Agents Of Nature: Understanding Teachers' Perceived Capability For Outdoor Learning Through An Ecological Systems Framework

Nicola Alison Parkin

A thesis submitted for the degree of

Doctor of Philosophy

Cardiff University

June 2025

Thesis summary

Time in nature has positive impacts on health, wellbeing, social and cognitive outcomes. Schools may equitably increase time in nature for all children through outdoor learning, but the role of the teacher is under researched. This thesis proposes an ecological model of outdoor learning, with challenges and enablers occurring at three levels: individual teacher; school environment; and national policy. An exploratory sequential mixed methods design is used to explore teachers' perceptions of their own capability for outdoor learning, and to develop a new quantitative measure of this domain: the School Contexts of Outdoor Learning (SCOOL) scale.

Study 1 explored teachers' views about outdoor learning using thematic analysis of interview data. Themes revealed conflict between teachers' expressed beliefs in the value of outdoor learning and their actual practice, with teachers perceiving both individual limitations and systemic constraints.

Studies 2i, 2ii and 2iii were used to develop and test items for SCOOL scale. Study 3 collected data from a large sample of UK teachers to enable the validation of the scale. The SCOOL scale had good internal consistency, test-retest reliability and convergent validity with other related measures. School location, country and age of children were found to be significant predictors of SCOOL scores.

In Study 4, the new SCOOL scale was used in a pre-post design to assess the impact on teachers of participating in WWT's Generation Wild programme. Teachers reported improved wellbeing, closer connection to nature and greater outdoor teaching time post intervention. Crucially, their perceived capability for outdoor learning also increased.

These findings show that the SCOOL scale is suitable both for comparison across environmental contexts and also to measure change over time. Using Generation Wild as a case study, suggestions are made for how the design of future interventions could tackle all three levels of the ecological model, to increase rates of outdoor teaching.

Table of contents

List of figures

List of Tables

Acknowledgements

There are very many people who deserve thanks: at Cardiff University, within WWT, and my friends and family who have been sorely neglected for the past four years.

At Cardiff University, my supervising team: Wouter Poortinga, Kersty Hobson and Merideth Gattis. From the first spark of interest when I read your advert during the 2021 lockdown, to the final stages of editing this thesis four years later, it's been quite the journey. Thank you all for taking a chance on me making a midlife leap from teaching in the woods to research. To my fellow PhD students in the School of Psychology, and particularly to Magie Junker for her solidarity and support. To the many undergraduate interns who helped support various research studies, particularly Karolina Wysocka, Ella Godwin, Ruby Garrison, Fatiha nur Pratiwi and Lorna Jarvis. Finally, a very special thank you to Sarah Parsons who went way above and beyond expectations in managing a large number of weighty parcels!

At WWT, thanks to my additional supervisors, Julia Newth and Jonathan Reeves. I was extremely fortunate to have your additional help and guidance, and appreciated the wider perspective you brought to writing up this work. To Mark Stead, for designing such an inspiring project (as well as exemplary proofreading skills whilst reading multiple drafts of this thesis!) To Morgan Marshall and Charlotte Levene, for providing support and troubleshooting logistical issues at different stages of the project. To the learning managers and their teams at all seven wetland centres who supported our research. It was an absolute pleasure to visit so many sites, and witness Generation Wild in action.

Finally, the personal thanks. To my former colleagues at Litton Primary school, who provided support through the lengthy process. To all the children I taught over the last twenty years, who showed me why outdoor learning mattered. To my own three beastly children, who did their utmost to provide distraction at all possible opportunities. To Kate, for everything (but we did specifically agree I would mention the many late night pick-ups from the station).

Chapter 1: Introduction

1.1   The aims and scope of this thesis

This thesis aims to explore the role played by primary school teachers in facilitating children's nature experience through outdoor learning, examining teachers' potential to act as 'agents of nature'. The research uses an ecological systems perspective, building on Bronfenbrenner's bioecological theory (1979, 2005). Agency is conceptualised as an individual teacher's capacity to teach outdoors, within the context of the school and wider education system (Priestley et al, 2015). While this may be driven by personal beliefs, knowledge, and experience, it is also shaped and constrained by broader societal and systemic factors.

This research took place within a research collaboration between Cardiff University and WWT (the Wildfowl and Wetlands Trust), and participants in two of the studies described in this thesis were teachers taking part in WWT's Generation Wild programme. Generation Wild is an environmental education programme targeted at primary schools in disadvantaged areas, which seeks to increase children's nature connection and wellbeing. Phase 1 of the programme launched in September 2021, and ran to August 2024; phase 2 commenced in September 2024 and will run until August 2027. The research presented in this thesis took place during phase 1 of the programme. Observations of Generation Wild visits, and conversations with participating teachers and children, also influenced the researcher's thinking around disadvantage, equity and inclusion in a much wider sense. Therefore, this opening chapter describes the aims, design, and delivery of Generation Wild as essential context to the studies presented in later chapters. It shows how the actions of the class teacher are central to children's engagement in Generation Wild, justifying the research focus on teachers and schools.

In alignment with the Generation Wild programme, this thesis focuses on primary school teachers working with children in disadvantaged areas of the UK during the years 2021 to 2024. The timing is particularly relevant as the lockdowns and school closures during the first year of the COVID-19 pandemic had a large, but differential, impact on the time that

children in the UK spent outdoors, widening existing inequalities (People and Nature Survey, 2020). More than four years after the pandemic began, there are still profound concerns over the impact of lockdowns and school closures on children's wellbeing (Sharma and Tate, 2023). As Holt and Murray emphasise, "the impact of COVID in the UK has to be viewed within the context of ten years of Austerity, a populist government, and the stresses on the economy and instability caused by the UK's departure from the European Union" (2021:488). During 2022, a period of rapid inflation in food and fuel prices further intensified the crisis in child poverty and wellbeing occurring in the UK.

Section 1.2 provides definitions of how the terms "outdoor learning" and "disadvantage" are used in this thesis acknowledging that different definitions may be used by other authors. Section 1.3 explores conceptualisations of children's relationship to nature, critiquing the problematic assumptions inherent in some narratives, and considers the potential of schools as sites for children to access nature. Section 1.4 gives an overview of Generation Wild, describing its aims and scope; its design and delivery; and particularly, the role played by teachers in successful delivery of the programme. Finally, section 1.5 states the specific research goals and section 1.6 outlines the chapter structure of this thesis.

1.2   Defining key terms used in this thesis

1.2.1   Defining outdoor learning and teaching

Outdoor learning can be used to describe a wide range of educational activities and experiences that take place beyond the indoor classroom setting. The UK-based Institute of Outdoor Learning offers a definition of outdoor learning as "actively inclusive facilitated approaches that predominantly use activities and experiences in the outdoors which lead to learning, increased health and wellbeing and environmental awareness" (2021: 21).

Outdoor learning is not exclusive to schools, and this kind of activity is common in the UK outside school settings, for example in Girlguiding and Scouts. However, this thesis focuses on school-based outdoor learning, defined by Waite as "teaching and learning that take

place in natural environments for children in formal education and care settings" (2020:1). Similarly, within the context of the Scottish curriculum, outdoor learning has been defined as, "All kinds of curricular learning that might take place outside the classroom in the local environment" (Beames et al, 2012:4).

For the purposes of this thesis, school mediated outdoor learning is considered to include any adult instructed or adult facilitated learning activity which takes place in any outdoor space during lesson times. This definition is deliberately kept broad and inclusive in that it is not conceptualised as being limited by pedagogical approach, learning intent, type of environment or frequency. However, it does exclude outdoor play times, and any optional extracurricular activities taking place outside the school day. This will be referred to simply as 'outdoor learning' throughout this thesis for the sake of brevity.

Delineating exactly which activities should be considered as outdoor learning is not a straightforward decision, and has implications for both research methodology and interpreting research findings, which are discussed in the relevant study chapters. Teacher participants in this research described activities across a broad spectrum, varying from brief outdoor segments lasting for a few minutes taking place within a curriculum lesson, to trips offsite and projects such as Generation Wild. Outdoor learning took place across all subject areas of the curriculum- although it was most commonly mentioned within PE and science lessons. Not all outdoor learning was directly curriculum linked; sometimes it was seen as a tool for increasing wellbeing and resilience. Whilst much outdoor learning could also be considered as environmental education, this was not always the case. Learning took place across a wide range of environments, usually within, but occasionally beyond, school grounds. Not all locations were nature rich, but they were all outdoors, and therefore offered the potential for children to form connections with the more than human world.

In this thesis, the term 'outdoor teaching' is used to describe the role of the adult educator in instructing or facilitating outdoor learning activities. Most often this educator is a graduate who has achieved qualified teacher status, but this may also encompass support staff, such as teaching assistants, and students in the process of qualifying as teachers

through initial teacher training. The impact and relevance of different pedagogical styles to outdoor learning practice will be considered later in this chapter.

A final point of relevance is that a variety of other terms have been used almost interchangeably within the wider literature to describe similar educational activities. These include nature-based learning (Jordan & Chawla, 2019), Learning in Natural Environments (Dillon & Lovell, 2022), and Nature Specific Learning Outside the Classroom (Mann et al, 2022).

1.2.2   Defining disadvantage

In the English education system, disadvantaged pupils are defined as "those who are currently eligible for free school meals (FSM) or have been eligible for FSM at any point in the last 6 years; looked after by the local authority; or previously looked after by the local authority or other state care" (DfE, 2024b). The pupil premium was introduced in 2011 to help close the gap in educational attainment between disadvantaged pupils and their peers. It is an additional payment given to schools for each child meeting the FSM criteria. In 2023/24, primary schools received £1455 in pupil premium for each eligible child. Although guidance is clear that "pupil premium is not a personal budget for individual pupils and schools do not have to spend pupil premium so that it solely benefits pupils who meet the funding criteria" (DfE, 2024b:3), schools are required to develop, deliver and monitor a Pupil Premium strategy statement. This means that teachers and schools must be aware of levels of disadvantage within their school's pupil population- although not necessarily which individual children are eligible-and of educational outcomes for disadvantaged children. Outcomes for disadvantaged pupils are a key metric of accountability, with published performance tables comparing schools, and a focus for OFSTED inspections.

During the 2023-24 school year, 24.6% of pupils in England were eligible for free school meals; this proportion has increased every year since 2017/18. Broadly comparable funding streams, with similar stated purposes, exist in each of the devolved nations: in Wales, the Pupil Development Grant; in Scotland, Pupil Equity Funding; and in Northern Ireland, Pupil Premium (but a separate scheme using a higher household income eligibility threshold than

England). Research by the Child Poverty Action Group (2022) estimated that an additional 800,000 children in England were living in relative poverty after housing costs, but did not qualify for free school meals. Section 1.4.2 describes how WWT uses the proportion of pupils within a school eligible for free school meals as the eligibility criteria for accessing the Generation Wild programme.

Where the term disadvantage is used in this thesis, a broader definition is intended than that which is used for FSM eligibility, taking the view that disadvantage may exist in many forms beyond absolute economic deprivation. Disadvantage in the educational context is also frequently understood in a wider sense, to include: children living in relative poverty (including some who are not eligible for FSM); children with SEND; children experiencing social, emotional and mental health difficulties; vulnerable children with a challenging home life; children who speak English as an additional language, and those who are from a minoritised ethnic background (Sharma and Tate, 2023).

The label of disadvantage can be problematic as it carries pervasive negative connotations, and assumptions of deficit may be made in some contexts. However, analogous to the central premise of the Social Model of Disability, that individuals are *disabled by* societal failings, my assumption is that some groups of children and young people are *disadvantaged by* the education system.

1.3   Children and nature

This section first summarises existing evidence that nature is associated with a range of positive health and wellbeing outcomes for children and considers mechanistic psychological pathways. Secondly, it critically appraises the psychological construct of nature connection. Thirdly, it examines inequalities in access to nature within the UK. Finally, it considers the positioning of schools as potential sites for children to access nature.

1.3.1 The effects of nature on human health and wellbeing

There has been a wealth of research over the last few decades exploring the relationship between natural environments and human health and wellbeing. Markevych et al (2017) summarise the three main functions of greenspace as: reducing harm through lowering exposure to pollution, heat and noise; restoring capacity through attention restoration and physiological stress recovery; building capacities by providing space for increased physical activity and social interaction. The benefits, for children specifically, of spending time in nature and forming a closer connection to nature has been a rapidly expanding research area (Chawla, 2020; Ives et al, 2017). Children's time in nature is associated with cognitive benefits (Berman, Jonides and Kaplan, 2008); positive social and emotional outcomes (Mygind et al, 2021); and increased communication and responsiveness (Cameron-Faulkner, Melville and Gattis, 2018). Time in natural environments is also associated with increased physical activity, healthy weight, and better general health for children (George et al, 2024; Islam et al, 2020).

Two key psychological approaches which have been proposed to explain the pathways between time in nature and health and wellbeing outcomes are Attention Restoration Theory (ART) and Stress Reduction Theory (SRT). Whilst these approaches offer distinct mechanisms to explain the relationship between time in nature and improved wellbeing, there is considerable overlap, and the approaches may be best viewed as overlapping and complementary processes rather than mutually contradictory theories (Kaplan, 1995; Markevych et al, 2017).

ART (Kaplan and Kaplan, 1989, 1995) states that concentration and mental fatigue can be improved by spending time in natural environments that are rich in inherently fascinating stimuli. A key characteristic of restorative environments is soft fascination: aspects of the environment that involuntarily capture attention in ways that require little effort, so allow mental space for reflection. In natural environments, these may be elements such as leaves blowing in the wind, or ripples travelling across water. In contrast, urban environments contain stimuli that capture attention, requiring top-down cognitive control of directed attention, such as the need to avoid traffic. Berman, Jonides and Kaplan (2008) used an

experimental approach to show that both direct (walking in nature) and indirect (viewing pictures of nature) experiences can improve performance on cognitive tasks requiring directed attention, supporting attention restoration theory. Dadvand et al (2015) found that primary school children with greater exposure to green space at home and at school had better working memory and less inattentiveness. Their modelling suggested that this beneficial association is, at least partly, mediated by reduction in exposure to air pollutants.

