'As well as having important health benefits, access to the natural environment can also improve children's learning.'* Since then, Natural England, Defra and partners have collaborated on projects to understand how to support schools and teachers to integrate nature into school planning, practice and routines. Evidence from our work and that of partners suggests that building the skills and confidence of teachers to take teaching and learning beyond the classroom is the key challenge to getting children out into nature and that these often underpinned many other concerns.

This evidence supports findings from this current study that show teachers had a strong desire to create nature contact opportunities for students, but often felt frustrated by urban environments, restrictive statutory frameworks and a lack of confidence or knowledge. The study highlights that teachers who feel themselves to be moderately connected to nature are well-placed to enhance nature contact opportunities for their students and would like to do so. The findings from the report will help inform future initiatives and improve equitable engagement, recreation, and access to natural spaces.

This aligns with recent calls, such as the Dasgupta Review, emphasising the need to embed the natural world in education policy. Government initiatives like the 25-year environmental improvement plan and the Department for Education's Sustainability and Climate Change Strategy emphasise nature-based learning's importance with the desire to *'Ensure learning in and about nature happens at every level of education...'*

# Executive summary

There is a wealth of evidence that accessing nature is good for both mental and physical health and for our overall wellbeing, a finding that has been demonstrated across all age groups, genders and different ethnicities. Feeling connected with nature (that is, our personal relationship to nature and how we feel about and experience it), has been shown to positively impact health and wellbeing and be correlated with pro-environmental behaviours, with these benefits lasting into adulthood if nature connection is formed at a young age. We know that if a parent or guardian feels connected to nature, their child is more likely to be connected too, but what is less well-known is whether teachers have a similar influence on the nature connection of children. Many children and young people, particularly those from disadvantaged backgrounds, lack regular opportunities to access nature in their home lives, a situation which has worsened since the Covid-19 pandemic. Therefore, if nature-connected teachers are able to positively influence children, it might be possible for them to develop helpful pro-nature and pro-environmental behaviours in children in the school environment.

The research described in this report aimed to discover whether teachers' own childhood experiences of nature have led to an enhanced sense of nature connection and whether this affects their teaching practices, impacting the access to nature of their pupils during the school day. Primary school staff who teach children from Reception up to Year 6 in schools across Southern England were recruited to take part in this research. Participants completed an online survey asking about both the access to nature that they and their pupils had, their subjective sense of nature connection and how this impacts their teaching. 27 participants completed the online survey, with 85% of participants reporting their nature connection score as moderate to high. It was unfortunately not possible to measure the children's nature connection.

Participants reported enjoying freedom, fresh air and adventure activities in nature as children, leading to a love of nature and a strong desire to pass that on to their pupils, with many reporting that individual teachers are the main facilitators in allowing children to access nature at school. However, many feel unable to do this themselves and state barriers such as curriculum requirements, unsuitable or small grounds, large class sizes and a lack of confidence in what to do when outside. They are therefore currently unable to implement the government's aim to boost the number of young people who can be active in nature and learn about nature when in school, as laid out in the 25-year plan for the environment (Department for Environment, Food & Rural Affairs, 2018). Many teachers feel highly connected to nature and want to pass that on to the children they teach, but currently they don't do so. The literature shows that the curriculum can be delivered very effectively outdoors but teachers involved in this study cited curriculum requirements as a barrier. Further research is needed to understand the mediating factors that are inhibiting teachers' use of the outdoors to deliver the curriculum.

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# Introduction

There is a wealth of evidence that accessing nature is good for both mental and physical health and for overall wellbeing (Houlden et al., 2018). This finding has been demonstrated across all age groups and genders and among different ethnicities and cultures (Chawla, 2020; Pretty et al., 2017; Vitale et al., 2022). According to the People and Nature survey 2023 by Natural England, 92% of adults who recently visited a natural space reported that it positively influences their physical health, while 91% noted its positive impact on their mental health (Natural England, 2023a). The benefits to children of having nature contact are many and varied, including decreases in infant deaths; improved ADHD symptoms; greater place making; lowered levels of obesity and rates of allergies; lower levels of stress and depression; greater resilience, co-operation and creative play; as well as academic engagement and attainment (Chawla, 2015; Chawla & Gould, 2020). Moreover, during a period when the average life satisfaction among young people has been declining (Department for Education, 2019), outdoor education focused on biodiversity has demonstrated benefits to children's long term psychological wellbeing and resilience and short-term mood (Harvey et al., 2020; Montgomery et al, 2022).

There is a large and increasing amount of evidence that demonstrates the importance of feeling connected to nature; the term nature connectedness relating to people's subjective feelings about their emotional relationship with natural environments (Martin et al., 2020). Nature connection has been demonstrated as being beneficial across the lifespan and has been linked to the existence of pro-nature attitudes and behaviours and improved mental health in all age groups (Pritchard et al., 2020; Hurly & Walker, 2019; Martin et al., 2020). Feeling connected to nature is an important indicator of pro-nature behaviours among children (Otto & Pensini, 2017; Cheng & Monroe, 2010; Barrera-Hernandez et al., 2020). Exposure to natural environments, and the duration of time spent in such settings, serve as significant predictors for developing a pro-environmental stance (Barrable & Booth, 2020a).

Fostering a bond with the natural world prior to the age of eleven has been recognised as a dependable predictor of developing environmental responsibility (Wells & Lekies, 2006). It is also associated with actively immersing oneself in nature to embrace a healthy lifestyle (Chawla, 2007; Thompson et al., 2008) and cultivating an appreciation for the beauty of the natural world (Zhang et al., 2014). Having empathy for and a desire to seek out nature when very young may also encourage children to continue these behaviours as they grow older (Beery et al., 2020). However, spending time in nature is not the only way that nature contact can be established (Jani et al., 2023), particularly in the current world, when young people's most common nature experiences take place indoors through technological entertainment (Dorward et al., 2016; Hughes et al., 2018; Moss, 2012). Perhaps as a result of this, more than half (52%) of children in England surveyed in the Children's People and Nature survey feel highly connected to nature (Natural England, 2023b).

# Mediating mechanisms and pathways between nature and health and wellbeing

The mediating mechanisms between nature and improved human health and wellbeing have been extensively investigated, and can play a key role in how connected one feels to nature and the extent to which it has an impact throughout a lifetime. Positive emotions, such as awe, happiness, and joy, are induced when people become absorbed, fully involved, and captivated by natural surroundings (Ballew & Omoto, 2018). This absorption and captivation acts as a mediating mechanism, fostering a connection between the person and natural environment. Additionally, place attachment emerges as a critical pathway. Returning to traditional homelands or meaningful places, such as gardens, has been associated with stress-recovery and enhanced wellbeing (Pretty et al., 2017). Higher levels of wellbeing associated with nature connectedness can be due to the sense of attachment to a place that nature provides.

The influence of nature on wellbeing extends beyond physical presence. Factors such as increased levels of physical activity, being able to socially interact with peers (Vanaken & Danckaerts, 2018) engage in immersive activities (Mygind et al., 2019), have the opportunity for self-reflection in natural settings (Wang et al., 2022), benefit from increased air quality (Diener et al., 2021; Elliot et al., 2023) and enjoy a decreased sense of crowdedness (Liu et al., 2023), also play pivotal roles.

Nature engagement, play in nature and significant life experiences are also important pathways. Nature connection has been found to be significantly enhanced through activities involving contact, meaning, emotion, beauty and compassion (Lumber et al., 2017), and mindful engagement with nature (Barrable et al., 2021). Childhood play within nature has been suggested to indicate whether people are more likely to participate in outdoor recreational activities and higher frequency of nature visits as they get older (Bixler et al., 2002; Cleary et al., 2020; Heezik et al., 2021). Nature engagement from a young age has been found to support belief in the inherent value of nature as an end in itself (ecocentric beliefs) and ecological values to preserve the environment and view the natural environment as calming (Ewert et al., 2005; Lohr & Pearson-Mims, 2005).

Nature connection in children may have additional developmental or social origins, with parents' or guardians' attitudes to nature playing a significant role. Previous research has suggested that parental nature connection is one of the strongest predictors for a child's nature connectedness (Barrable & Booth, 2020b; Passmore et al., 2021). Childhood interactions with nature facilitated by parents (for example hiking, camping, gardening) are highly likely to set that person on a trajectory which results in pro-environmentalism as an adult (Wells & Lekies, 2006). Children whose mothers (commonly the primary care-giver) have greater pro-environmental attitudes, are more likely to engage in pro-environmental behaviour themselves as young adults (Evans et al., 2018). The more contact with nature one has as a child, the more contact they will seek out later in life (Rosa et al., 2018);



although there may be an interruption through adolescence due to societal influences (Hughes et al., 2019).

## **The importance of schools in facilitating nature contact and connection**

The majority of children ages 5-18 spend a significant portion of their week in school, and school grounds have been reported to provide untapped biodiversity engagement opportunities (Harvey et al., 2019). Additionally, school grounds have been recognised as important providers of greenspace for this age group (McCormick, 2017; Vanaken & Danckaerts, 2018), serving as valuable facilitators of nature contact. Learning in nature has been demonstrated as enhancing a range of physical and mental health outcomes (Marchant et al., 2019; Jenkins et al., 2011). This is particularly important for those that are less likely to have a greenspace accessible to them. In the 'Monitor of Engagement with the Natural Environment' commissioned by Natural England, 10% of parents asked had not visited any greenspace with their children for at least a year, with disadvantaged children and those from minoritised ethnic groups even less likely to have visited greenspace regularly (Hunt et al., 2016).

In England, children's levels of outdoor activity outside of school have dropped and not returned to pre-Covid-19 pandemic levels, making enhanced access to and connection with nature at school, more vital than ever (Salway et al, 2022). It is known that children attending rural schools are more likely to have a higher level of nature connection than those attending urban schools, with the effect being the strongest in primary-school aged children (Price et al., 2022). However, nature connection, and feelings of stewardship towards animals has been shown to increase in urban school children when they are involved in projects utilising nearby natural resources such as ponds (Barthel et al., 2018) and woodland (Cudworth, 2021). Although rural schools clearly have an advantage in terms of having greater access to nature than urban schools, Richardson (2020) suggests that merely relying on simply being in nature as a way of enhancing connection in children and young people is not always enough. Initiatives aiming to connect children and adolescents to nature should do more than simply provide access to greenspace. Lumber et al (2017) demonstrated that nature contact needs to be purposeful, and when done in a meaningful and authentic way, perception of biodiversity and connection can still be enhanced, even within urban school environments (Montgomery et al., 2022; Richardson, 2020).

## **Rationale for the current study**

It is known that teacher practices can positively contribute to the mental health outcomes of students, including emotional and social development (Blazar & Kraft, 2017). Positive experiences with teachers during childhood and the teenage years can continue to benefit students' wellbeing into adulthood (Wang et al., 2013; Dittman & Forstmeier, 2022).

Studies have found that teachers can play a role in encouraging people to pursue careers in environmental professions as adults (Chawla, 1998) and that active engagement by teachers in environmental education can enhance environmental stewardship in children and young people (Stern et al., 2008). Furthermore, it has been demonstrated that Early Years teachers' own childhood experiences in nature are indicative of whether they positively support outdoor education or not (Bilton, 2020). Given the large amount of time that children spend in education, and the known positive effects of environmental teaching practices and students' positive relationships with teachers, it is therefore a reasonable hypothesis that teachers who have developed a strong sense of nature-connectedness in childhood may be well-placed to encourage their students to access nature while at school. Exploring this potential interaction is important: if teachers have a meaningful influence in terms of enhancing children's access to nature at school, there may be an opportunity to foster nature connection in those who are not benefitting from parental or guardian pro-nature influence at home. Understanding this potential mechanism may also help us to determine whether nature connected teachers are best placed to drive forward proposed government initiatives such as the National Education Nature Park, a free programme which gives practitioners support and resources to embed nature in their teaching, with an aim to 'empower children and young people to make a positive difference to both their own and nature's future' (Department for Education, n.d.).

## Materials and Methods

The current study aims to understand whether teachers' own past experiences in nature influences their current teaching practice, specifically impacting their students' access to nature at school. Teachers working with children from Reception up to Year 6 in primary schools across Southern England were recruited via email, over a three-week period in April and May 2022. The authors initially approached any pre-existing contacts that they had in primary schools, inviting them to take part in the survey, with subsequent participants recruited via snowball sampling. Participants comprised any staff involved in teaching children, including class teachers, head teachers, deputy heads and teaching assistants. The pool of participants was limited to primary school teaching staff, as they may have more curriculum opportunities to engage children with nature, compared with secondary school teachers and they also work with children before they experience the reported 'dip' in nature connection (Price et al., 2022).

Participants were provided with a link to complete an online survey containing a mixture of mostly single- and multiple-choice questions and five open-ended questions, created using Microsoft Forms (see Appendix 1 for a full list of questions). The survey aimed to identify whether teachers' childhood experiences in nature impacts their students' access to nature at school. To this end, questions asked about participants' childhood experiences in nature, whether this had altered as they had aged, their students' access to nature at school and whether the participants' own experiences impacted that access. The Inclusion of Nature in Self scale, illustrated extension (Kleespies et al., 2021), measured

participants' connection to nature. The illustrated extension is adapted from the original inclusion of nature in self scale (INS) (Shultz et al., 2002), and is a standardised, validated tool, widely used with both children and adults from diverse backgrounds, using a single item measure, with a seven-point scale. Scores range from a minimum of 1 (complete separation from nature) to 7 (complete inclusion of the self in nature) (Kleespies et al., 2021).

Demographic information, single- and multiple-choice survey data was organised into descriptive results, using Microsoft Excel software. A group average score was calculated for the INS scale. Responses to the open-ended questions were limited in breadth, with most participants answering each question in a few words, or 2-3 sentences at most. Techniques for analysing this kind of limited textual survey data are poorly delineated, so Braun & Clark's (2006) framework for thematic analysis, was used to inform our analytic process and to ensure rigour. It is important to note that a Reflexive Thematic Analysis as described by the same authors (Braun & Clarke, 2019) was not attempted, due to there being insufficient richness, or information power in the dataset. The process consisted of an initial familiarisation with the data (reading through the responses, making notes), before applying codes and organising these into five themes deductively, guided by the questions. The focus of meaning was mostly semantic (i.e. codes mostly captured the surface meaning) due to the unambiguous nature of the responses, although some latent coding was also necessary (i.e. some codes captured underlying meaning) where the responses were more contemplative. The analysis aimed to explore the participants' own perspectives and encapsulate their reality as expressed through their responses (see Appendix 2 for a full list of themes with corresponding codes). Ethical approval for the survey was granted by the Natural England Research Ethics Committee.

## Results

### Sample characteristics of participants

A total of 32 participants completed the online survey. Two participants were Early Years Practitioners and so had their data removed from the sample, and a further three participants had their data removed as they were based in Scotland, leaving a total of 27 participants, from 14 schools. No instructions were given as to how many representatives per school should fill out the survey, however, ten schools were represented by only one participant per school. Of the remaining four schools, one was represented by two participants, two by three participants and one by nine participants. All of the participants taught in different classes. All participants taught in primary education (ages 4 – 11). The 'average' participant was a female class teacher, aged 41 or above, based in the home counties, with over 11 years' experience of teaching, working in an urban, state-maintained school. The average percentage of students eligible for free school meals (FSM) at the state schools was 24.6% (with a range of 0-62.9%), which closely matches

the national average of 24% of primary-aged pupils eligible for FSM in 2022/23 (Department for Education, 2023). Sample characteristics of the 27 participants are presented in Table 1.

**Table 1. Characteristics of survey participants**

<b>Sample characteristics</b>	<b>Participants who completed the survey (27 participants from 14 schools) N(%)</b>
<b>Age</b>	Total n=27
<b>21-30</b>	2 (7.5)
<b>31-40</b>	7 (26)
<b>41-50</b>	16 (59)
<b>51+</b>	2 (7.5)
<b>Gender</b>	Total n=27
<b>Female</b>	23 (85)
<b>Male</b>	4 (15)
<b>Number of years teaching</b>	Total n=27
<b>0-10</b>	7 (26)
<b>11-20</b>	12 (44)
<b>20+</b>	8 (30)
<b>Job title</b>	Total n=27
<b>Teacher</b>	18 (66)
<b>Headteacher/ Deputy Head</b>	4 (15)
<b>Other</b>	4 (15)

<b>Sample characteristics</b>	<b>Participants who completed the survey (27 participants from 14 schools) N(%)</b>
<b>Teaching Assistant</b>	1 (4)
<b>Type of school</b>	Total n=14
<b>State-funded</b>	11 (79)
<b>Privately-funded</b>	3 (21)
<b>School characteristic</b>	Total n=14
<b>Urban</b>	7 (50)
<b>Rural</b>	5 (36)
<b>Semi-rural</b>	2 (14)
<b>Location of school</b>	Total n=14
<b>Sussex</b>	5 (36)
<b>Home Counties</b>	6 (43)
<b>London</b>	2 (14)
<b>Wiltshire</b>	1 (7)

## Survey descriptive results

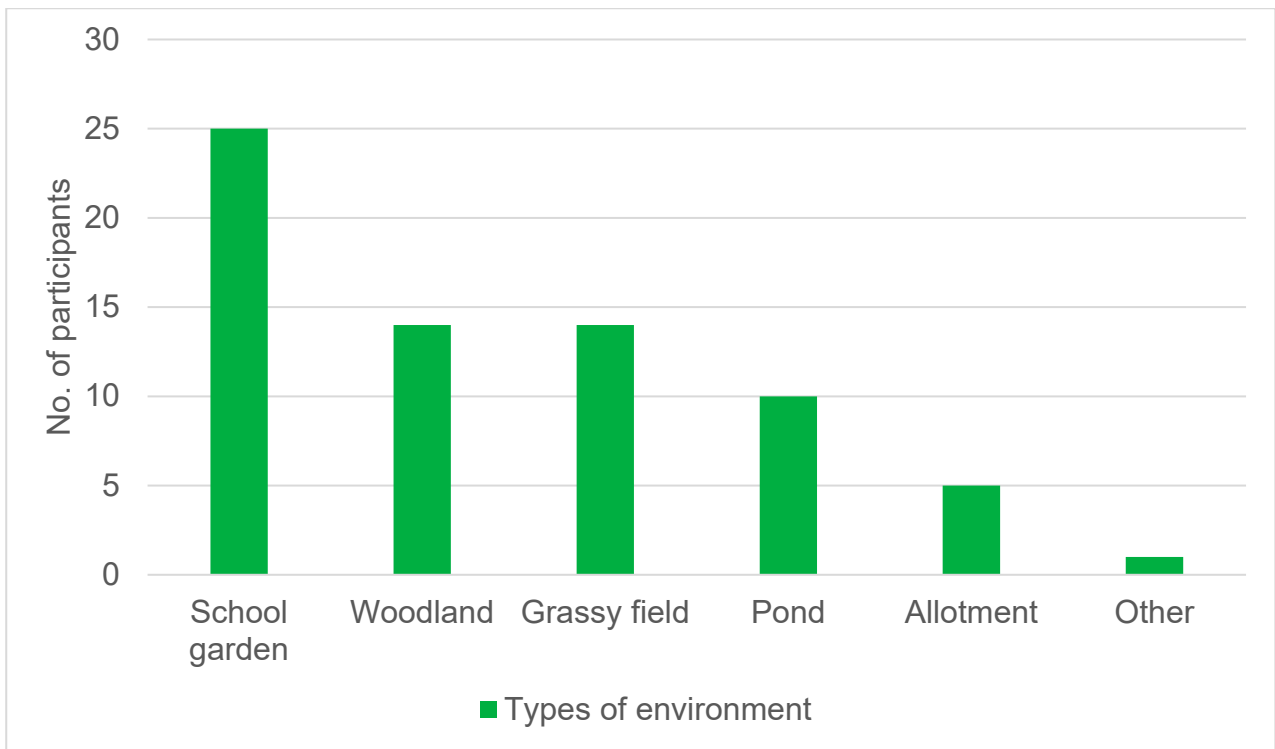
As there were 27 participants reporting on 14 different schools, there was inevitably some variability across different participants' responses when reporting on the same school. As previously discussed, access to outdoor or environmental education is often dependent on the inputs of individual teachers (Chawla, 1998; Stern et al., 2008; Bilton, 2020), so therefore it is important to consider that the following survey data reflects the individual perceptions and priorities of the participants.