Stress Reduction Theory (SRT) was proposed by Ulrich (1991) and holds that exposure to natural environments can promote recovery and healing by increasing positive emotions and reducing arousal and negative emotions. This contrasts with urban settings which may hinder this process and have adverse effects on health outcomes. A recent meta-analysis (Yao, Zhang and Gong, 2021) found exposure to nature was associated with multiple measures of health and wellbeing, including salivary cortisol, anxiety, self-reported stress, blood pressure and heart rate variability. Wells and Evans (2003) found that nearby nature acted as a buffer for the effect of stressful life events on children's psychological distress.

1.3.2. The construct of nature connection

The construct of nature connection refers to the relationship between humans and the rest of the natural world. The terms 'connectedness to nature', or 'nature relatedness' are also commonly used. Nature connection is variously described as an individual's sense of inclusion within the natural environment (Schultz, 2002), or the closeness (Wilson, 1984) or oneness (Mayer and Frantz, 2004) of the relationship between an individual and the natural world. Nature connection is considered separate and distinct from contact with nature, pro-environmental behaviour and environmental knowledge (Whitburn, Linklater and Abrahamse, 2020). Researchers from different disciplines have debated whether nature connection is best understood as a measurable psychological trait or as a dynamic, culturally embedded relationship.

Within environmental psychology, nature connection is conceptualised as an objectively measurable psychological construct encompassing affective, cognitive and experiential dimensions of an individual's relationship with nature. Human-nature connection can be

16

understood through Wilson's biophilia hypothesis (1984), which states firstly that humans have an innate affinity to living things and a tendency to seek connections with nature, and secondly that this affinity is evolutionary.

Perspectives from human geography and anthropology, however, extend this understanding by emphasising that human relationships with nature are always culturally situated, relational, and shaped by contexts (Ingold, 2000; Whatmore, 2002). These approaches highlight that relationships with nature may not be universal, as they are mediated through diverse worldviews and practices. Therefore, a more inclusive approach to nature connection should place individual psychological experiences within the reality of the sociocultural context. Qualitative studies with minoritised groups of young people have highlighted that factors such as urban living, poor access to safe outdoor spaces, socio-economic status, racialisation, and cultural identity strongly influence experiences of nature (Bell, Thompson, & Travlou, 2003; Broch, 2022; Horton & Kraftl, 2018; Smith & Pitt, 2022). For some groups, interactions with nature may be constrained by safety concerns, social norms, or historical exclusions (Boyd et al, 2018; King & Church, 2013). These findings challenge any conception of the universality of nature connection.

Within psychology, debates persist regarding the extent to which complex constructs such as nature connection can be meaningfully measured through quantitative instruments. Proponents argue that nature connection can be operationalised as a psychological trait, and measured using a validated psychometric scale. There are many different measures of nature connection, which measure subtly different aspects of the construct (Tan, 2013). Commonly used instruments include the Connectedness to Nature Scale (Mayer & Frantz, 2004), the Nature Relatedness Scale (Nisbet, Zelenski, & Murphy, 2009), and the Inclusion of Nature in Self scale (Schultz, 2001). These instruments all have good psychometric properties of internal consistency and predictive validity. This type of quantitative approach is valued for cross-population comparability, and the potential to inform sustainability policy (Ives et al, 2017).

A significant limitation of most nature connection measures is that scores are distinctly negatively skewed, causing a ceiling effect, particularly where studies seek to demonstrate an effect of interventions. Additionally, as with all measures relying on self-report, nature connection instruments are prone to social desirability bias and attitudinal–behavioural gaps (Kals, Schumacher, & Montada, 1999).

While standardised instruments can enable empirical comparison and theoretical development, they may privilege Western individualist framings and underrepresent culturally and situationally diverse experiences. Bell et al (2019) argue that such framings risk oversimplification, and call for reflexivity about the epistemological assumptions underpinning measurement of nature connection and wellbeing. They caution that simplistic assumptions about exposure and wellbeing can overlook the diversity and complexity of human-nature relationships, emphasising that benefits depend not only on the quantity of exposure but also on the quality of natural spaces, individual experiences, and socio-cultural context. Existing measures of nature connection may inadequately capture context-dependent, embodied, or culturally specific experiences of nature, particularly for young people in urban or socially diverse settings (Bell et al, 2019; Birch et al, 2020). As most scales were developed in Western, educated, industrialised, rich, and democratic (WEIRD) populations, this may limit their validity across diverse cultural settings (Martin et al, 2020).

Despite these critiques and limitations, there is good evidence that the construct of nature connection is associated with positive outcomes. In adults, stronger connection to nature is positively associated with wellbeing (Pritchard et al, 2020), as well as increased pro-environmental behaviour (Evans, Otto and Kaiser, 2018). The association between connection to nature and wellbeing has been less thoroughly studied for children (Chawla, 2020), but a recent review of the literature found positive effects of nature connectedness on wellbeing (Arola et al, 2023). Therefore, increasing nature connection and wellbeing are argued to be desirable outcomes for environmental education interventions (Barrable et al, 2024).

Louv's *Last Child in the Woods* (2005) popularised the concept of 'nature-deficit disorder' to a wider audience beyond academia, arguing that children's reduced exposure to nature

contributes to a range of physical, psychological, and social problems. Louv's work has been hugely influential in popular discourse around children's outdoor play and learning, and is often cited in support of outdoor education programmes and initiatives to integrate green spaces into schools. However, within academia it has been critiqued, with Dickinson (2013) suggesting that framing children's disconnection from nature as a disorder oversimplifies the complex cultural and contextual factors underlying this issue. Dickinson argues that Louv's approach relies on a simplistic fall-recovery narrative, calling for a return to nature while neglecting the broader contextual factors that shape children's experiences.

In this thesis, the term 'nature connection' is used in a plural and diverse sense, describing any relationship an individual has with the more-than-human world around them, and accepting that this is shaped and constrained by the social and cultural environment in which they live. Connection to nature is not assumed to be automatic, universal, or unproblematic, but instead considered as socially constructed, culturally mediated, and relational. The research described here acknowledges the utility of quantitative measures, whilst recognising their limits, embracing the need for methodological pluralism and critical reflexivity (this is explored at greater length in chapter 3).

1.3.3 Inequalities in access to nature and experience of nature

Despite this evidence suggesting that nature is beneficial for mental and physical health, some researchers have challenged the assumption of a universal and inherently positive relationship human-nature relationship. Bell et al (2019) caution against reducing nature to a prescriptive "healthy dose," arguing that such framings risk oversimplifying experiences and overlooking socio-cultural inequalities. Boyd et al (2018) demonstrate that non-visitation of natural spaces is shaped by practical, social, and perceptual barriers, particularly for marginalised groups. Individual experiences of outdoor spaces are structured by social hierarchies, cultural norms, and material realities. Given the evidence summarised in the previous section suggesting benefits of spending time in nature, it is important to understand how disadvantage may impact both children's time in nature, and the benefits they gain from nature.

The equigenesis hypothesis (Mitchell and Popham, 2008) proposes that neighbourhood greenspace may mitigate socioeconomic inequalities in health and wellbeing. In a systematic review of 90 studies, Rigolon et al (2021) found strong evidence to support a greater beneficial effect of nature on health for individuals with low socioeconomic status and suggest that greenspace could be a key tool to address disparities in health. The following section sets out how disadvantage may impact children's time in nature.

There has been widespread concern throughout the last decade over both the headline statistic that one in nine children in England have not visited any natural environment for over 12 months (Hunt et al, 2016), and the differential finding that children from low income and BAME families were disproportionately likely to be in this group. The UK children's Monitor of Engagement with the Natural Environment (MENE) survey shows stark variation in the time children spend in natural environments, by both Index of Multiple Deprivation (IMD) decile and ethnicity. For the most deprived decile of the population, 61% of children spent time outdoors at least once a week compared to 81% of children in the least deprived decile. In addition, 70% of children from white households visited a natural place at least once a week compared to 56% of Black and Minority Ethnic children (MENE, 2019).

There are many reasons for this disparity in time in nature between population groups. A key issue is the availability of neighbourhood greenspace, with more affluent wards in England having five times more parks and greenspace than the most deprived wards (CABE, 2010). Around one in eight English households has no access to a garden, with less affluent and black and minority ethnic households disproportionately affected (ONS, 2020).

In addition to living conditions and circumstances, there are further complex social and economic reasons why children have differential access to greenspace. Boyd et al (2018) found that those with lower income, and poorer health were less likely to visit natural places, and identified practical, psychological and social barriers. Birch, Rishbeth, and Payne (2020) emphasise that whilst urban green spaces provide non-judgmental environments conducive to wellbeing, that experience varies with cultural background, socioeconomic status, and familiarity with nature.

Waite et al (2021) identified less well understood barriers, including poor understanding of what young people value, fear of the unknown, lack of representation and failure to consider a variety of cultural norms. Smith and Pitt (2022) likewise emphasise the problem of lack of representation of minoritized ethnic groups in natural outdoor places. Broch highlights how perceptions of exclusion, unfamiliarity, and cultural difference shape outdoor experiences for some minoritised groups (2022). Zaidi and Pitt (2022) highlight how language can be a particular barrier to family visits to public spaces in cultures that prioritise socialising as an extended multi-generational family, as although children speak fluent English, older generations may not. Markevych et al (2017) suggest that the causal pathways between nature and health and wellbeing benefits are likely to vary within and between population groups, and that understanding contextual factors is critical.

Children's and young people's experiences of outdoor spaces are frequently mediated by tensions, complicating the idea that nature connection is universally accessible. Bell, Thompson, and Travlou (2003) show that urban fringe woodlands in Scotland are simultaneously spaces of autonomy and sites of adult regulation, reflecting generational conflicts over space. Cloke and Jones (2005) extend this perspective by exploring "disordered" or marginal spaces, revealing that children's imaginative and embodied engagements often occur outside adult-sanctioned green spaces. Horton and Kraftl (2018) used their participants' experiences of "rats, assorted shit and racist groundwater" to contest simplified notions of childhood-nature relationships in deprived urban areas. However, this is not only an urban issue, as King and Church (2013) demonstrate in their exploration of rural youth identities. They found that many young people reject traditional countryside activities, preferring alternatives such as sports which align with peer culture.

These findings suggest that meaningful engagement with outdoor environments is context-dependent, challenging assumptions of universality embedded in standard measures of nature connection. A simplistic application of the construct of nature connection risks obscuring the socio-cultural, and structural factors that shape young people's engagement with outdoor spaces.

1.3.4 The role of schools and teachers in increasing children's contact with nature

Schools and teachers have been positioned as having the potential to equitably increase all children's access to green space for both play and learning (Bates et al, 2018; Bikomeye et al, 2021). Children in the UK spend around six and a half hours per day in school, for 190 days of each year, and school grounds cover over 500 million m^2 (Department for Education, 2021). Primary schools, in particular, have great potential to facilitate nature access and nature connection in an equitable manner (Barrable, 2019a; Ives et al, 2018; Lankenau, 2018). As the UK charity Learning Through Landscapes states in their mission statement, "This is where children and young people will derive the greatest benefit, as the school playground is the one outside space to which children have frequent access" (LTL, 2023).

Yet evidence also demonstrates persistent structural and cultural barriers meaning that the school environment may not provide equitable access to nature. These problems are particularly acute when considering the unequal provision of green space across schools in the United Kingdom, especially in urban and deprived areas. Disparities in both size and quality of greenspace directly limit opportunities for outdoor play, environmental learning, and everyday contact with nature. Schools in densely built areas may have little more than tarmac playgrounds, whilst in wealthier or more rural areas school grounds may contain woodlands, sports fields, and gardens. This gap in availability of greenspace reflects broader structural inequalities (see previous section), and underscores how school grounds themselves may potentially exacerbate, rather than mitigate, social divisions. In the UK, children in schools with a low percentage of Free School Meals, in smaller settings, or situated in rural areas are more likely to have daily opportunities to spend time in nature within school (WWF, 2024). Thus, a reliance on schools as sites for nature access may risk widening existing inequalities.

Cultural and ethnic inequalities may further shape how children experience school grounds as sites of nature connection. National surveys suggest that children from Black, Asian, and minority ethnic (BAME) backgrounds are less likely to report frequent engagement with nature outside school, which can influence how meaningful they find school-based outdoor learning (Hunt et al, 2016; MENE, 2019). Waite et al (2023) emphasise that structural and

cultural barriers, concerns about safety, and limited representation in outdoor leadership restrict the inclusivity of outdoor programmes. Similarly, a report examining inclusion within the UK outdoor education sector (Anderson et al, 2021) highlights how outdoor education materials and narratives often privilege white, middle-class experiences of nature. If school grounds and curricula replicate these exclusions, outdoor learning risks reinforcing rather than challenging cultural inequities.

However, there has been a decline in outdoor teaching and learning in the UK in recent decades, and teachers perceive substantial barriers (Prince, 2019). Whilst a body of literature exists about the barriers and enablers to outdoor teaching (for example, Oberle et al, 2021; Patchen et al, 2022; van Dijk-Wesselius et al, 2020), many of these factors differ markedly across time and place, and therefore caution is needed when generalising findings from studies of a different country, education system or time period.

This thesis aims to increase understanding of the teacher's role in facilitating children's nature connection and nature experience through outdoor learning in UK primary schools. The literature on teachers, schools and outdoor learning is evaluated more fully in chapter 2; the place of outdoor learning within the education systems of the four UK nations is also examined. The role played by teachers within Generation Wild is described in the following section of this chapter.

1.4   The Generation Wild programme

Generation Wild explicitly seeks to address the problem described above: that although time in nature may counteract the negative effects of poverty on wellbeing, evidence shows that disadvantaged children spend less time in nature than their peers.