## Students' access to nature

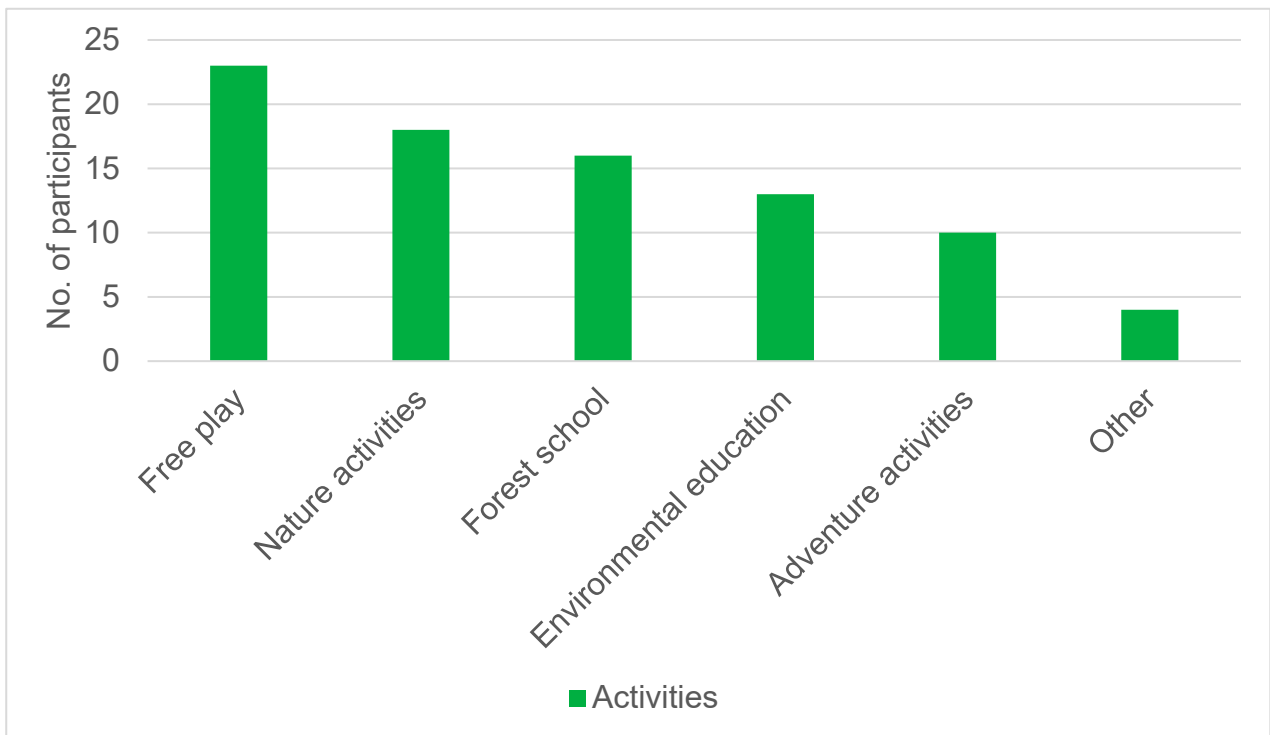
Over half of the sample (52%) reported that children spent time in nature while at school at least on a weekly basis (Figure 1). The types of outdoor environment available were reported as being varied, with nearly all children reported as having access to a school garden (n=25), and nearly half access to woodland (n=14) or a grassy field (n=14) (Figure 2). The activities the children engaged with while in nature were also reported as varied, with free-play (n=23) and nature-based activities (n=18) being the most common (Figure 3). 70% of teachers reported that all children get equal access to outdoor activities and that the person most likely to decide who gets that access is the individual teacher (n=20) (Figure 4).



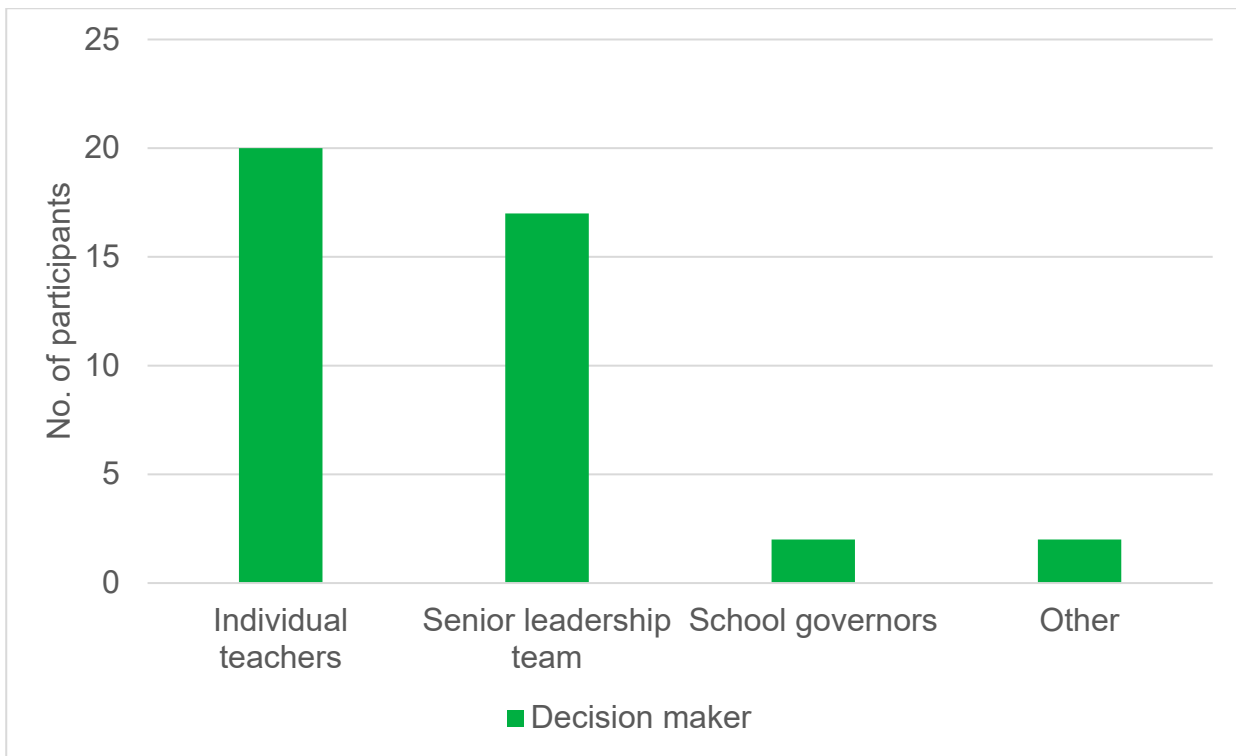
**Figure 1: Time children spend actively engaging with nature on or off site, on average (%)**



**Figure 2: Types of natural environment children have access to when at school, either on or off site (tick all that apply)**