1.4.1   The aims and scope of Generation Wild

The Generation Wild programme (Stead, 2022; 2023) is designed and delivered by WWT, and aims to increase primary school children's nature connection and wellbeing. The

programme is specifically targeted at schools with relatively high levels of financial disadvantage. Geographically, participating schools are clustered within approximately an hour's travelling time around the seven WWT wetland centres: five in England, one in Wales and one in Northern Ireland (see figure 1.1). Generation Wild offers participating schools an initial class visit to one of the seven wetland centres, with the costs of transport fully funded. After the visit, children can access a website (WWT, 2021), which describes over 50 nature connection activities. Children are encouraged to complete 10 activities to earn a badge and certificate, as an incentive for continued engagement. Every child receives a ticket for a free family return visit to the wetland centre.

Figure 1.1. Map showing location of schools participating in Generation Wild around the seven WWT wetland centres (created by Mark Stead, 2023)

1.4.2 Eligibility criteria for Generation Wild

Eligibility for Generation Wild is defined by the percentage of children in a school eligible for free school meals (FSM), with the most deprived quintile of schools in the area around each centre qualifying for the programme (see figure 1.1 for location of centres). As levels of disadvantage vary across regions of the UK, this means the minimum FSM threshold to qualify for Generation Wild also varies, from 20% for schools around the Arundel centre in Sussex, to 45% for schools around Castle Espie in Northern Ireland. Descriptive statistics were estimated for all children participating in Generation Wild using school census data (Parkin & Junker, 2023). In schools taking part in Generation Wild, 41% of children were eligible for free school meals (England average 24%); 28% spoke English as an Additional Language (England average 21%); 44% of children taking part in Generation Wild were from a BAME background (England average 36%); and 21% were identified as having special educational needs or disability (England average 13%). However, these averages mask a great deal of variation between participating schools, with the proportion of children in a school eligible for free school meals ranging from 23 to 72%, and proportion of pupils from a BAME background varying from 5 to 100%.

1.4.3 The design and development of Generation Wild

Generation Wild follows on from a previous WWT programme, Inspiring Generations, which ran from 2012 to 2018 and offered free visits to wetland centres for schools in disadvantaged areas. The Inspiring Generations visits had a focus on knowledge acquisition and included a curriculum linked guided learning session, such as: 'How do animals live in a pond?, 'How do birds fly?' or 'Which invertebrates live in wetlands?' (WWT, 2019). Research into the impact of this programme found the greatest impact for children in the schools with the highest levels of disadvantage, with increased interest in wildlife and nature in the weeks following the wetland visit. However, this impact was short-lived: children's attitudes and activity levels reverted to pre-programme levels after 6 to 12 months, with qualitative findings suggesting that this was a consequence of a lack of continued related stimulus at home or school (WWT, 2017). Generation Wild was designed to build on what had been learned from the evaluation of Inspiring Generations in several ways: by promoting nature

connection rather than knowledge acquisition; and by aiming to involve both families and schools for a longer period, beyond the site visit.

The Generation Wild programme was originally conceived in 2018; the programme received funding (from an anonymous charitable donor) in 2019, and design work began in 2020. Phase 1 of Generation Wild launched in September 2021, and ran until July 2024, reaching approximately 45,000 children at a cost of £1.6 million. Phase 2 runs from September 2024 to July 2027.

1.4.4   The Cardiff University WWT research collaboration

In January 2021, WWT released a research brief for an academic organisation to evaluate Generation Wild. An interdisciplinary team of academics at Cardiff University were chosen as the evaluation partner, and the collaboration began in February 2021. Generation Wild launched as the new school year began in September 2021. I began my PhD in October 2021, and observed several Generation Wild visits towards the end of that month. Data collection for study 1 ran during year 1 of the programme, from January to July 2022; study 4 ran during year 3, from January to July 2024. Other research activities (not described in this thesis) were undertaken throughout phase 1.

A key aim of the collaboration was to evaluate the impact of Generation Wild, but my research questions go far beyond a simple evaluation of the programme. The collaboration with WWT offers a rare opportunity to assess the impact of a large real-world intervention on teachers and children in a way that allows the examination of processes of change. Over the course of the first year, my research interests gradually evolved to focus on the role of teachers and schools in facilitating time in nature for children. This may have been an inevitable consequence of my own previous career in teaching, but it also arose from observations of the limitations of teacher engagement with the programme (see chapter 3).

1.4.5 The role of the teacher in Generation Wild

In addition to signing their class up to the programme in the first place, and accompanying children on the wetland trip, Generation Wild requires ongoing teacher engagement over a period of around six to eight weeks, as described below. Teachers are explicitly asked to perform several tasks: setting up individual pupil logins on the website for each child in their class; reading a story in preparation for the visit; and crucially, making time in class for follow up activities. Teachers also act as a channel of communication to children's families, encouraging the completion of activities with family members at home.

There is also the implicit role of teachers in promoting interest and engagement, as role models have been shown to be an important factor influencing children's nature connection (Chawla, 2020; Bergan et al, 2023). Existing literature on the role of teachers in outdoor learning is reviewed in Chapter 2. Therefore, if children are to remain meaningfully involved in Generation Wild beyond the initial wetland visit day, understanding teachers' perspectives is vital. WWT staff have designed and planned for every aspect of programme delivery during the relatively brief school trip to a wetland centre. However, everything that happens before and after that visit is dependent on the class teacher's engagement and enthusiasm. WWT acknowledges that "it is children's teachers and families who are best able to facilitate a long-term connection with the natural world" and one of the stated aims of the programme is "to empower teachers" (Generation Wild website, 2021). However, whilst the programme funds the school visits and transport costs, there is little funding available to help teachers overcome barriers to participation in school. Qualitative research conducted with WWT staff identified communication with teachers as being an issue which particularly impacted the experience of children with Special Educational Needs and Disabilities (SEND) during site visits (Godwin et al, in press), reinforcing the need to focus on the role of the teacher in facilitating children's engagement with the programme.

If the Generation Wild programme could be shown to improve teachers' sense of capability for outdoor learning and frequency of outdoor teaching, then there is the potential to create a much wider impact on future classes taught by those teachers- even when the children have not themselves taken part in the programme. This would provide evidence to support a

new mechanism by which school mediated nature connection programmes such as Generation Wild could go on to have an indirect impact on future cohorts, through bringing about lasting changes to teachers' attitudes towards outdoor learning.

1.4.6   The structure of the Generation Wild programme

This section gives further relevant detail on the design and delivery of Generation Wild. The programme is built around the wetland site visit, but there is also considerable activity designed for teachers to complete with their class pre and post visit, and WWT envisage participation lasting for around 6 to 8 weeks in total. The information below is set out in chronological order: first, the activities which build up to the class wetland visit; then what happens during the visit; finally, the follow-up to the visit.

Before the wetland visit

Teachers are invited to make a site visit in advance of bringing their class; however, many choose not to, due to time pressures, and distance from the wetland site. They are also given the option of attending a live webinar briefing or viewing a pre-recorded version to explain the purpose of the Generation Wild programme. These briefings were developed in year 2 of delivery, in order to improve teacher engagement. The briefings clarify the aims of the programme and reinforce the expectation of continuing activities in school in the weeks following the wetland visit. The programme is based on the strong central narrative of Ava (a magical puppet character who is half girl, half bird). Teachers are asked to read the beginning of Ava's story to their class before the visit, but not to explicitly link this to the coming wetland trip, in order to retain an element of magic and surprise for the children.

During the wetland visit

The wetland visit uses a mix of drama and technology to provide an immersive experience. When the children first arrive at the centre, they are walked through the wetland to an area where a giant nest has been constructed. The children are not told that they will 'meet' Ava,

but she emerges from the nest unannounced, and children watch a five-minute puppet performance (see image 1.2). During the performance, Ava asks the children if they will carry out nature connection activities around the wetland site. She tells the children that if they complete the activities, this will show the animals that they care about helping nature, and the animals might trust them enough to talk.

Image 1.2. Children watching the Ava puppet performance. Credit: WWT, 2021.

After the puppet performance, the class splits off into smaller groups, with a teacher or teaching assistant, and (ideally) around ten children. Each group follows one of three routes around the centre, guided by a map. Each route visits three activity posts, which are named after wetland species such as woodlouse and lapwing. At every post, the children complete a nature activity, taking anything from two to fifteen minutes. For example, children are asked to 'Build a nest', and 'Listen for bird calls' (see images 1.3 and 1.4). Once they have completed the activity at the post, children use one of Ava's magical 'translator phones'- actually a well disguised MP3 player- to listen to a two-minute message from the wetland creature (see image below). These messages add more detail of Ava's story and encourage children to care for nature.

Image 1.3. Text from the lapwing post. Credit: WWT, 2021

Once each group of children has visited their three posts- completing the nature activities and listening to the animals' messages- they return to the nest. The whole class watches a final six-minute puppet performance together, which ends with Ava flying off on her migration to find her family in West Africa (image 1.5). This ends the structured element of the Generation Wild programme. From the start of the introductory puppet performance to the end of the second performance typically takes around 1 hour 20 to 1 hour 30 minutes. This can vary depending on the age of the children, weather and travel times. Classes typically spend between 3 and 4 hours in total at the wetland site, with the remainder of their time spent eating lunch, exploring the site and using the playground.

Image 1.4. Children using a translator phone to listen to an audio message from a wetland creature. Credit: WWT, 2021.

Image 1.5.   Children watching Ava fly off to find her family. Credit: WWT, 2021.

After the wetland visit

After their wetland trip, children can access the Generation Wild website, which describes 54 nature connection activities (for example, making a bird feeder, walking barefoot, and dancing in the rain). Children are asked to complete 10 activities and record them on the website to earn a badge and certificate. The activities are designed to relate to the five pathways to Nature Connection- contact, beauty, meaning, emotion and compassion- identified by Lumber, Richardson and Sheffield (2017). Accessibility and inclusion have been prioritised: the activities were designed to require minimal equipment or specialist knowledge, and can be done in any safe local green spaces such as gardens, school grounds or public parks.

Image 1.6. Children taking part in a Generation Wild activity. Credit: WWT, 2021.

An additional aspect of the programme's design, aiming to create longer term impact, is that every child receives a ticket for a free family return visit to the wetland centre. During this visit, families can complete a modified version of the Generation Wild routes, completing

activities and using a translator phone to listen to a slightly different set of audio tracks. This is only offered to families who book in with the Generation Wild return tickets, and is not currently available for general public visits.

1.4.7 Generation Wild impact statistics

In the three years from September 2021 to July 2024, over 45,000 children have taken part in the programme, from 1504 classes across 605 schools (Stead and Marshall, 2025). Over 150,000 nature activities have been recorded on the Generation Wild website. Overall, 16% of children completed 10 activities and became a 'Guardian of the Wild'; however, this varies considerably across the seven sites, from 11% to 51%. Almost 3000 families have made a return wetland centre visit using the free tickets.

These headline summary figures prompt questions which go beyond the scope of this thesis, and are therefore not addressed herein, but would be interesting to explore in future research: what differentiates the children who do complete activities from those who do not? Why are there such marked differences between the seven sites? Which families make the return visit? And who does not return, and why?

1.5 Research Goals

This thesis aims to explore the role played by primary school teachers in facilitating children's nature experiences through outdoor learning. To achieve this aim, three interrelated research goals were developed. The goals are connected through a sequential mixed methods design, in which initial qualitative insights inform the development of a quantitative measure that is subsequently used to assess the impacts of a nature connection programme. The sequential mixed methods design is described in Chapter 3.

Research Goal 1: The qualitative exploration of teachers' perceptions and experiences about schools as sites for enabling disadvantaged children to spend time in nature.

This goal arose from recognition that, although teachers play a significant agentic role in environmental education programmes, this has not always been recognised in programme design. It is also crucial to acknowledge the current magnitude of social inequalities in the UK, and how these inequalities may shape disadvantaged children's opportunities to engage with nature.

Within this broad goal, three specific subgoals, or questions of interest, were defined:

RG1a) Teachers' perceptions and experiences of how children benefit from time in nature.

RG1b) Teachers' perceptions and experiences of how disadvantage affects children's access to nature, and how outdoor teaching can help address inequalities in access to nature.

RG1c) Teachers' perceptions and experiences of the barriers and enablers to outdoor teaching in UK primary schools.

RG1a and RG1b were addressed through Study 1 and reported in Chapter 4; RG1c was addressed through Study 1 and reported in Chapter 5. The findings of Study 1 informed the development of an ecological model of the barriers and enablers of outdoor learning, which leads directly into the second research goal.

Research Goal 2: The development and validation of a novel quantitative measure of School Contexts of Outdoor Learning (SCOOL).

The SCOOL scale is based on the ecological model of barriers and enablers of outdoor learning. The measure allows quantification of the respective importance of individual teacher beliefs and knowledge versus systemic structural constraints in shaping teachers' practice. It permits systematic comparisons both between teachers working in different contexts, and also the evaluation of change over time for teachers and schools taking part in

interventions. The interview data from Study 1 were used to generate items for the SCOOL scale, ensuring its ecological validity.

RG2 has been split down into two smaller subgoals:

RG2a) The development, testing and reduction of items for the SCOOL scale

RG2b) The psychometric validation of the SCOOL scale.

RG2a is addressed through Studies 2i, 2ii and 2iii (Chapter 6); RG2b is addressed through Study 3 (Chapter 7). The SCOOL scale is then used as a measurement tool in addressing the third (and final) research goal.

Research Goal 3: Assessing the impact of taking part in Generation Wild on teachers' attitudes and behaviour towards outdoor learning, and their personal nature connection and wellbeing.

RG3 focuses on how teachers are affected by their involvement in the Generation Wild programme. It is addressed by Study 4 and reported in Chapter 8. The new SCOOL scale is used within a pre-post design to measure teachers' perceived capability for outdoor learning, along with existing measures of nature connection and wellbeing, and questions about outdoor teaching behaviour.

Addressing these research goals aims to improve understanding of both the role of teachers in outdoor learning, and the impact of outdoor learning on teachers themselves. It is hoped this research provides useful recommendations for the design of future nature interventions, and contributes evidence to influence educational policy and practice.

1.6   The structure of this thesis

Chapter 1 has stated the case for why increasing the rates of outdoor learning should be a priority, whilst critically acknowledging debates around childhood and nature connection. It has also provided background information about the design and delivery of WWT's Generation Wild programme, which was the context of this research. Finally, specific research goals were stated, and related to the studies of this thesis.

Chapter 2 provides a more focussed review of the literature on three related areas: the role of teachers in outdoor learning; the place of outdoor learning in UK education policies over recent decades; and barriers to outdoor learning. This review critically evaluates methodological limitations and identifies gaps in current knowledge. Subsequent chapters describe the research conducted to address the research aims, and fill these gaps.

Chapter 3 describes the methodological approach. It contains a positionality statement, and acknowledges how my personal and professional identities have shaped this research. It also provides a brief reflexive justification of the methodological framework underpinning the sequential mixed methods research design, and demonstrates how the separate studies link together. However, more specific details of methods used for each study are given within the study chapters which follow.

Chapter 4 reports Study 1, which used semi structured interviews to collect data from teachers taking part in Generation Wild. Reflexive thematic analysis was used to generate four themes from these data in an inductive way. The first three themes describe teachers' beliefs about how the context of deprived children's lives affects their contact with nature, addressing Research Goals 1a and 1b. The fourth theme reveals the conflict that teachers experience: despite believing that nature is beneficial for children, they often feel unable to spend any meaningful amount of time on outdoor learning. This conflict in the findings justified further analysis of the same data.

Chapter 5 presents a second deductive analysis of the data from Study 1, addressing Research Goal 1c. The findings of this second analysis are presented as three themes

supporting the ecological model of outdoor learning proposed in chapter 2. The themes describe teachers' perceived barriers to teaching outdoors at three levels: the individual teacher, the school environment and national policy and systemic issues.

Chapter 6 outlines the steps undertaken to develop, reduce and refine the items for the draft version of the School Contexts of Outdoor Learning (SCOOL) scale, based on the socio-ecological model put forward in chapter 5. It describes a series of short linked studies (2i, 2ii and 2iii) conducted as part of the process in order to address Research Goal 2a. Study 2i was a short qualitative study to generate items; Study 2ii comprised cognitive testing of items with teachers to establish face validity; and Study 2iii consisted of an expert panel to review content validity. The endpoint of this chapter is a 31 item draft version of the SCOOL scale.

Chapter 7 presents Study 3, a large-scale data collection using a survey consisting of the draft SCOOL scale plus existing validated measures with over 500 UK teacher participants. The analysis used to validate the SCOOL scale structure is presented, along with consistency and reliability measures for both the overall SCOOL measure, and its three factors, addressing Research Goal 2b. The data from Study 3 are also used to test hypotheses about the predictors of teacher capacity for outdoor learning.

Chapter 8 presents Study 4, which used a pre-post design to collect data from teachers before and after their participation in Generation Wild. A range of outcomes are measured: perceived capability for outdoor learning (measured using the new SCOOL scale); outdoor teaching behaviour (operationalised as frequency, duration and subject area of outdoor teaching sessions; personal nature connection; time in nature; wellbeing. The primary aim of this study was to address Research Goal 3, but data were also used to test the consistency and validity of the SCOOL scale with a second sample.

Chapter 9 brings together the key findings from all six studies into an overall discussion and sets out the novel contribution of this research. It offers insights into the implications for conducting research whilst embedded within an organisation such as WWT. It considers strengths and limitations of the overall research design, then sets out directions for future work in this area. It then considers how the findings of this thesis could be applied to

increase outdoor learning in UK primary schools, with the end goal of increasing children's nature experiences and connection to nature. A series of recommendations is made covering both the design and implementation of future outdoor teaching and learning programmes and implications for UK education policy.

Chapter 2

A review of the literature on the role of the teacher in outdoor learning

2.1   Introduction

2.1.1   Chapter aims and scope of this literature review

Chapter 1 of this thesis argued that increasing rates of childhood outdoor learning should be a priority, due to the overwhelming evidence showing that time in nature has beneficial effects on children's health and wellbeing. This is particularly true for those from disadvantaged groups, due to the equigenic effect of nature (Mitchell & Popham, 2008). It also described WWT's Generation Wild programme, and showed how teachers play a crucial role in effective delivery of the programme. Whilst there is a good deal of evidence for the impact of outdoor learning interventions on pupil outcomes, little is currently known about the impact on teachers. As teachers are crucial to the delivery of many environmental education initiatives, including Generation Wild, this is a significant gap in existing research knowledge.

The current chapter reviews the existing literature on outdoor learning, focussing on the role of the teacher. It summarises key findings, examines relevant theories, evaluates methodological strengths and limitations, and highlights gaps in current knowledge. While drawing primarily from psychological literature and theories, it also incorporates relevant insights from other disciplines where they contribute to the research. This chapter aims to acknowledge perspectives from these fields while maintaining a psychological approach.

2.1.2   Chapter structure

Section 2.2 provides a broad overview of the literature on outdoor teaching and learning, before narrowing its focus to primary schools across the four UK nations. Section 2.3 then concentrates on the teacher's role, exploring how psychological constructs have been used to understand teachers' attitudes and behaviours toward outdoor learning. It highlights how little is known about the impact of outdoor learning interventions on teachers. Section 2.4

justifies the adoption of an ecological systems framework to examine factors influencing the implementation of outdoor learning. An ecological model of outdoor learning is proposed, based on existing literature on the topic. Finally, Section 2.5 sets out the gaps in the existing research on teachers and outdoor learning, identifying opportunities for further investigation in this area.

2.2   Outdoor learning

Chapter 1 has considered different definitions of outdoor and nature based learning, and set out the scope of what is considered outdoor learning within this thesis.

2.2.1   Benefits of outdoor learning for children

Research evaluating outdoor and nature-based learning has demonstrated a wide range of impacts for children, including physical activity levels; mental health and wellbeing; educational outcomes; environmental attitudes and pro-environmental behaviours. The findings of relevant studies across each of these areas are summarised below.

Systematic reviews have found evidence that children's total time outdoors is positively associated with higher levels of physical activity (Bingham et al, 2016; Gray et al, 2015). More specifically, higher rates of physical activity were observed in young children attending forest kindergartens which take place entirely outdoors in natural environments, compared to other early years settings (Lovell et al, 2010). Increased physical activity was measured in primary school children taking part in outdoor learning sessions (Aronsson, Waite and Clark, 2015). A further relevant finding was that students participating in the John Muir award developed more positive attitudes to physical activity (Mitchell and Shaw, 2015).

There are currently few studies measuring wellbeing outcomes, and the evidence base is mixed, and often of low quality (Dillon & Lovell, 2022). Whilst some studies have reported significant and sustained improvements in pupil wellbeing (Harvey et al, 2020), many research studies did not yield conclusive evidence. In a systematic review of 'immersive

nature experiences,' Mygind et al (2019) found some evidence of increased self-esteem for participants compared to control groups. Miller and colleagues reviewed quantitative studies measuring the impact of nature based outdoor learning on primary aged children and concluded that there is "emerging evidence" of positive impacts on a range of mental health, wellbeing and social outcomes (2021: 1115).

A number of studies have found that pupils who participate in outdoor learning have higher achievement across a range of subjects including reading, maths and science (Becker et al, 2017; Bolling et al, 2018; Fiennes et al, 2015; Harris, 2021). Fiennes and colleagues found that children with below average prior achievement tended to make the greatest progress as a result of outdoor learning interventions. Research has also shown that curriculum focussed outdoor learning was associated with increased engagement with school for primary aged children in Wales (Marchant et al, 2019). Other positive educational outcomes are improved second language acquisition (Myhre & Fiskum, 2021); improved attendance, skills and grades (Ruiz-Gallardo et al, 2013); and increased intrinsic motivation (Bolling et al, 2018).

A final positive outcome of outdoor learning pertains to how children think about and act towards the wider environment. Systematic reviews evaluating the efficacy of different environmental education approaches have found that programmes with experiential, place-based and participatory approaches were more likely to demonstrate impact (Stern et al, 2014; Ardoin et al, 2020). In Harris' evaluation of a year-long curriculum focussed outdoor learning intervention (2021), teachers described changes to children's environmental attitudes. From a theoretical perspective, Prince (2017) argued that role modelling by teachers can be an effective mechanism for increasing children's pro-environmental behaviour through providing mentoring over sustained periods of time in outdoor environments.

However, the literature in this area is limited, and Mann et al (2022) concluded that whilst there is some evidence for increased environmental awareness, more rigorous research is needed to determine which types of outdoor learning lead to behavioural change. A handful of robustly designed studies have suggested possible pathways. Otto and Pensini (2017) showed that participation in structured environmental education in natural environments

was associated with increases in pro-environmental attitudes and behavioural intentions for children aged nine and ten years. In a randomised experimental design, Collado et al (2020) reported changes in ten- to twelve-year-old children's self-reported environmental attitudes and some behaviours, in primary schools testing a curriculum-embedded nature-based environmental education programme.

Mann et al (2022) conducted a systematic review of nature-specific outdoor learning and concluded that outdoor learning should be incorporated into every child's schooling due to the wide range of proven benefits. However, as Dillon & Lovell highlight, children from poorer families and ethnic minorities "are less likely to have the opportunity to engage in learning in natural environments, potentially widening inequalities" (2022:9). Few studies have explicitly considered the effect of demographic factors, and participant samples are often poorly described, meaning this is an under researched area.

There is a small amount of evidence suggesting that nature-based learning may benefit some subgroups more than others. For example, Harvey et al (2020) found some evidence that children with initially lower connection to nature score experienced a greater improvement in wellbeing over the course of a hands-on nature learning program which took place within school grounds. Moula and colleagues (2023) report qualitative findings suggesting that an arts in nature intervention was particularly impactful for children who struggled to engage within typical classroom spaces. Jensen et al (2024) found that both socio-economic factors and local greenery were strong predictors of children's nature knowledge and argued that interventions should therefore be targeted at low-income areas, as this is where children benefit most. There is also evidence that school based outdoor learning can benefit children with SEND (Fiennes et al, 2015) and specifically, develop social skills and increase wellbeing in autistic children (Blakesley et al, 2012). A quasi-experimental study found gender differences in the impact of education outside the classroom, with a significant increase in physical activity for boys but not girls (Schneller et al, 2017).

Despite these insights, Dillon and Lovell (2022:5) point out that there is still a need for "more focused evidence for particular population subgroups, outcomes and delivery approaches" to improve understanding of the effects of outdoor learning in natural environments. Mann

et al (2022) reach a similar conclusion in their review of Nature Specific Learning Outside the Classroom (NSLOtC). They advocate for better descriptions of both interventions and participant samples, and state that further research is needed to reach "conclusions which go beyond simply *whether* NSLOtC is effective. This is to present a more sophisticated picture of *how* it works most effectively for *whom* and in *what* settings" (2022: 10). Both Dillon and Lovell (2022) and Mann et al (2022) highlight common methodological limitations in this research. Studies evaluating interventions often lack robust designs, such as matched control groups, so do not support causal inferences. Much research also neglects to adjust for potentially confounding demographic factors, such as socio-economic status and ethnicity. Samples tend to be small, meaning that studies may lack the statistical power to detect small effect sizes. In addition, many studies have failed to use validated measures meaning it is unclear whether they are measuring the intended constructs. Furthermore, as the majority of studies have only measured short-term outcomes- either during or immediately after an intervention- it is unclear whether the effects persist over a longer timescale. The research described in the following chapters of this thesis attempts to overcome some of these limitations.

2.2.2 Pedagogical approaches to outdoor learning

This section considers how pedagogical beliefs may influence outdoor learning practice, and the extent to which outdoor learning is currently integrated into compulsory state education around the world. This varies widely, reflecting underlying cultural values, as well as different educational philosophies.

Although outdoor learning is not necessarily linked to a specific pedagogy (Waite, 2020), it tends to align with social constructivist beliefs that learning occurs through interaction with others and is best achieved through active and experiential learning (Glackin, 2016; Prince and Diggory, 2023). In their review of nature specific learning outside the classroom, Mann and colleagues highlight that many studies also described "a student-centred style of learning, and a different student relationship with adult learning facilitators compared to a regular classroom teacher," (Mann et al., 2022:9). They propose that these pedagogical factors may be crucial in mediating the effectiveness of outdoor learning. Cree (2009)

emphasises the importance of the child-centred learning approach in Forest School, suggesting that the ethos of adult leader as facilitator for experiential learning may be a cause of conflict for teachers who are more accustomed to taking an instructional role.

Constructivist approaches to learning state that learners do not passively acquire knowledge, but are active agents in their own learning, constructing meaning through experiencing and engaging with the world around them (Aubrey and Riley, 2019). From a constructivist perspective, the adult teacher facilitates, or scaffolds, a child's learning, rather than acting as a direct instructor. Historically, the work of constructivists such as Piaget, Vygotsky and Bruner have been enormously influential on teachers' understanding of how young children learn and develop. Enquiry-based learning is a constructivist pedagogy, which focusses on children's own observations and questions about the world around them. Learning according to this approach will be determined by the interests of the learner, crossing over traditional subject boundaries. Barfod & Daugbjerg (2018) found enquiry-based teaching of science and mathematics was common practice within Danish *udeskole* (outdoor school).

In contrast, direct instruction approaches are based on the work of behaviourists, such as Skinner, Pavlov and Thorndike, from the first half of the twentieth century. In contrast to the view of the child learner as agent in constructivism, direct instruction approaches view the learner as a passive recipient of knowledge, with the teacher as a sole authority figure leading the lesson (Aubrey and Riley, 2019). These approaches include the use of assessments that solely test recall rather than understanding, behaviour management systems based on rewards and sanctions, and the delivery of pre-planned sequence of lessons from a scheme of work (Adams & Carnine, 2003). The use of such schemes of work has become increasingly common in primary schools in England to support curriculum planning since the revised national curriculum in 2013 (DfE, 2018).