**Figure 3: The kinds of activities the children do when in natural environments (tick all that apply)**

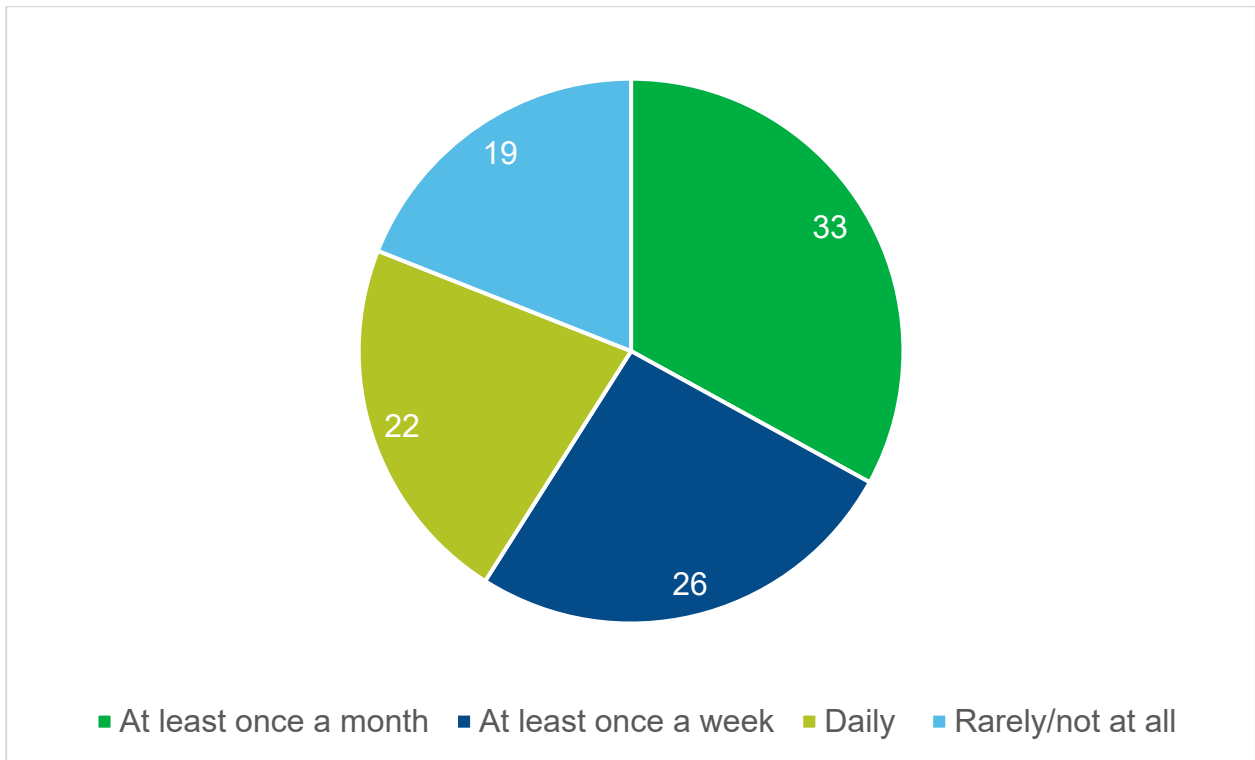


**Figure 4: Who decides how much access to nature the children get (tick all that apply)?**

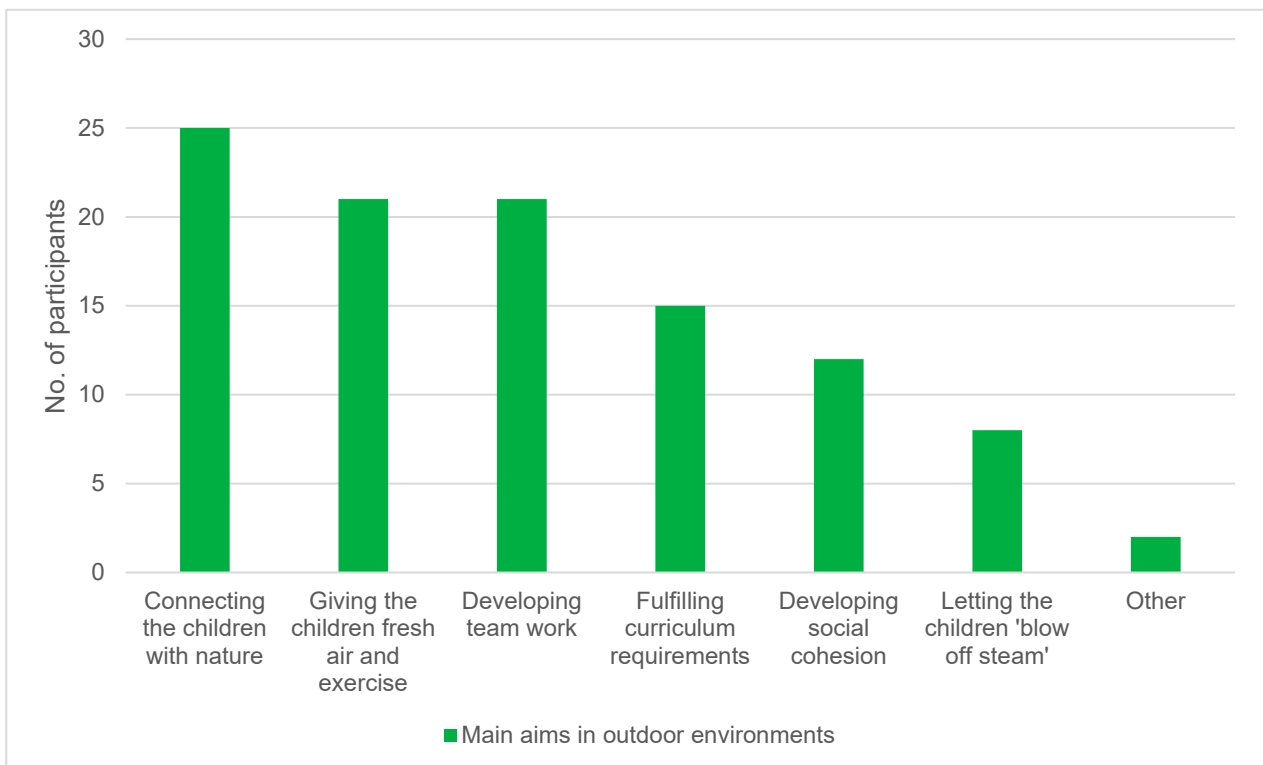
## Students’ access to nature, facilitated by participants

When asked how often the participants personally facilitated their students’ access to nature, results were mixed, with participants either reporting doing this only once a month (33%) or conversely, daily (22%) (Figure 5). 93% of participants said that their main aim when being in an outdoor environment with the children was to connect them with nature, with allowing them to have fresh air and exercise and developing teamwork also two main concerns (Figure 6). 59% of participants reported that curriculum requirements were the main restricting factor in allowing students to access the outdoors, with unsuitable or limited outdoor space the second main restricting factor (Figure 7). 78% of participants said that their own personal enjoyment of being outdoors was the main factor enabling them to use outside space with their students, with 59% reporting that their confidence in using the outside space was also a motivating factor (Figure 8).