These different pedagogical beliefs are also associated with differences in curriculum. In an education system underpinned by constructivist beliefs about learning, the curriculum will be learner or skills centred, whereas an education system based on a pedagogy of direct instruction will use a knowledge-centred curriculum (Schcolnik & Kol, 2006). Whilst the

English primary national curriculum (DfE, 2013) is designed to be knowledge centred, both the Scottish Curriculum For Excellence (Scottish Executive, 2006; Education Scotland, 2019) and the Curriculum for Wales (Welsh Government, 2022) are explicitly skills centred. Direct instruction approaches tend to favour a curriculum where subjects are taught discretely, while constructivist approaches align with topic based cross-curricular learning. Again, this can be seen in differences between the English, Welsh, and Scottish primary school curricula. The English national curriculum is organised around the teaching of four core and nine foundation subjects. By contrast, the Curriculum For Wales is structured around a set of integral skills, such as "critical thinking and problem solving" and "emotional intelligence and awareness" (Welsh Government, 2022:15). The Scottish Curriculum for Excellence is built around experiences and outcomes, including working with others, physical activities and health, and local knowledge (Education Scotland, 2019). Enquiry based learning is mentioned throughout Scotland's Curriculum For Excellence, and is central to "What Matters" in the new curriculum for Wales. The Scottish and Welsh curricula are further described, and contrasted with the English national curriculum, in section 2.2.4.

2.2.3   Outdoor learning in the UK

Despite a wealth of research evidence supporting the benefits of outdoor learning, and broad societal approval, research shows that teachers in many countries struggle to teach outdoors in practice (Oberle et al, 2021; Patchen et al, 2022; van Dijk-Wesselius et al, 2020). Barriers to outdoor learning will be explored in section 2.3.4. Prince (2019) reports a decline in outdoor learning in English primary schools between 1995 and 2017, and it is argued that nature-based learning remains an underutilised resource in English schools (Marchant et al, 2019). The impact of COVID-19 further reduced outdoor learning provision in 80% of schools (Institute of Outdoor Learning, 2021). However, there is a lack of data measuring whether outdoor learning has subsequently returned to pre-pandemic levels. In fact, there is a lack of any deliberately collected representative national data on outdoor learning rates in England over recent decades. Greer et al (2023) report an incidental finding that only 23% of primary school teachers, and 19% of secondary school teachers in England ever teach outdoors. However, as this was an opportunity sample responding to a survey on climate change and sustainability, and likely to be biased towards individuals who are already engaged with

teaching about these issues, they suggest that true rates of outdoor learning may well be lower still.

In Scotland, attempts have been made to collect accurate and representative national data, with Mannion and colleagues conducting three waves of surveys on the location, focus and duration of outdoor learning (Mannion et al, 2006; 2014; 2022). The 2022 survey showed a marked decrease in reported outdoor learning time from 24 minutes per week to just 7 minutes per week. However, in the same survey, 60% of teachers believed that outdoor learning provision had increased in their school in comparison with pre-pandemic levels. There was no obvious explanation for these seemingly contradictory findings, although it is noted that response rates were low: although all schools were invited to participate, responses were only received from 34 schools. Mannion et al highlight that, "For some, COVID provided new reasons for going outdoors… but a wide variety of possible factors existed for any one school" (2022:10).

In the absence of directly collected data on outdoor learning, Prince and Diggory (2023) analysed school inspection reports as a proxy measure of outdoor learning in England. Only 42% of inspection reports mentioned outdoor learning and in 72% of these cases, outdoor learning was mentioned only in respect to the Early Years Foundation Stage. There were very few mentions of outdoor learning for key stage 1 and 2. Prince and Diggory (2023) therefore suggest that, as there is no statutory requirement for outdoor learning beyond the Early Years Foundation Stage, schools are not prioritising it in curriculum and timetabling. Comparable research in Scotland found 72% of school inspection reports mentioned outdoor learning across all primary age ranges (Beames & Polack, 2019), which may reflect Scotland's stronger policy support for outdoor learning than England.

Forest School is a particular approach to outdoor learning which developed from the pedagogy of Scandinavian outdoor kindergartens and the Danish *udeskole.* This approach was introduced to the UK in the 1990s. The Forest School approach has become increasingly popular in UK primary schools, although the term is often used loosely to indicate any type of outdoor learning rather than indicating an adherence to the particular pedagogical values of Forest School (Forest School Association, 2024). Media commentators have suggested

that Forest Schools are particularly valued by middle class parents, and may be used as a selling point to make a school more attractive (Brockes, 2024). Leather (2018) critiques how Forest School has been commodified into a saleable brand which has come to dominate UK outdoor learning practice due to market forces, to the exclusion of other approaches. He also describes it as 'lost in translation,' pointing out that cultural differences between UK and Scandinavia mean key differences in practice.

Although Forest School and other forms of outdoor learning have gained prominence, they remain optional within UK education. This makes it essential to examine how outdoor learning is represented in education policies and curricula, which will be the focus of the next section.

2.2.4 Outdoor learning in the different UK nations

Historically, England and Wales have shared most aspects of education policy and curriculum throughout the twentieth century, while Scotland has maintained a separate education system. Following devolution in 1998, education policy in Scotland, Wales and Northern Ireland has evolved along separate lines. While there are shared influences, curriculum design, testing, and inspection frameworks vary significantly between nations. This section begins with relevant aspects of UK government policy, and then highlights differences between the education systems of each nation.

Outdoor learning was encouraged in the UK government's Green Futures report (DEFRA, 2018), which set out a 25-year plan to improve the environment, recognising the importance of school grounds as sites for children's nature experiences and making school grounds greener was listed as a priority. A key policy point stated was, "to encourage children to be close to nature, in and out of school, with particular focus on disadvantaged areas" (2018:71). In the 2023 revision of this document, the Environmental Improvement Plan, this became a more specific commitment to, "increase the number of children connecting with nature through school" (DEFRA, 2023: 259). However, this broad governmental support for outdoor learning and nature connection has not yet materialised into funding commitments or changes to educational policy in England.

In England, outdoor learning is a statutory requirement of the Early Years Foundation Stage, which sets standards for care and learning for children from birth to five years. However, there is no mandatory requirement for outdoor learning in the English primary national curriculum (DfE, 2013), although it has been encouraged by a succession of high-profile (but relatively small scale) initiatives, such as the Natural Connections Demonstration Project (Waite et al, 2016), and the Children and Nature programme (Passy & Cutting, 2023).

The Natural Connections Demonstration Project ran from 2012 to 2016 in 125 schools across the southwest of England, aiming to increase opportunities for learning in natural environments. Key student outcomes reported from the project were improved engagement and motivation, enhanced social skills, increased connection to nature, and improved wellbeing and better behaviour (Waite et al, 2016). Positive outcomes were also reported for teachers; these will be discussed further in section 2.3.

The flagship Children and Nature project ran from 2019 to 2022, offering a total of £6.3 million in government funding. The goals of this project were to improve the quality of the natural environment within school grounds, and train staff in using the outdoor environment for teaching and learning. The programme targeted intervention at schools with over 30% of pupils eligible for free school meals, special schools and alternate provision, and reached 46,000 children in 184 schools over three years. The Children and Nature project was originally intended to be evaluated using a randomized controlled trial (RCT) design; however, this plan was disrupted by the COVID-19 pandemic (Iyer et al., 2021). Delivery was paused in March 2020 but resumed in September 2020, and some attempts at evaluation were made. However, without the planned RCT, it was difficult to draw robust inferences from the findings. Whilst qualitative findings suggested a range of benefits to pupils, the quantitative findings did not support this. There was no significant change in mental health and wellbeing, and a small decline in nature connection, although in the absence of a control group, this should be interpreted with caution (McKaskill et al, 2023). The project evaluation report concluded that a whole school approach was "the most effective way of embedding sustainable outdoor learning into everyday school life" (Passy & Cutting, 2023:7). The authors also recommended that investment was needed across these four key areas to

support school based outdoor learning: teacher training, teaching resources, greening school grounds, and wet weather clothing for pupils. However, successive governments are yet to make significant investment or prioritise outdoor learning in English schools.

Current Department for Education initiatives include the National Education Nature Park programme and the Climate Action Award scheme. The Nature Park programme encourages the development of school grounds to support climate resilience and increase biodiversity through a five-step cycle of mapping the space, identifying opportunities, decision making, taking action and recording change (DfE, 2023).

A national curriculum was first introduced in England and Wales in 1988, aiming to create cohesion in what was taught across schools and establish a core body of knowledge. Although educational policy powers were devolved as part of the 1998 Government of Wales act, teachers in Wales continued to follow a lightly modified version of the English national curriculum for a further two decades. The new Welsh curriculum (Welsh Government, 2022) became statutory in primary schools from September 2022, and is centred on four purposes, or broad statements about who learners should become. Two of these purposes, becoming "*ethical informed citizens of Wales and the world*" and "*healthy confident individuals*" are particularly closely aligned with outdoor and nature-based learning (Welsh Government, 2022:1). The new curriculum considers learning as a process rather than focusing on prescribed content or outcomes (Welsh Government, 2022). It allows schools to develop their own curriculum to meet local needs and tailor learning for their communities, balancing knowledge, skills and experiences.

In Scotland, the Curriculum for Excellence was introduced in 2010, and updated in 2019, (Scottish Executive, 2008; Education Scotland, 2019). It mandates outdoor learning and emphasises that it should be integrated into regular practice across all curriculum areas. Outdoor learning is regarded as particularly central to Learning for Sustainability, one of six themes running through the curriculum (Education Scotland, 2019).

Northern Ireland has a number of policies which are broadly supportive of outdoor learning and play, although it is only mandated during the Foundation phase (4 to 6 years) and not

throughout the remaining years of the primary curriculum (CCEA, 2007). No specific information is available about outdoor learning within the Northern Irish system, possibly reflecting that at the time of writing, the Northern Irish assembly had been suspended for five of the last eight years (McCormack, 2024).

Beyond curriculum differences, UK nations also vary in pupil assessment systems and external inspection regimes. In England, standardized testing plays a central role in assessing both pupils and schools. Primary school children take Standardised Assessment Tests (SATS) in Year 2 and Year 6, with results published for benchmarking and scrutinised as part of OFSTED inspections. Additional mandatory national assessments in England include the Reception Baseline Assessment, the Phonics Screening Check in Year 1, and the Multiplication Tables Check in Year 4. In contrast, primary-aged children in the devolved nations do not take SATs, relying instead on ongoing teacher assessment systems.

Since 2000, England has seen a significant shift towards academy schools, which are directly funded by the Department for Education rather than local authorities. As of 2024, almost 43% of primary schools were operating as academies (DfE, 2024d). Academies are not required to follow the national curriculum but must provide a "broad and balanced" education. However, pupils in academies still take SATS, and academy schools are inspected by OFSTED in the same way as local authority run schools. Academies, particularly those run by large academy chains, have faced criticism for limiting teacher autonomy (Male et al, 2022; Vinall, 2022). Unlike England, academies do not exist in the devolved nations, where schools remain under local authority control.

Section 2.2 has reviewed academic literature on the benefits of outdoor learning for children, and considered how different pedagogical perspectives inform outdoor learning practice. It has also presented an overview of outdoor learning policy and practice in UK schools at the current time. Despite some similarities in primary education across the four nations of the United Kingdom, the variation in curriculum, testing and inspection regimes amounts to substantial difference in the context in which teachers work and pupils learn. The impacts of these differences on teachers' capabilities for outdoor learning will be explored further in the following section.

2.3   Psychological perspectives on teachers and outdoor learning

The previous section showed that outdoor learning within UK schools largely takes place on a discretionary basis, rather than being mandated by national policy. Therefore, understanding teachers' beliefs and motivations around outdoor learning is essential to increasing delivery rates and efficacy. Prince (2019) argues that it is "teachers' beliefs, drive, effort and enthusiasm" that are key to enabling outdoor learning. This section, 2.3, therefore focuses on teachers, considering how psychological approaches have been used to explore teachers' attitudes, beliefs and behaviours relating to outdoor learning.

2.3.1   The role of the teacher in outdoor learning

Depending on the pedagogical approach to outdoor learning (see section 2.2.3), teachers may take on different roles, including acting as a role model for a relationship to nature (Bandura, 1986); a scaffold or 'more knowledgeable other' facilitating the child's own learning (Vygotsky, 1986, 1934); or an instructor, imparting nature knowledge and information (Skinner, 1957).

Adult role models are argued to be essential in helping children connect with nature (Chawla, 1999) and develop moral concern for natural entities (Chawla, 2007). Passmore et al (2021) found that parental nature connection was a better predictor of children's nature connection than either demographic characteristics or visits to natural places. As primary school children may spend more of their waking time in contact with their teacher than their parents, there is a clear rationale for considering how teachers' nature connection might influence the children in their care. Recent studies have shown that teachers' own connection to nature is strongly associated with attitudes to outdoor teaching (Barrable and Lakin, 2020; Barrable et al, 2022; Cont et al, 2023). The mechanisms of this relationship are currently poorly understood, and merit future investigation. Barrable and colleagues suggest that individuals with stronger nature connection may be more likely to choose to participate in optional outdoor activities, and also to perceive themselves as more competent in teaching outdoors (2022).

Prince (2017) argued that outdoor learning has the potential to facilitate pro-environmental behaviour in children through role modelling, mentorship and demonstrating actual practice in natural environments. However, there is a lack of research considering how teachers' attitudes and beliefs may impact on their outdoor learning practice. Although teachers' own attitudes and their knowledge about nature play a key role in facilitating effective outdoor learning, it is known that adults from urban areas often lack natural history knowledge (Bashan et al, 2021; Gosler & Tilling, 2022). Therefore, there is a risk of generational decline in nature knowledge as younger cohorts of teachers, particularly in cities, are themselves less knowledgeable about nature.

2.3.2   Teacher agency and self-efficacy for outdoor learning

Agency and self-efficacy are two closely related but distinct constructs. Self-efficacy can be understood as an individual's belief in their ability to successfully perform tasks or achieve goals (Bandura, 1977, 1997). Agency refers to an individual's capacity to make choices and take actions that influence their life and environment (Emirbayer & Mische, 1998). In contrast, self-efficacy is internal to the individual and is task specific, so can vary depending on the activity or context. Agency is often considered a broader construct that acknowledges the importance of systemic structural constraints in shaping practice. This is exemplified in the work of Priestley, Biesta and colleagues, describing an ecological approach to teacher agency (Biesta et al, 2015; Priestly et al, 2012). According to the ecological view, teacher agency is the product of individual capacity and the environment in which that individual works. Therefore, "Agency is not something that individuals have (...), it is something that people and groups can achieve" (Priestley et al, 2015:3). Given the differences in curriculum, testing and inspection highlighted in section 2.2, this approach is relevant to understanding outdoor learning across UK nations.

Over the last three decades, teachers have increasingly been positioned as 'agents of change' (Fullan, 1993; 2006), and regarded as professionals who can take ownership of their own teaching practice. Teacher agency has been enshrined into education policy in some countries, including Scotland's Curriculum for Excellence (Scottish Executive, 2006), and the Curriculum for Wales (Welsh Government, 2022). In both Wales and Scotland, teachers are

seen as co-creators of the curriculum, and skills are prioritised over prescribed knowledge content, with interdisciplinary learning encouraged. This contrasts significantly with the English national curriculum, which makes no reference to teacher agency, and continues to prioritise subject-specific knowledge over skills. For teachers working within education systems that grant teachers little individual agency in terms of curriculum development or assessment, this can result in a conflict between policy and practice. Priestley et al remark that "the extent to which teachers are able to achieve agency varies from context to context based upon certain environmental conditions of possibility and constraint" (2012:191).

There is a substantial body of educational research showing that both self-efficacy and agency are associated with improved outcomes in education for teachers and pupils. Teacher agency improves responses to challenges and increases professional satisfaction (Biesta et al, 2015) and improves student outcomes through empowering teachers to implement learner centred approaches (Priestley et al, 2012). Teacher efficacy, defined as "Teachers' beliefs in their ability to affect student engagement and learning" (Tschannen-Moran & Woolfolk-Hoy, 2001:783) has been widely studied as a predictor of teacher effectiveness. High teacher efficacy is associated with increased resilience, better management of classroom behaviour, and enhanced educational outcomes (Tschannen-Moran and Hoy, 2001).

However, few studies have applied these constructs in the specific area of outdoor learning. The few studies that exist have focussed more on adventurous activities, rather than day-to-day teaching in outdoor environments. Hovey et al (2019) found that participating in an outdoor education program within an initial teacher training course increased trainee teachers' self-efficacy for outdoor education. Hursen and Islek (2017) found that participation in a school based outdoor education programme increased teachers' knowledge, skills and self-efficacy beliefs.

A significant limitation of research in this area is the lack of suitable validated measures. As self-efficacy is task specific, measurement of the construct requires domain specific instruments. Although generic measures of teacher self-efficacy exist (Tschannen-Moran, Woolfolk and Hoy, 1998), they lack the specificity to accurately measure self-efficacy for

teaching in the outdoor environment. Schumann and Sibthorp (2014) developed the Teaching Outdoor Education Self-Efficacy Scale (TOE-SES) to measure the self-efficacy beliefs of outdoor educators. The domain for this measure relates to more adventurous activities than the definition of outdoor learning used in this thesis, such as hiking in the wilderness. A further related measure of interest was recently developed by Barnes et al (2021) to measure parents' feelings of self-efficacy for engaging children with nature. However, no existing scale measures teachers' sense of their own capability for outdoor teaching.

2.3.3 Teacher motivation for outdoor learning

Individual behaviour can be either extrinsically motivated through factors, such as rewards and punishments, or intrinsically motivated through the inherent satisfaction and enjoyment of the activity (Ryan and Deci, 2000). In the absence of extrinsically motivating factors for outdoor learning in current English educational policy, there is a need to understand teachers' intrinsic motivation to teach outdoors. Self-determination theory (SDT, Deci and Ryan, 1985; Ryan & Deci, 2000) states that humans have three main psychological needs associated with intrinsic motivation: autonomy, competence and relatedness. Barrable and Lakin (2020) applied an SDT framework to understand student teachers' motivation for outdoor learning. They proposed that increasing student teacher's nature connection would increase their perceived competence and willingness to teach outdoors. In addition to the importance of nature relatedness, social relatedness has also been shown to be related to competence and willingness to teach outdoors (Barfod, 2018).

2.3.4 There are barriers which limit outdoor learning in practice

Existing literature shows that teachers across many countries consistently describe substantial barriers to the implementation of outdoor teaching and learning. For example, low staff confidence in teaching outdoors has been related to a lack of specific training (Dillon and Dickie, 2012; Walker et al, 2021), as well as concerns over student behaviour (Harris, 2021; van Dijk-Wesselius et al, 2020). Poor weather is also commonly reported as a challenge in studies within the UK (Harris, 2021; Rickinson et al, 2004) and North America (Oberle et al, 2021, Patchen et al, 2022). Difficulty in accessing green spaces is a frequently

reported theme (Van Dijk-Wesselius et al, 2020; Walker et al, 2021), and this can be linked to the constraints of health and safety policies (Patchen et al, 2022). Low school budgets affecting staffing and resources have been reported as a barrier in studies across the UK (Rickinson et al, 2004), Canada (Oberle et al, 2021) and the United States (Patchen et al, 2022).

Within the UK, attitudes of school leaders are frequently reported as important in enabling or constraining outdoor learning (Harris et al, 2021; Marchant et al, 2019). However, lack of support from administrators at the wider level of school district or state was also identified as a key barrier in the US (Patchen et al, 2022) and Canada (Oberle et al, 2021). The need to prepare for standardised tests was also regarded as a constraint on outdoor learning time (Edwards-Jones et al, 2018; Shume and Blatt, 2019).

Although it is clear that some issues have been reported across many studies, in different educational contexts; however, barriers are differently described and organised by each researcher. For example, in their qualitative evaluation of the Natural Connections Demonstration project in 12 English schools, Edward-Jones et al (2018) characterised barriers to outdoor learning as policy-related, place-related and people-related. Policy-related barriers were largely caused by, "the dominance of performance-based pedagogy in Western cultures" (2018: 60); people-related issues included low staff confidence, and risk averse attitudes; and place-related challenges included lack of safe local greenspace. Oberle et al (2021) used thematic analysis of interviews with teachers to identify four main themes describing support factors and barriers to outdoor learning in Canadian elementary schools. These were: teacher characteristics, systemic factors, culture, and environmental factors. Patchen et al (2022) used thematic analysis of focus groups with teachers and school administrators to identify multiple factors limiting how time in nature might be included within the school day, in US elementary schools. Their main themes concerned difficulty making connections to the curriculum during outdoor lessons, staff lacking confidence for outdoors lessons and issues around timetabling of staff and spaces.

The lack of a coherent framework to describe challenges and enablers of outdoor learning makes comparison across contexts difficult. This will be addressed in section 2.4.

2.3.5 Evidence for the impact of outdoor learning on teachers

There is currently little research considering the impact of outdoor learning on teachers, and the few existing studies focus on individual outcomes only, rather than considering how systemic constraints may affect teachers' ability to engage with interventions. For example, the evaluation of the Natural Connections Demonstration Project (see section 2.2.4) found that the programme increased teachers' confidence and self-efficacy in delivering outdoor learning, and improved teacher-student relationships (Waite et al, 2016). The authors commented that these impacts are "exciting and important findings in the context of continuing pressures on teachers to raise attainment and to address teacher morale and retention" (2016: 76). The evaluation of the Nature Friendly Schools project (see section 2.2.4) found that over 80% of schools reported a positive impact on teachers' confidence "to lead lessons outdoors; to manage risk outdoors; to increase the range of subjects taught outdoors; to translate the curriculum into outdoor spaces" (Passy and Cutting, 2023:21). These data were collected through school leader reports, rather than from individual teachers, and are therefore limited in scope. However, qualitative findings from a small number of interviews supported the quantitative results, describing how teachers' attitudes changed through engagement with the project. There were also reports of improved relationships with pupils, and improved health and wellbeing for teachers as well as pupils.

There is further limited evidence that nature-based learning can lead to improvements in teacher wellbeing. Deschamps et al (2022) found that subjective wellbeing was higher for teachers who practised outdoor learning than for those who did not in a Canadian sample of pre-school and primary teachers. A handful of research studies evaluating educational interventions in the UK have also reported improved teacher wellbeing. Moula et al (2023) found that participation in an 'arts in nature' programme improved wellbeing for both teachers and children. Marchant et al (2019) also report improved teacher wellbeing after taking part in a curriculum based outdoor learning programme. White, Eberstein and Scott (2018) suggest there was a beneficial impact on wellbeing for teachers of participating in a bird feeding project. These evaluations have tended to suffer from methodological limitations, and there is a clear need for further research into impacts on teachers employing larger sample sizes, validated measures and a more diverse sample.

2.3.6   Section summary

There has been limited research on the role of teachers within outdoor learning, and little is known about the impacts of nature based outdoor learning for teachers. Where outdoor learning is a discretionary activity, rather than mandated by the education system, then for teachers to successfully teach outdoors the literature argues they need to be intrinsically motivated to teach outdoors and feel personally capable of teaching outdoors. They also need to feel able to overcome environmental constraints to outdoor learning. Whilst the constructs of motivation, efficacy and agency have been applied to understanding teacher performance and student outcomes in the classroom, little research has focused on outdoor learning. Therefore, there is a need to understand teachers' motivations, and sense of agency specifically for outdoor learning.

Existing research on the barriers to outdoor learning is largely qualitative and based on small sample sizes, often drawn from specific national contexts or particular phases of schooling. Researchers have recently called for the use of a systems framework to allow the ways in which these diverse issues interact to be better understood. Both Oberle and colleagues (2021), and Patchen and colleagues (2022) advocate that these issues should be studied from a systemic perspective. They emphasise how seemingly simple barriers may interact in complex ways within the school context, and have an impact which is greater than the sum of each discrete part. For example, inclusion of students with disabilities was highlighted as particularly difficult, because of systemic issues relating to how support services were timetabled.

The design of intervention programmes seeking to increase outdoor learning should therefore acknowledge the complexity of interacting barriers, including the wider systemic issues. From this perspective, it seems plausible that the lack of individual agency available to teachers within current English educational policy may in fact constitute a substantial barrier to outdoor learning. Learning from the Children in Nature programme emphasised the need for a whole school approach if outdoor learning is to be successfully and sustainably embedded into practice. The following section of this chapter sets out the case

for applying an ecological systems framework to understanding and reducing systemic barriers to outdoor learning.

2.4   Applying an ecological systems approach to outdoor learning

Section 2.2 reviewed the range of international approaches to outdoor learning, highlighting variations in educational policies and curricula across the UK nations. Section 2.3 focused on the role of the teacher in outdoor learning, exploring how the constructs of agency and self-efficacy have been used to understand teachers' attitudes, beliefs, and behaviours in relation to teaching outdoors. The current section integrates these strands, justifying the use of an ecological systems approach to research teachers' sense of their own capability to deliver outdoor learning. This incorporates individual agency, but set firmly within the broader educational context, where both school leadership attitudes and national policies may be perceived as constraints.

2.4.1   Ecological systems theory

Ecological systems theory (Bronfenbrenner, 1979) states that an individual's development is influenced by factors occurring within multiple interconnected system levels of their environment, ranging from immediate surroundings to broader culture and societal structures (see figure 2.1).

Figure 2.1. Bronfenbrenner's bioecological model of development (reproduced from Simply Psychology.org, 2025)
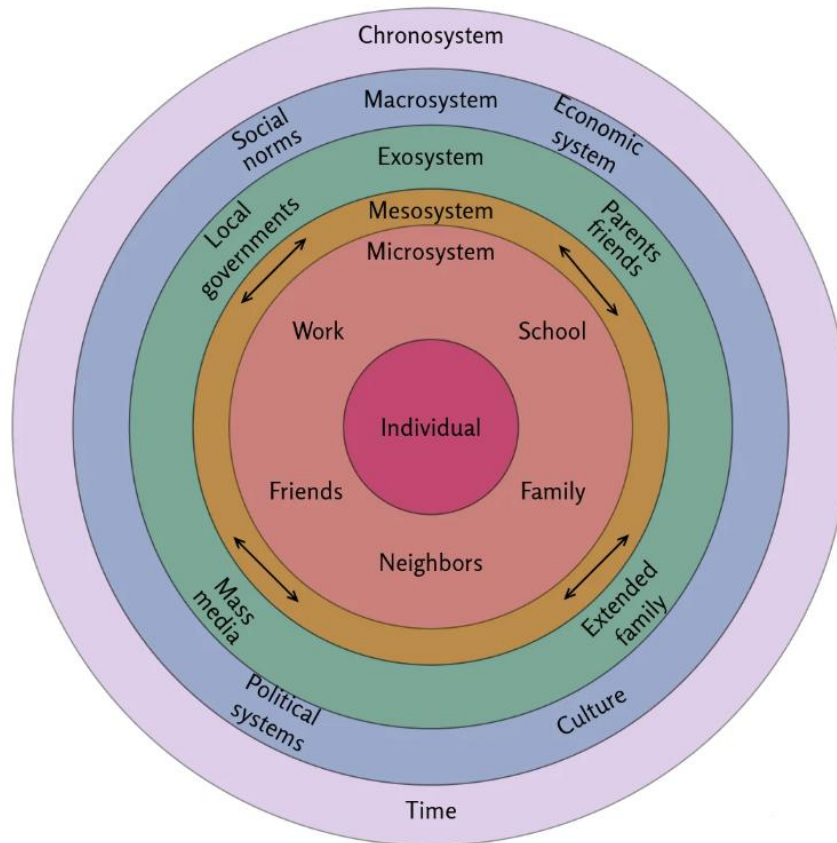
Bronfenbrenner specified five nesting ecological systems: the microsystem, mesosystem, exosystem, macrosystem and chronosystem. The microsystem describes immediate influences on the child such as family, friends and school. The mesosystem refers to interactions between different microsystems, such as home-school communication. The exosystem level describes indirect influences such as local government and mass media, whilst the macrosystem looks wider at how cultural and policy affects the child's environment. The chronosystem is the outermost ring, and accounts for major changes over time, including both expected changes such as puberty, and exceptional events. The COVID-19 pandemic has been described as a significant disrupting event at the level of the chronosphere by researchers in education (Brigandi et al, 2022), wellbeing (Sarvan & Muslu, 2022) and health (Haleemunnissa et al, 2020). Ecological systems theory attempts to show how these different systems interact to influence child development.