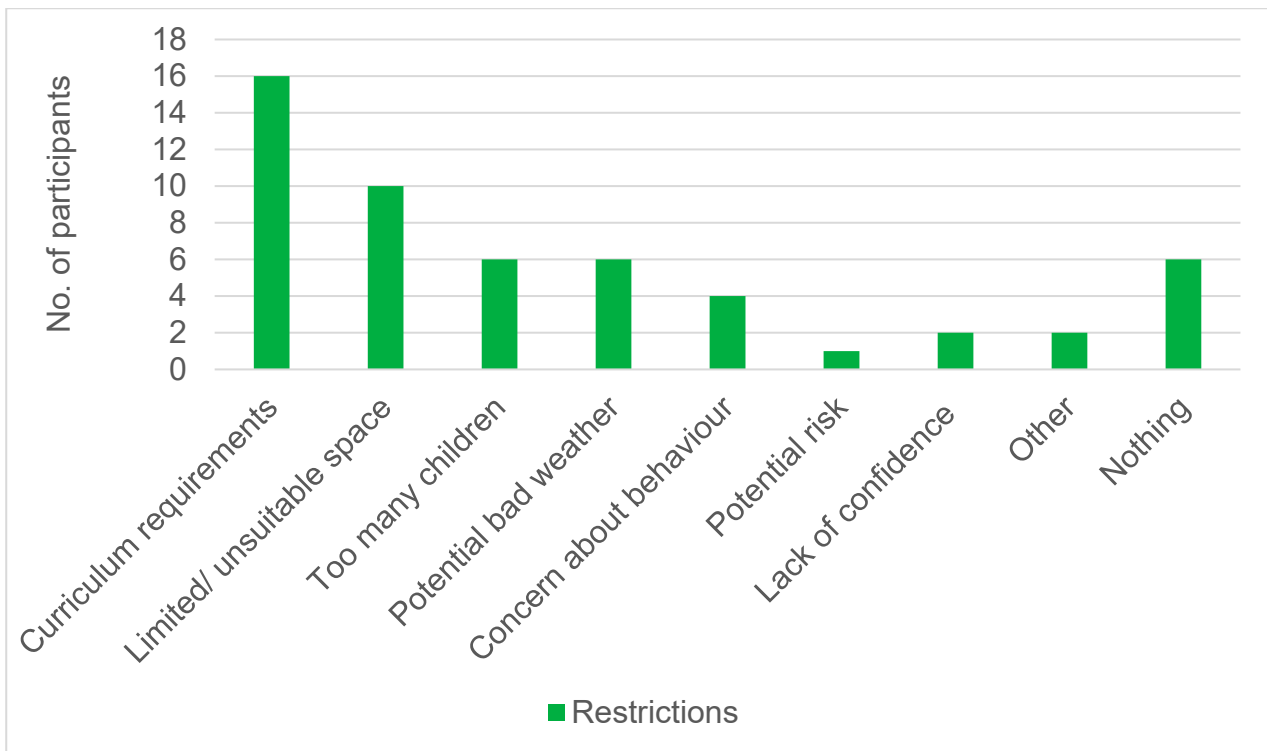




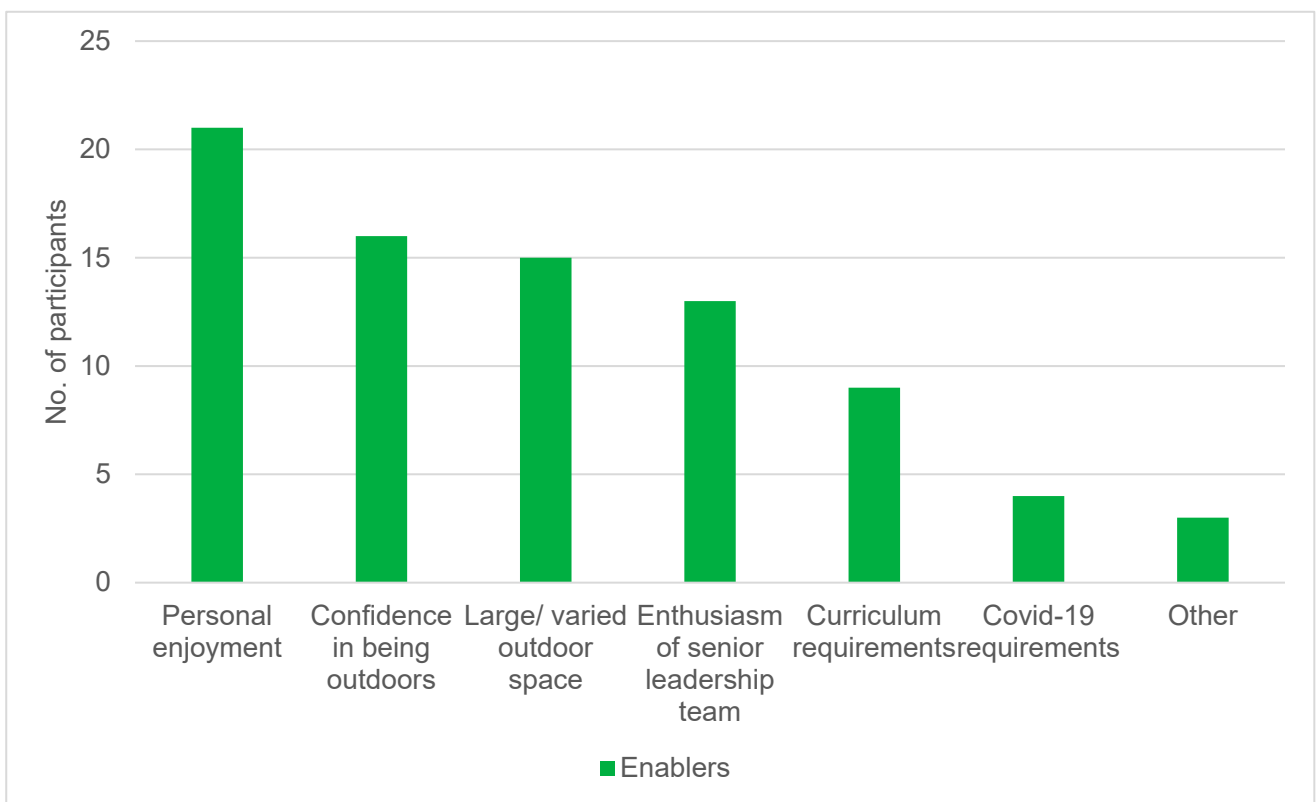
**Figure 5: In your professional capacity as a teacher, how much time do you spend engaging with nature with your students? (%)**



**Figure 6: What are your main aims when you are in an outdoor environment with the children at school (tick all that apply)?**



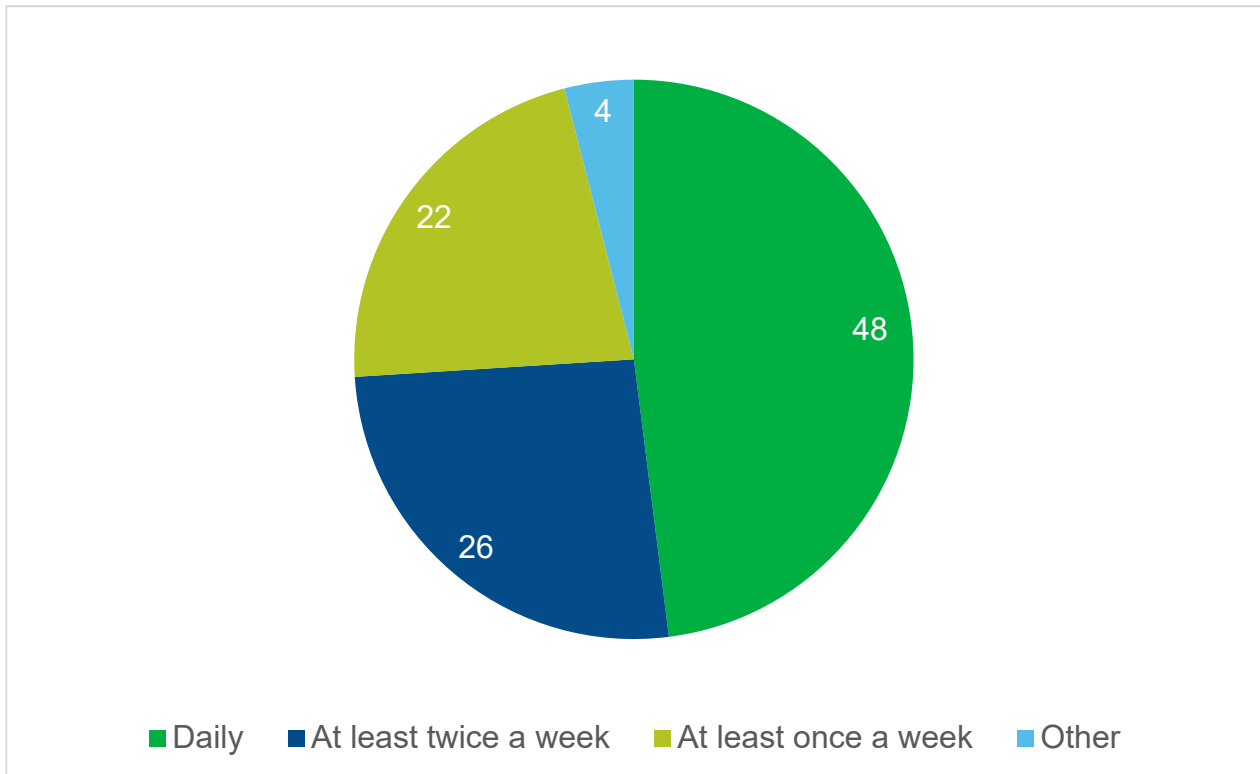
**Figure 7: Is there anything which restricts you to use outside space in your teaching (tick all that apply)?**



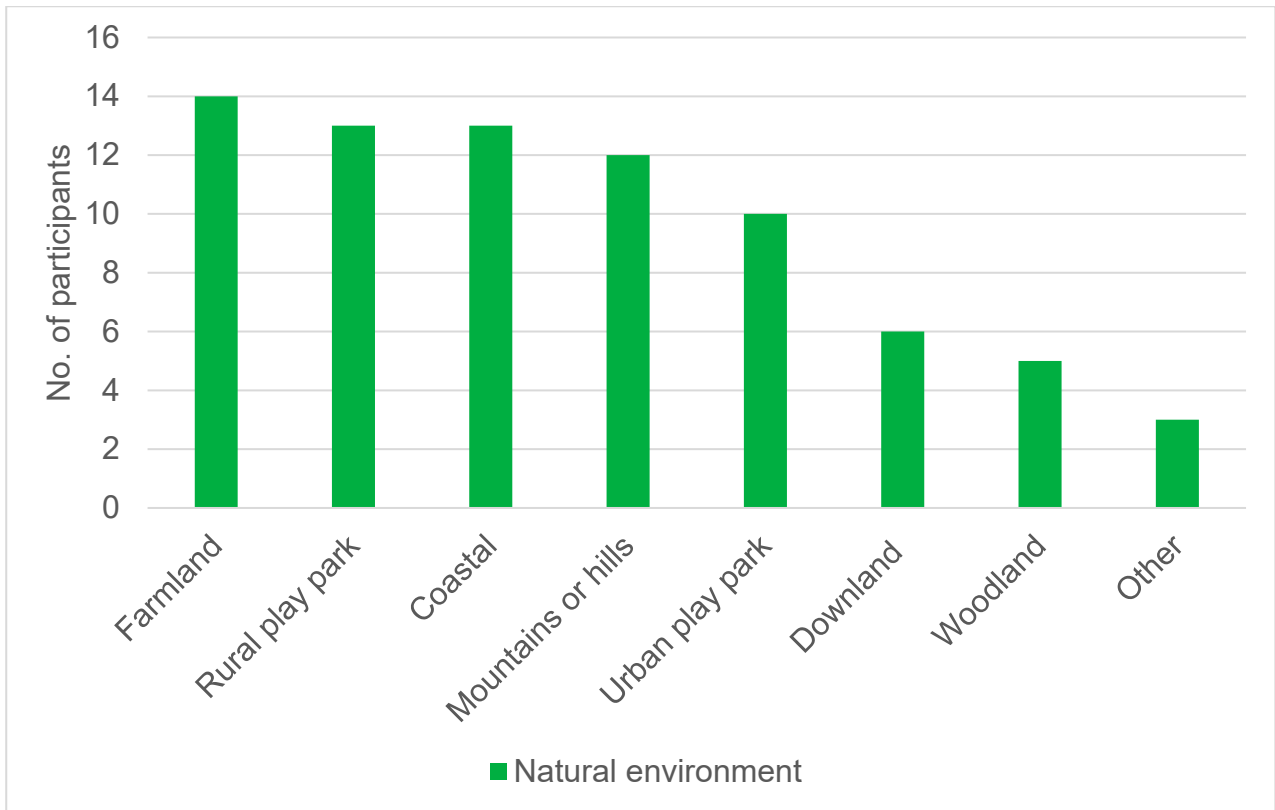
**Figure 8: Is there anything which enables you to use outside space in your teaching (tick all that apply)?**

## Participants' experiences in nature as children

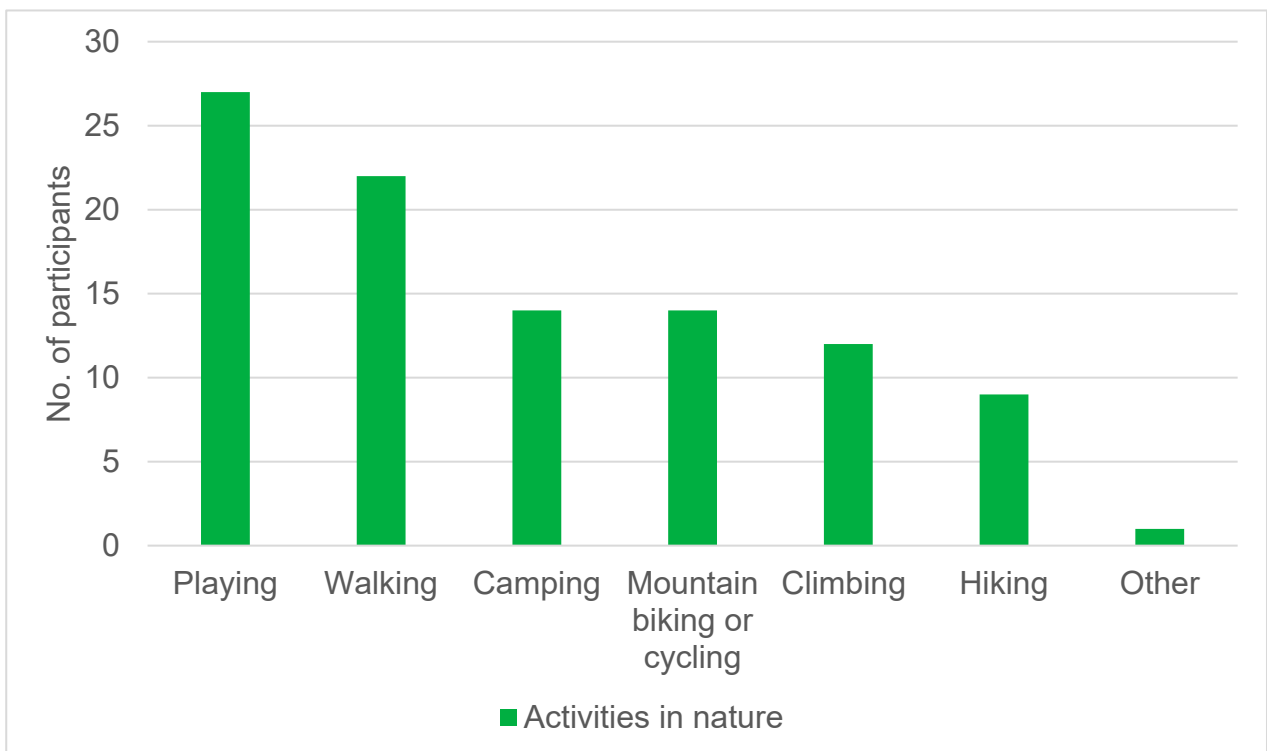
96% of the participants reported spending time in nature as a child at least once a week, with 48% saying they were in nature on a daily basis as children (Figure 9). The variety of natural environments that the participants had access to as children were varied, including rural and urban play parks, coastal areas, farmland and mountainous or hilly regions (Figure 10). Every participant said that they spent time playing in nature as children, with physical activities such as walking, hiking or cycling also frequently selected (Figure 11). Participants spent time in nature with both family and friends, with these two options being chosen by 81% and 77% of participants respectively (Figure 12).



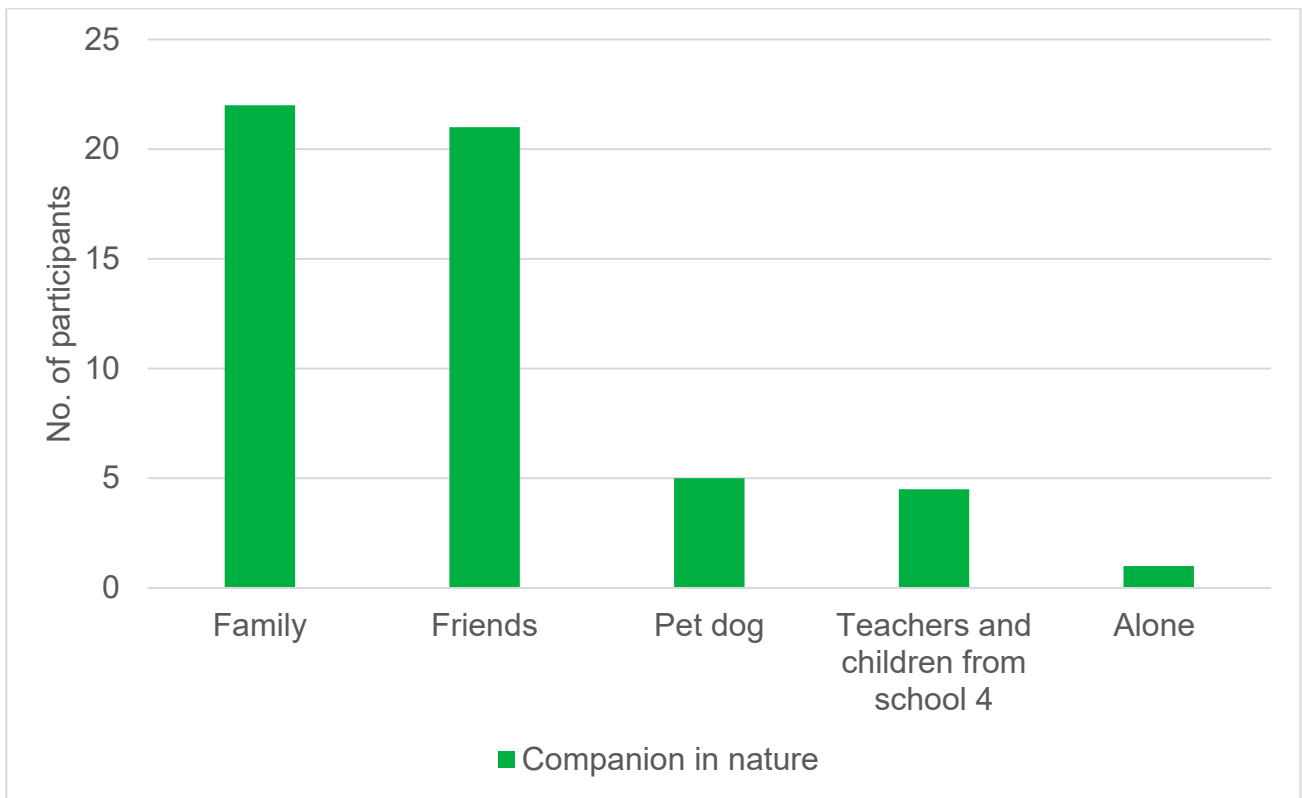
**Figure 9: How much time did you spend in nature as a child? (%)**



**Figure 10: Where did you go in nature as a child (tick all that apply)?**



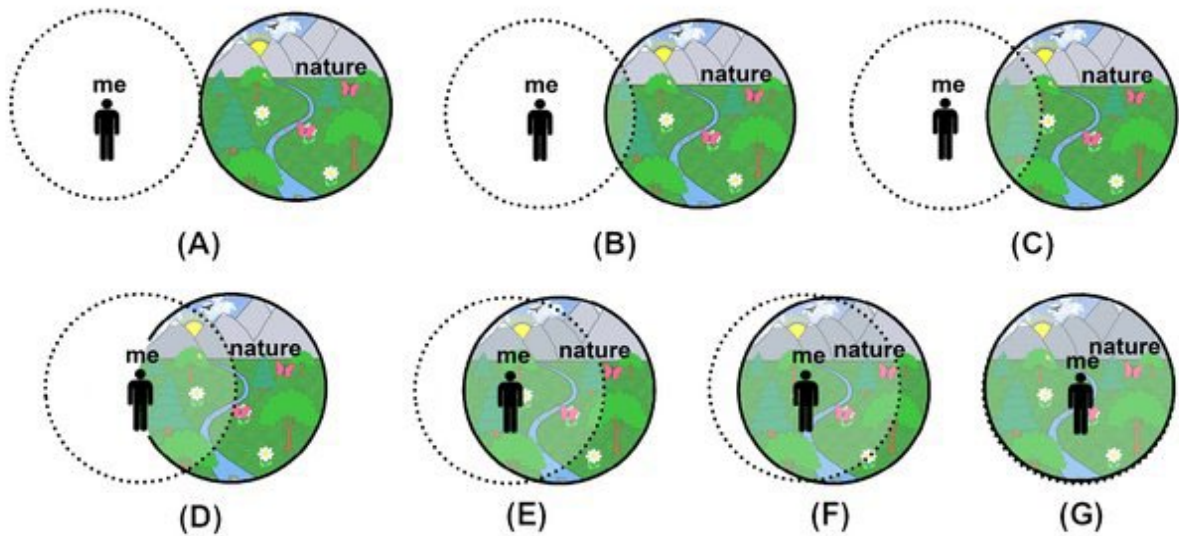
**Figure 11: What sort of activities did you do in nature as a child (tick all that apply)?**