Although many other social science disciplines have long acknowledged the idea that societal influence affects individual outcomes, within the field of psychology, this was a novel premise. Bronfenbrenner's ideas marked a significant shift away from highly controlled laboratory experiments towards natural experiments and observational research in real-world settings. A key criticism of the original ecological systems theory was that it underestimated the role of biological or genetic factors (Wachs, 2000). In response, Bronfenbrenner continued refining his model, ultimately developing the bioecological model (2005), which explicitly acknowledged the role of genetics in shaping individual development.

Further critiques have emerged over time. Velez-Agosto et al. (2017) challenged the theory's rigid, nested structure, arguing that these systems are not strictly separate or hierarchical but should instead be seen as flexible, dynamic, and interwoven. They revised the model to place greater emphasis on culture, suggesting that it permeates all systemic levels rather than being confined to the macrosystem, thus accounting for a broader diversity of cultural influences. Additionally, psychologists engaged in basic research have critiqued ecological systems theory for being more descriptive than explanatory, lacking detailed mechanisms for developmental change (Tudge et al., 2009), and presenting challenges for empirical testing (Rosa & Tudge, 2013).

Despite these criticisms, Bronfenbrenner's theory remains widely used in applied research across numerous social science disciplines. Bronfenbrenner's work has been hugely influential, and as of February 2025, has been cited over 230,000 times according to Google Scholar, with over 72,000 of those citations since 2020. It is also used in the design of social policy interventions, such as the pioneering Head Start programme (1965) in the United States, providing joined up support with education, health and nutrition for low-income children and families. In the UK, the similar Sure Start programme ran from 1998, but with drastic cutbacks made from 2011 onwards.

Likewise, ecological models have also been used to design and evaluate health promotion interventions (WHO, 1986; McLeroy et al, 1988; Stokols, 1996) including in school settings (Townsend et al, 2011). The British Psychological Society has endorsed the importance of

understanding and applying ecological systems theory when taking a psychological approach to improving the wellbeing of individuals living in poverty (2022). However, the ecological systems approach has not previously been applied to increasing rates of outdoor learning in schools. The following section proposes an ecological model, based on the existing literature on the barriers to outdoor learning.

2.4.2 An ecological model of outdoor learning

An ecological framework is particularly well suited to addressing complex challenges, such as increasing outdoor learning in school settings. By accounting for the multiple interacting systems that shape education-from individual beliefs to institutional policies and broader societal influences-this approach offers a comprehensive perspective on both the barriers and enablers of outdoor learning. Schools have been described as complex adaptive systems, characterised by dynamic interactions among pupils, teachers, parents, curricula, and policies. These interactions can make it difficult to predict the outcomes of specific interventions (Sharples et al, 2024).

Recent work by Oberle et al (2021) and Patchen et al (2022), summarised in section 2.3.5, called for barriers to outdoor learning to be researched conceptually through a systems lens, acknowledging that multiple minor issues can interact to constitute major barriers. An ecological systems approach situates individual behaviour within the broader social environment, acknowledging that interconnected systems collectively shape experiences. Consequently, in order for effective and sustainable outdoor teaching to be delivered by teachers, supportive environmental contexts must be created across multiple system levels, including the individual, institutional, and public policy domains. The second system level consists of the organizational and physical environment of the school, which surrounds and supports the teacher. The third system level encompasses national education policies and systems, which shape school-level practices through curriculum priorities, teacher training, and funding allocations. Beyond these three levels, broader national and international events-such as the COVID-19 pandemic- exert an overarching influence, impacting the feasibility and implementation of outdoor learning initiatives.

The proposed ecological model of outdoor learning is shown in figure 2.2. Within this model, both challenges and enablers can occur at each level, as outlined in the following sections with references to existing research. This extends the ideas of Edwards-Jones et al (2018), that barriers to outdoor learning can be understood as people related, place related or policy related, by explicitly situating individual teachers within the context of geographical location, the education system, and broader society.

Figure 2.2. An ecological model of Outdoor Learning.
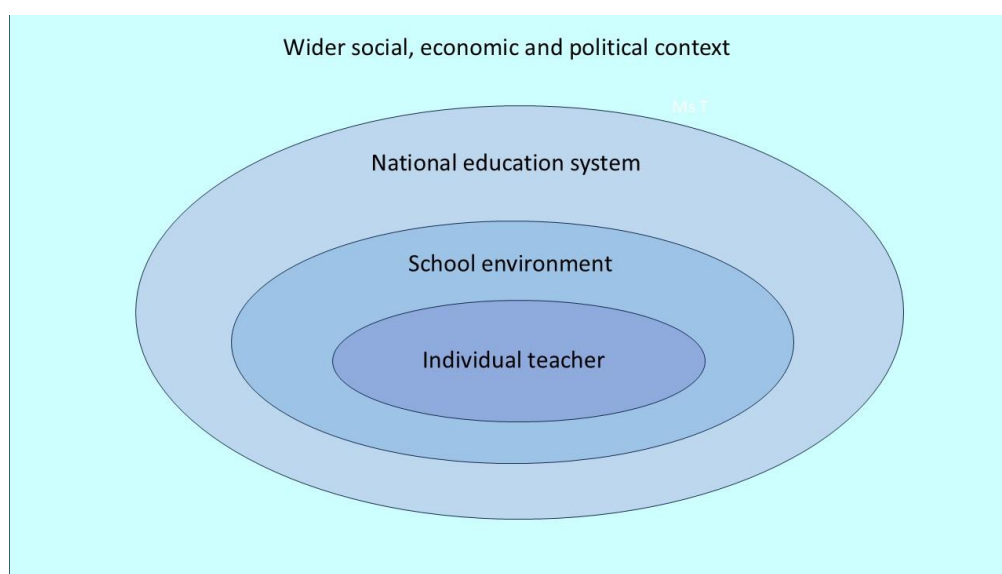
The following subsections summarise the literature relevant to each model level. As the levels are interrelated in sometimes complex ways, this inevitably means there is some degree of repetition of research findings across the three sections.

2.4.3   Challenges and enablers at the individual teacher level

At the individual teacher level, confidence, training, and personal connection to nature play key roles in enabling or hindering outdoor teaching. Prince (2019) recognises at the individual level that "teachers' beliefs, drive, effort and enthusiasm" are key to enabling outdoor learning. However, previous studies have found that low staff confidence is a major barrier to teaching outdoors (Dyment, 2005; Dillon and Dickie, 2012; Rickinson et al, 2004; Walker et al, 2021). One of the most widely reported factors lowering teacher confidence is

concern over student behaviour in outdoor settings (Harris, 2021; Oberle et al, 2021; Patchen et al, 2022; van Dijk-Wesselius et al, 2020). Teachers may feel uncertain about managing students beyond the structured classroom environment, particularly in terms of maintaining discipline, ensuring safety, and keeping students engaged.

Recent research has highlighted the need for training in outdoor teaching. Oberle et al (2021) report that many teachers felt themselves ill-prepared to teach outdoors due to a lack of training. Mann et al (2022) suggest that there is a need for teacher education focused on how natural environments can be used effectively for learning to enhance pupils' nature connection and wellbeing. They proposed that integrating this into teacher training at an early stage would equip teachers to use these methods effectively throughout every stage of their career. Similarly, Greer et al (2023) highlight the importance of initial teacher education incorporating relevant training on the use of school grounds for outdoor teaching, including increasing cross-curricular teaching to strengthen learning about climate change and sustainability.

However, despite these recommendations, outdoor learning remains largely absent from UK teacher training, perhaps because of its absence from education policy. There is no mandatory requirement for teachers in the UK to receive training in outdoor education, and there is no mention of outdoor learning in either the Initial Teacher Training Core Content Framework (Department for Education, 2019) or the English Early Career Framework (DfE, 2019b). Prince (2019) identified that teacher expertise in outdoor learning had decreased between 1995 and 2017, with initial teacher training providers in the UK no longer offering outdoor learning as a specialism. Where some degree of outdoor specific training is offered, this is often an elective option rather than a core requirement of the course (Cont et al, 2023). An exception to this is that since 2016, Liverpool John Moores university has included the 'natural curriculum', which seeks to embed nature and outdoor learning across the initial teacher education programme (Rowley, 2023: 1). Evaluation of this programme found that participating student teachers reported stronger nature relatedness, and greater willingness to engage in outdoor learning (Rowley and Cont, 2024).

A small number of further studies have found that a teacher's personal connection to nature is a significant predictor of their attitudes toward outdoor teaching (Barrable and Lakin, 2020; Barrable, Touloumakos and Lapere, 2022; Cont et al, 2023.) However, the pathway from teachers' personal nature connection to attitudes and behaviour relating to outdoor teaching remains unclear.

In summary, there are many issues which may affect an individual teacher's agency for teaching outdoors, which have been described in this section. However, it is important to consider challenges and enablers in the wider environment- and teachers almost always work within a school. Therefore, the next level of the ecological model is the school environment.

2.4.4   Challenges and enablers at the school level

At the school level, a range of diverse issues can play a role in shaping outdoor learning opportunities. These include: access to safe natural environments; availability of funding and resources; leadership attitudes and cultures of risk aversion. Although all pertaining to the unit of the school, these issues cut across the categories of people, place and policy related barriers put forward by Edward-Jones and colleagues' (2018).

Many studies have found that the availability of natural environments within school grounds (Patchen et al, 2022; Prince, 2019; Van Dijk-Wesselius et al, 2020) affects the perceived possibility of outdoor learning. A closely related but distinct issue is the ease of accessing green spaces outside school grounds but in the local area (Harris, 2021; Walker et al, 2021). Prince (2019) found a decline in UK schools using their local environment beyond school grounds between 1995 and 2017, and suggests this may be due to increasing concerns over safety and risk management when taking pupils off site. Low school funding, combined with rising transport costs, is a serious barrier to student trips beyond walking distance (Oberle et al, 2021; Rickinson et al, 2005).

In the UK, school funding is determined at national level, by a complex funding formula affected by pupil numbers, numbers eligible for pupil premium and levels of SEND (DfE,

2023b). In other countries, such as the USA, the situation is different with significant variation in school funding between wealthy and poor districts (Bruce et al, 2019). In UK schools, despite parity of funding across all schools, leaders have considerable discretion in how that budget is spent to best meet the needs of the children in their school. Budgetary and resource shortages are frequently reported as constraints on outdoor learning. Scott et al (2014) found that low budgets can limit the development of outdoor learning spaces, purchase of equipment and materials, and spending on transport for excursions off site. Shume and Blatt (2019) also report that schools struggle to afford the cost of developing and maintaining safe and engaging outdoor learning spaces. Other costs associated with outdoor learning may be the cost of outdoor specific training (Oberle et al, 2021) and additional first aid training (Waddell et al, 2024).

A number of studies have found unsupportive leadership is considered to be a barrier to teaching outdoors (Dyment, 2005; Harris et al, 2021; Marchant et al, 2019; Oberle et al, 2021). Risk aversion and caution around liability have emerged as particular concerns in the UK over the last 20 years (Gill, 2007; Prince, 2019; Rickinson et al, 2004). While these issues are directly enacted at school level by school leaders, they may also be more distantly influenced by statutory national guidance such as Keeping Children Safe in Education (DfE, 2024).

In addition to those school mediated issues, the UK's unpredictable weather is frequently regarded as a barrier to year-round outdoor learning. According to the Met Office, "places in the east and south of the UK tend to be drier, warmer, sunnier and less windy than those further west and north." It therefore seems reasonable to assume that the extent to which the weather is seen as a barrier could vary across regions of the UK. Poor weather may be seen as a particular barrier in schools where children lack appropriate clothing and footwear (Harris, 2021; Prince, 2019). However, it is acknowledged that there is a deeply subjective element to perceptions of weather (Andrade et al, 2010; Knez et al, 2008), and that outdoor learning still takes place in Scandinavian countries which have harsher climates than the UK (Remmen and Iversen, 2022).

2.4.5   Challenges and enablers at the national level

At the national level, education policy can act as a barrier to outdoor learning by limiting teacher agency and restricting opportunities for learning beyond the classroom. Rickinson et al (2004) identified curriculum requirements as a key obstacle to outdoor learning, noting that a mandated curriculum leaves little flexibility for outdoor activities. Further issues include time constraints may make it difficult for teachers to incorporate outdoor learning into lessons, and the dominance of standardised testing makes outdoor learning challenging to assess, leading to its marginalisation in formal education. Dyment (2005) similarly found that curriculum demands were widely regarded as a barrier to outdoor education, reinforcing the notion that strict academic requirements discourage teachers from taking lessons outside. Oberle et al (2021) further identified systemic factors, including policies, funding, and curriculum structures, as key barriers preventing the integration of outdoor learning into mainstream education. There are markedly fewer mentions of systemic factors enabling outdoor learning practice. However, Prince reported that teachers working within the Early Years Foundation Stage in England regarded it as "an enabling curriculum for outdoor learning" (2019: 329), in stark contrast to the primary national curriculum.