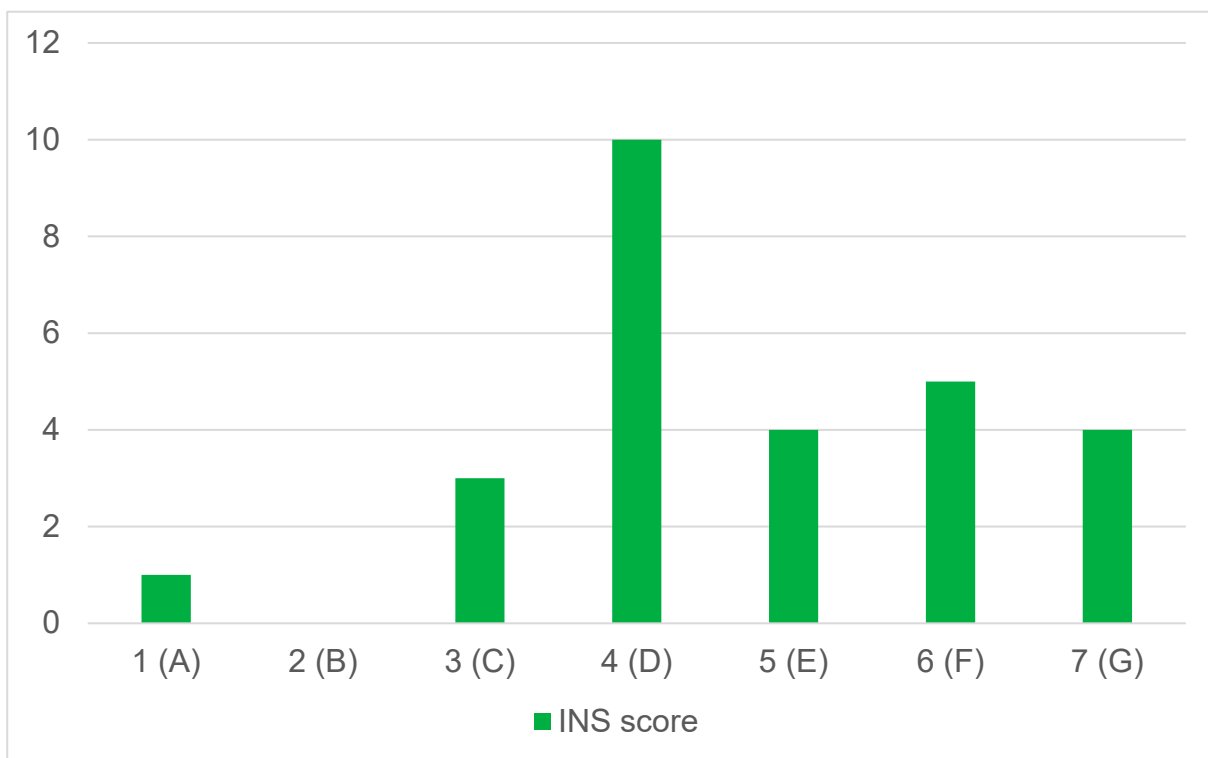
**Figure 12: Who did you mostly spend time with in nature when you were a child (tick all that apply)?**

## **Inclusion of Nature in Self (INS) scale**

Every participant completed the illustrated INS (Figure 13). The mean score for the 27 participants was 4.74 (SD = 1.48), suggesting that most participants felt moderately connected to nature, with the majority having scores close to the average.



**Figure 13: Kleespies, M., Braun, T., Dierkes, P., & Wenzel, V. (2021). Inclusion of Nature in Self Scale (Illustrated Extension).**



**Figure 14: Teachers INS score: How interconnected are you with nature?**

## Discussion

Five themes were generated from responses to the open-ended survey questions, further clarifying and supporting the teachers' responses to the single- and multiple-choice questions, which we use to structure our discussion.

### **Activities in nature with family and friends: teachers' most memorable moments in nature as a child**

When recalling time spent in nature as a child, either good or bad, the memories cited by participants were wholly positive, and most frequently involved outdoor activities with family or friends. This is in accordance with evidence that social interaction and immersive, recreational and adventure activities in nature are mediators between green space engagement and wellbeing (Mygind et al., 2019; Vanaken & Danckaerts, 2018). Two participants remembered, for example, spending 'a lot of time in the woods playing with cousins' and 'regular walks/hikes with my family in the countryside'. Others recalled den-building, cycling, camping, or completing their Duke of Edinburgh award. The majority of memories recalled did not relate to 'mundane' environments such as private gardens, but instead to diverse spaces such as woodland, mountains, beaches or countryside, in keeping with the finding that immersive experiences in nature removed from everyday environments provide immediate beneficial outcomes (Mygind et al., 2019). For example, one participant remembers 'playing in the mountains with my cousins, build[ing] dens and play[ing] by the stream'. The combination of immersive activity with significant people in these enriched, meaningful and diverse natural spaces, appears to have helped support the creation of long-term positive memories (Pretty et al., 2017), creating lasting connections with the natural world.

### **Fresh air, freedom and peace: aspects of nature valued most highly by teachers**

When conceptualising the emotional meaning that nature holds for the participants, the concept of fresh air was highly prevalent, with participants simply writing phrases such as 'fresh air', or 'fresh air, beauty'. It is known that natural green spaces can reduce particulate matter (Diener et al., 2021), and moderate air quality through less traffic and polluting activity (Elliot et al., 2023), which may help to explain this response. 63% of participants taught (and therefore likely also lived), in urban environments, and so perhaps appreciated the sense of expansive space that nature allowed them, with the implicit suggestion that fresh air is more readily available there. Simply viewing nature can alleviate perceptions of crowdedness (Liu et al., 2023) and concepts such as freedom and peace were also frequently mentioned. For example, one participant wrote that 'I enjoy the sense of freedom and space' and another wrote 'Relaxing, calming, memorable, peaceful'. The sense of escaping high density areas appears to be important to the teachers, through enhancing these feelings of freedom and solitude, but also more literal feelings of

freedom from their busy work and home environments, as exemplified by comments such as 'I feel more at peace and able to cope with my very busy life'.

## **An increase in use and enhanced appreciation of nature: teachers' changing relationship with nature over time**

It has been shown that ageing can positively impact on our ability to feel connected to nature and that this concept is highly valued particularly by older adults (Freeman et al, 2019). In addition, it has been shown that our relationship with nature changed during the Covid-19 lockdowns, with park and green space use increasing during 2020 and these same spaces seen as important for our wellbeing during the first few months of the pandemic (ONS, 2021). Perhaps reflecting this, while a few participants wrote that their relationship with nature had not changed, the majority reported that it had changed for the better as they had grown older. Participants reported that they appreciate it more, are more drawn to it, more aware of it and actively seek it out more than they did as children, with some noting, 'I appreciate it more than ever' and 'I also understand its importance now'. Some wrote that regular dog walks in nature were also a positive change for them, saying, 'having a dog has been hugely beneficial as [I] can do daily walks'. Others noted that they now have the resources to enable them to engage with nature more regularly, for example, '[I'm] lucky enough to have a campervan so holidays always centred around nature'. It is known that a nature-connected adult is more likely to pass their love of nature on to their children (Barrable & Booth, 2020b; Passmore et al., 2021) and some participants explained that they try to do this at home with their own children, writing 'now I can pass this love of nature on to my daughter' and 'as I now have a child it is important that he spends time outside as I did'.

## **The desire to be change agents in a restrictive system: teachers' personal values impacting their practice**

The concept of teachers as change agents is well-established, although this often relates to the idea of teachers as being best-placed to support 'top down' initiatives, rather than affecting more democratic 'bottom-up' approaches (Brown et al, 2021). In spite of this, some participants noted that their love of being outside had directly impacted their teaching practice, with many actively trying to create ways for the children at their schools to connect with nature, or to learn about environmental issues. Some noted that they had introduced specific initiatives in order to do this, such as the participant who wrote, 'I introduced forest school ... as I felt it was so important for the children to engage in it'. Others stated that they tried to weave nature-related themes into their regular teaching, saying for example, 'I choose to include nature in topics and activities because I believe it's important'. One participant noted a less tangible form of influence, saying 'I pass on my enthusiasm about, respect for and knowledge of nature'.



It has been argued that there is a culture of compliance and pragmatism in UK primary education (Alexander, 2010), with teachers unable to operate beyond the boundaries of a number of restrictions. This was strongly reflected by many participants, who commented on the daily restrictions they faced in being able to connect their students with nature. Primarily, this was cited as being due to the limitations/strict expectations of the curriculum and availability or quality of outdoor space, with one teacher writing, 'I feel the sheer volume of what is expected in our curriculum limits us from using the outdoors to its complete potential'. One participant cited these issues as a reason for leaving teaching altogether, saying 'the prescriptive nature of the curriculum means that I do not do what I want to – which is the reason I am leaving the profession!'. This is in accordance with research that has found primary school teachers are facing large, unmanageable workloads (Sturrock, 2021) and the National Curriculum as placing a heavily restrictive focus on core subjects such as numeracy and literacy, at the expense of other areas (Ball, 2013; Marchant et al., 2019; Ashton & Ashton, 2023). It is somewhat ironic that teachers feel unable to use their schools' outside spaces to their full potential, when it has been shown that outdoor learning can support both teacher's and children's mental health (Cottrill et al., 2022), the assessment of which is a key area judged by Ofsted inspectors when assessing schools (Ofsted, 2023).

Although state-maintained schools in England have lower levels of vegetation than privately-funded schools (Howlett & Turner, 2023), biodiversity focussed outdoor education can still be achieved even in sites with limited natural spaces (Montgomery et al., 2022). In spite of this, some participants pointed to a lack of greenspace in their own schools, saying that their ability to connect pupils with nature was, 'restricted by the school grounds' and that 'there is such limited space and surrounded by concrete here'. It has been shown that outdoor learning can enhance teachers' confidence and skills when teaching in natural settings (Cottrill et al., 2022). Some participants confirmed that a lack of experience had also led to a lack of confidence, writing, 'I do not do very many outdoor activities so I am not very knowledgeable about nature' and 'I have support from another practitioner with gardening activities as I feel less confident with these'. Fieldwork during GCSE and A-Level science has been declining over several decades, which may help to explain this lack of confidence and knowledge among the teachers, as they may not have received this training when they were students (Lambert & Reiss, 2015).

## **Taking lessons outside, mindfulness, play and adventure: teachers' aspirations for their students in nature**

It is evidenced that when outdoor adventure-based activities are integrated with academic learning, the intrinsic motivation of participants to engage more deeply in education is enhanced (Mackenzie et al, 2018). Outdoor-based learning has also been shown to improve focus and learning engagement (Jenkins et al., 2011; Marchant et al., 2019). When asked what they would ideally like to do with students in outdoor environments,

many participants expressed the desire to simply take core subject lessons outside of the classroom, saying, 'allow the children and staff to see all lessons can be taught in nature, not just a select few'. Others note that they would like to be able to use outdoor spaces for children to be active and to use natural materials in their practical lessons, such as science and maths. Participants wrote for example, 'Maths, I think the children would remember more if it was outside and physical' and 'A lot of lessons would benefit from being outside. Active maths, timeline in history, Science investigations, drama activities, reading etc'. This suggests that for some, nature holds an intrinsic value that can be used to enhance existing activities, in keeping with the evidence.

Some participants expressed the desire to let their students undertake more traditional nature-based activities such as pond-dipping or gardening, writing for example, 'Sketching. Observing wildlife', 'Pond-dipping' and 'Gardening'. Others talked about using nature to allow the children to take time out of their normal busy school routines, saying that their students could 'Spend more time just sitting quietly and taking it all in and watching the birds and the skies etc as life is such a rush'. Some felt that using the outdoor spaces would allow students some peaceful reflection or calm, writing for example, 'Sit spot meditation as a daily practice'. Many participants also expressed a desire to enable children to do the kinds of activities that they themselves enjoyed when young, saying 'Let them connect with nature through discovering, exploring, conserving, playing' or 'A camping experience e.g. putting up a tent, cooking food outside'. This suggests the symbolic significance that nature played in the minds of this cohort, and the value that they placed on their own childhood experiences in nature, as they desired to recreate these experiences for and pass on their appreciation of nature to their students (Barrable & Booth, 2020b; Passmore et al., 2021).

## Limitations

There are a number of limitations when using survey methods, including the phrasing of questions being open to personal interpretation and potential misunderstanding. For example, participants might have held different views on what constitutes free play or nature-based activities, resulting in divergent responses. Additional demographic information such as the socio-economic group that the participants belonged to when growing up and as adults, may have helped to further explain levels of nature access and connection, both in their own childhoods and as adults. It is also known that recalling childhood experiences as an adult is problematic and usually such memories contain at least some element that has been inferred or added in later, making the use of this type of retrospective data (which forms a part of the current study) problematic (Well et al., 2014), although there is no obvious way to counteract this issue. Recruiting teachers proved challenging, with the final number of participants a small and demographically homogeneous group. Time spent with children on a day-to-day basis would have varied due to the many different roles held by participants, potentially impacting their level of influence. Finally, the sample was self-selecting: it would appear that those who were the

most connected to nature felt the most engaged with the topic and were the most likely to volunteer, so it cannot be claimed that the group are fully representative, or that findings can be extrapolated wholly to others.

## Conclusions and future research

The results of the Inclusion of Nature in Self (INS) score demonstrate that this is a moderately nature-connected group. The survey data shows that participants mostly spent time in nature on a daily basis as children, in a wide variety of landscapes, taking part in various physical activities, with friends and family. Fresh air, freedom and peace were the aspects of nature most valued by participants and the majority stated that they appreciate the value of connecting with nature and use it more now they are older. Participants reported being unable to use natural spaces at their schools as much as they would like, due to the physical features, curriculum requirements, lack of confidence or knowledge, however they articulated a desire to facilitate nature engagement for their students. They had a number of practical ideas of how best to do this, including utilising outdoor learning and engaging in a variety of nature-based activities.

Due to the sample size and structure, it is not possible to draw conclusions as to whether the amount or frequency of childhood experiences of nature by teachers influences their teaching practice, in particular their propensity to teach in greenspaces. However, the study provides insight into perceived benefits and barriers which would be useful to explore through further research. The study findings indicate that there appears to be a disconnect between the prevalent belief amongst these practitioners that outdoor learning can be beneficial and their actual practice. In the current study many have stated that curriculum and unsuitable grounds are restricting factors. Interestingly, the literature indicates both that learning can be delivered more effectively outdoors, and that biodiversity focussed outdoor education can still be achieved even in sites with limited natural spaces (Montgomery et al., 2022). The need to meet curriculum demands indicate that teachers should increase not decrease outdoor learning; however, it seems that another factor is influencing teaching practice and discouraging teachers from incorporating more outdoor activities. Further research could explore the nature of these mediating factors and increase our understanding of why practitioners do not lever the benefits of outdoor teaching to relieve the burdens of the curriculum.

Future research might also gather the views of a much wider sample of teaching staff and explore what resources would be needed to make outdoor learning in nature a reality in all schools. A study investigating the impact on teachers of attending courses for forest school or outdoor learning on a similar cohort would be a valuable way to see if perceptions could be changed and increase the likelihood of practitioners using outside spaces more often in their teaching. Finally, it would be valuable to explore the INS scores of teachers, students and their parents to determine whether teachers influence nature connection in their students to the same degree as parents.

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# Appendix 1: Online survey questions

Do you agree to participate in the survey and to the use of your survey responses as described above? If you do not wish to participate, please close your browser.

Your age range:

Name of the school that you teach at:

This is so we can link your responses with those of your class, should you share the questionnaire with them and will not be used to identify you.

Please enter the first three characters of the school's postcode (e.g. BN1):

This is so we can link your responses with those of your class, should you share the questionnaire with them and will not be used to identify you.

Your role at the school (e.g. class teacher, SENCO etc):

Number or name of your class (e.g. 5A):

This is so we can link your responses with those of your class, should you share the questionnaire with them and will not be used to identify you.

Year group you usually teach in:

The gender with which you identify:

Number of years that you've been in teaching:

How much time do children spend actively engaging with nature, either on or off site, during an average week at school? (E.g. any activity where the children spend time in a natural environment, not including outdoor P.E. lessons, standard break/lunchtimes or after-school)

The type of natural environments that children have access to when at school, either on or off site (tick all that apply):

The kinds of activities the children do when they are in these natural environments (tick all that apply):

Do all children get equal opportunities to take part in these activities?

Who decides how much access to nature the children get (tick all that apply)?

How much time did you spend in nature as a child?

Where did you go in nature as a child (tick all that apply)?

What sort of things did you do in nature as a child (tick all that apply)?

Who did you mostly spend time with in nature when you were a child (tick all that apply)?

Please describe any key moments that you had in nature as a child (e.g. any particular events that stand out in your memory, or a particular person who took you out into natural environments), either good or bad. [Open ended question]

What is it about nature that you enjoy or don't enjoy? [Open ended question]

Has your relationship with nature changed as you've got older? If so, how? (e.g. how often you visit the natural environment, the activities you do, where you visit) [Open ended question]

In your professional capacity as a teacher, how much time do you spend engaging with nature with your students?

In what ways do you think your own personal values impact what you do with the children outside? [Open ended question]

What are your main aims when you are in outdoor environments with the children at school (tick all that apply)?

Is there anything which restricts you to use outside space (tick all that apply)?

Is there anything which enables you to use outside space (tick all that apply)?

If you could do anything that you wanted to do with the children in outdoor environments during the school day, what would that be? [Open ended question]

How interconnected are you with nature? (Please tick the option that best describes your relationship with the natural environment) [INS Scale]

## Appendix 2: Themes and codes generated from open-ended question responses

Guiding question	Theme	Codes
<b>Please describe any key moments that you had in nature as a child</b>	Activities in nature with family and friends: teachers' most memorable moments in nature as a child	Spending time with family and friends (18) Physical activities or playing sport (12) Nature engagement activities (10) Adventurous play (7) Camping (3) Spending hours in nature (3) Freedom from adults (2) Imaginary play (1)
<b>What is it about nature that you enjoy or don't enjoy?</b>	Fresh air, freedom and peace: aspects of nature valued most highly by teachers	Fresh air (12) Freedom (9) Peace and quiet (7) Time to notice/ be mindful (7) Escape from digital devices/ distractions (3) Feeling connected with nature/something bigger (3) Enjoying changing seasons (2) Dislike of bad weather (2)

Guiding question	Theme	Codes
<p><b>Has your relationship with nature changed as you've got older?</b></p>	<p>An increase in use and enhanced appreciation of nature: teachers' changing relationship with nature over time</p>	<p>Spend more time in nature now (17)</p> <p>Use and appreciation unchanged (7)</p> <p>More holidays in/ trips to the countryside (6)</p> <p>Passing on appreciation to children (5)</p> <p>Having a dog leading to greater use (4)</p> <p>Not getting out as much now as a child (1)</p>
<p><b>In what ways do you think your own personal values impact what you do with the children outside?</b></p>	<p>The desire to be change agents in a restrictive system: teachers' personal values impacting their practice</p>	<p>Actively creating ways for children at school to connect with nature (19)</p> <p>Restricted by lack of natural environments (4)</p> <p>Restricted by demands of curriculum (3)</p> <p>Personal values positively impact use of the outdoors with children (3)</p> <p>Not feeling knowledgeable or confident enough (2)</p>
<p><b>If you could do anything that you wanted to do with the children in the outdoor environment during the school day, what would that be?</b></p>	<p>Taking lessons outside, mindfulness, play and adventure: teachers' aspirations for their students in nature</p>	<p>Taking traditional subjects outside (7)</p> <p>Exploring/free play (5)</p>

Guiding question	Theme	Codes
		Mindfulness/ meditation in nature (3) Adventure activities (3) General nature connection (3) Pond dipping (2) Gardening (1) Visiting external outdoor spaces (1) Just being outside (1) Outside enough already (1)



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