Existing research has also shown that the need to prepare for standardised tests can be perceived as a barrier to outdoor learning (Edwards-Jones, Waite, and Passy, 2018; Shume and Blatt, 2019). Several studies highlight how preparing students for standardised tests can negatively impact outdoor learning opportunities (Edwards-Jones, Waite, & Passy, 2018; Shume & Blatt, 2019). The pressure to meet assessment targets often prioritises classroom-based instruction over experiential, nature-based learning. Waite (2010) observed a marked decline in outdoor learning as children progressed through the education system, particularly between EYFS and Key Stage 1, and again during Key Stage 2. This pattern aligns with policy differences between age groups (as described in Section 2.2.4), highlighting how the increasing emphasis on academic outcomes may discourage teachers from utilising outdoor learning as children advance through the curriculum. Prince observes that the perception of time as a barrier to outdoor learning "was almost always linked to performativity and testing" (2019: 335).

2.4.6   Section summary

The ecological systems approach offers a useful framework to bring together what is currently known about individual teacher, school and systemic barriers and enablers to outdoor learning. The extant literature has focussed on either individual challenges, such as low teacher confidence and lack of training, or environmental challenges such as availability of greenspace. As a result, researchers are only beginning to now understand the complexity of systemic constraints to teacher agency. Building on recent work by Edward-Jones et al (2018), Oberle et al (2021) and Patchen et al (2022), this thesis uses an ecological systems approach to understand and measure teacher's perceived capability for outdoor learning. The ecological view of teacher agency has been described in section 2.3.2. However, it is worth reiterating here that while the ecological model of outdoor learning views teacher agency for outdoor learning as centred on individuals, it also considers the systemic constraints that limit individual capabilities.

2.5   Chapter conclusions

2.5.1   Gaps in the existing research evidence on outdoor learning

This chapter has reviewed the existing literature on outdoor learning, highlighting where gaps exist in current research knowledge. Very little existing research has focussed on the role of teachers in delivering outdoor learning, or considered the importance of the school context. This will be the focus of the research presented in this thesis. Five key gaps were identified: scant data on current outdoor learning practice; the need to examine outdoor learning outcomes for different population subgroups; the lack of a theoretical framework describing barriers to outdoor learning; the need for a quantitative measure of teacher capability; little research on outdoor learning outcomes for teachers. These are summarised in this final section.

First, there is a lack of data on the current prevalence of outdoor learning in England and Wales, or the types of outdoor learning activities undertaken. This data would serve as a

benchmark for future research and evaluations. The studies described in this thesis will provide both quantitative and qualitative data on the type, frequency and duration of outdoor teaching activities taking place in primary schools across the UK.

Second, there is a need to examine population subgroups (e.g. economic disadvantage, ethnic groups) more specifically, to find out what works for whom (Dillon and Lovell, 2022; Mann et al, 2022). Although the studies described in this thesis do not measure child outcomes, they do consider the importance of demographic variation within and between school populations and how this may affect access to nature. Studies 1 and 4 of this thesis focussed particularly on schools serving disadvantaged communities, as per the eligibility criteria for Generation Wild. Ensuring full and accurate description of participant samples for all studies was a key research priority.

A third significant gap in the current literature is the lack of a theoretical framework to understand challenges and enablers to outdoor learning in UK schools. While there are many studies describing the challenges to outdoor learning, these issues have largely been considered in isolation, rather than taking a holistic view of how barriers interact across system levels. Researchers have tended to focus on either individual or school level factors, with insufficient attention paid to the impact of the wider education system. National education policies and curricula can be regarded as the wider environment in which teachers operate, having the potential to enable or restrict practice, regardless of individual teachers' beliefs or abilities. Comparatively little attention has been paid to how these policies may act as a barrier to outdoor learning through reducing teacher agency, as well as incentivising a narrow focus on curriculum-related testing regimes. Applying the ecological model of outdoor learning will allow the complex interactions of these factors to be better understood. Closely related to this point, a fourth gap is the need for a quantitative measure of teacher capability for outdoor learning. This would both enable comparisons of teacher agency for outdoor learning across a range of environmental contexts, and allow measurement of change over time.

The fifth and final research gap highlighted is that very few studies have measured the impact of outdoor learning interventions on teachers themselves. Those that did were

limited by small sample size, and failure to use validated measures. The final study in this thesis will address this gap by measuring the impact of taking part in Generation Wild on teachers' personal nature connection and wellbeing, as well as their perceived capability for outdoor learning.

2.5.2   Chapter summary

Outdoor learning in England currently takes place within a complex and contradictory landscape of educational policy. Although key governmental publications such as the Green Futures report (2018) and Environmental Improvement Plan (2023) have called for more outdoor learning, the primary national curriculum does not include any type of outdoor or nature-based learning. At the same time, OFSTED's inspections continue to incentivise teaching to the specific requirements of the standardised testing regime.

In contrast, in the devolved UK nations, primary curricula prioritise skills development rather than specific knowledge acquisition, and grant teachers more agency to decide what they teach, as well as how they teach it. Both the Scottish Curriculum For Excellence (Scottish Executive, 2006; Education Scotland, 2019) and the Curriculum for Wales (Welsh Government, 2022) reference outdoor learning as a possible means to teach the curriculum, as well as meeting children's health and wellbeing needs. In addition, Scotland, Wales and Northern Ireland do not have standardised national assessments for primary school children.

This thesis uses an ecological systems framework to understand and measure teachers' perceived capability for outdoor learning. This approach has not previously been applied to understanding outdoor learning and allows challenges and enablers at all system levels to be considered as part of a dynamic whole. The research that follows in the remainder of this thesis will allow the impact of these wider systemic issues on teacher agency for outdoor learning to be better understood.

Chapter 3: Methodology

3.1   Introduction

This chapter is concerned with providing a methodological overview of the research presented in this thesis. Specific details of the methods used in each study will be provided within the methods section of the relevant empirical chapters, 4 to 8. Sections of this methodology chapter are unapologetically written in the first person as it is a personal account, acknowledging my own role as researcher and the methodological choices that I made.

Researchers across many social science disciplines state clearly the importance of acknowledging one's own positionality and articulating this in a reflexive way. This is seen as crucial in educational research, particularly in the case of practitioner research (Czerniawski, 2023; Milner, 2007; Shepherd, Noble and Parkin, 2022). Section 3.2 contains mypersonal statement of positionality. I was influenced in writing this statement by the work of Braun and Clarke (2013); Gough and Madill (2012); Jacobson and Mustafa (2019); and Jamieson, Govaart and Pownall (2023).

Section 3.3 describes my use of a research journal as a tool for reflexivity, and gives examples of how early observations of Generation Wild visits influenced my research directions. Section 3.4 continues with a reflexive discussion of how my lived experiences and underlying philosophical assumptions influenced my methodological choices. Section 3.5 presents the rationale for using a sequential mixed methods research design. Finally, section 3.6 summarises the overall ethical stance taken during this research.

3.2   My positionality

I am a middle aged white British woman with avowedly left-wing political views. I grew up working class in the nature-depleted, post-industrial setting of the former East Midlands coalfield. I am fortunate to now own a house with a garden, on the edge of the Peak District,

and enjoy hillwalking, photography and outdoor swimming. I also read a lot of 'nature writing,' deliberately searching out accounts by individuals from minoritised groups in order to understand a wider range of experiences.

My higher education has meandered between the disciplines of Anthropology, Psychology and Education over three decades. At the start of my PhD, I considered myself primarily a quantitative researcher, with some interest in exploring qualitative methods. Through conducting Study 1, I realised a growing love for qualitative research, and am now a complete convert, extolling the value of mixed methods to students and research colleagues.

Before beginning this PhD in 2021, I had been teaching in early years and primary education settings for the previous 15 years. I worked close to home, in a relatively affluent rural area of northern England. As an early-years educator, I believe in a learner-centred constructivist pedagogy, viewing children as agents of their own learning. I think that children learn best through active exploration inside and outside the classroom, and that time in nature is necessary for physical health and mental wellbeing. In the face of the escalating climate crisis, I also believe that outdoor learning in natural environments should form a key part of education for sustainability. I was fortunate to work in schools where leaders encouraged me in this practice and took a reasonable attitude to risk assessment, keeping children safe whilst encouraging them to expand their boundaries.

I worked in education through the lockdowns of the COVID pandemic in 2020 and 2021, juggling attempting to remotely teach four- and five-year-olds, and caring for the children of key workers in school. I began this PhD in 2021 furious about the behaviour of the UK government during those times. The analysis reported in Chapter 4 gave me an opportunity to process some of those feelings, but I remain angry over the inequitable impact of lockdowns on certain groups of children who were already disadvantaged in education.

These facets of my social identity mentioned all have some implicit relevance to the research described in this thesis. I was attracted to this PhD project in the first place because of my own deeply held conviction that all children can benefit from spending time in nature. My lived experiences as an educator influenced my choice of research direction in ways that my

supervisors and I could never have anticipated at the start of the PhD process. As a research team, we had expected my research would focus on child participants in Generation Wild, but from the first months of my PhD, I found myself repeatedly asking, "but what about teachers?" Eventually, that question became the focus of this thesis.

3.3   Observations, conversations and my research journal

During the first year of my PhD, I carried out at least nine visit days across five WWT wetland sites, observing approximately 15 classes taking part in Generation Wild. These classes spanned the entire primary age range and included two schools for children with SEND as well as a group from a Pupil Referral Unit (PRU). I continued to observe visits during the two subsequent years albeit at a much slower rate. I made notes and often wrote up reflective commentaries afterwards in my research journal, sometimes sharing sections with my supervisors. Whilst very little of this material is included in this thesis, what I learned during these sessions did profoundly influence the direction taken by my research.

As I learned more about the design and delivery of Generation Wild, I realised that not much attention was given to increasing teacher capability for outdoor learning activities[1]. It was assumed that participating teachers would experience no difficulties in engaging with the programme and fulfilling the role allocated to them by WWT. Observations and conversations soon revealed that this was not always the case, and I was driven to explore the role played by teachers in enabling children to connect with nature.

My work is action-oriented and driven by my personal values that research should be useful outside academia to enable positive change in the world. I am motivated by wanting to understand how teachers can best facilitate disadvantaged children's nature connection- and what might prevent them from doing so. From the start of my research, I sought to provide

---

[1] Although this had been considered at the early stages of project development in the form of teacher CPD, a lack of funding and systemic constraints has prevented these plans from being realised. See chapter 9 for further discussion.

evidence that could inform changes in policy and practice and to disseminate findings in the most accessible way possible.

Over the course of my PhD, I kept an ongoing research journal. It began as a way of summarising meetings, conversations and reading, but became invaluable as a reflective (and reflexive) tool. The journal had no rules or method, other than entries were dated and ran sequentially in order. I also used the journal to record observations of school wetland visits, and conversations with teachers and learning managers. In line with my training as an anthropologist, whilst I occasionally took field notes- if this were feasible during an outdoor visit and without making participants feel self-conscious- I did not make recordings. I did ensure that I wrote up notes as soon as possible to keep these observations as authentic and accurate as possible, subject to my own recall. Therefore, where journal extracts include speech and conversations, the words used should be considered as an approximation, my best attempt at recalling the sense of what that person said, rather than a verbatim transcription of their own words.

The journal was particularly useful to me at several timepoints: firstly, during the initial process of formulating research aims; again, during the process of constructing themes for study 1; and finally, as I began to pull my separate studies together into this thesis. At several points in this thesis, I have included both observations and reflective extracts from my research journal, as they illustrate how observations and conversations lead to critical shifts in my thinking.

Extract from my research journal, November 2021:

> *Of the four teachers (from the same school) who I've observed over the last two days, only one of them seemed truly enthusiastic about Generation Wild, telling me how she would use the website and activity ideas when they got back to school. One teacher seemed as though she'd actively have preferred to be somewhere else- perhaps somewhere warmer and less muddy? I wonder what implications this has for these children's continuing engagement with the project…*

This extract from my research journal relates to the first Generation Wild observations I carried out, just a few weeks into my PhD. This was my first inkling that there were important research questions to address relating to teachers, as well as to outcomes for children. At the time, I was genuinely shocked at the lack of interest and engagement shown by some teachers during the wetland visit.

Looking back on this journal extract now, I am uncomfortably aware of both my own privilege in having lived a life that meant I felt safe, comfortable and welcomed in natural places, and my naïveté in not understanding that for others this might not be the case.

The extract below is a short record of an interaction between teacher and child which I observed during a Generation Wild wetland visit by a Pupil Referral Unit.

> *After an earlier fight with a fellow pupil, the child had been very animated and engaged looking at creatures in the pond. At the end of the session, a member of staff asked him casually, "Do you think you can do some of these activities and help nature?"*
>
> *"It's not like this where I live. Nobody has a garden, and everybody just chucks their rubbish down everywhere."*
>
> *The member of staff tried, "Well, we don't drop our rubbish. We can show people not to drop rubbish, to put it in the bin." Silence. He continued optimistically, "We could get one of those litter-picker grabby things and clean up?"*
>
> *"What's the point?" the boy answered, his posture sagging wearily. "There's no point. Whatever we did, everybody else would keep on chucking their shit down anyway. It's not like it is here…" He gestured at the view across the wetland and estuary.*

This was a profound moment for me, the hope of the Generation Wild call to action, versus the reality of despair put into words by a child who lived in a city half an hour away, but inhabited a different world. Despite the care taken in designing the Generation Wild activities, to ensure that they were accessible to all, some of the nature connection activities

must still feel exclusionary for children living in the most adverse situations. Children are asked to help nature by feeding birds in their garden, or to make homes for nature. For children who may not have a secure home or sufficient food themselves, this is unattainable and must seem alienating[2].

In evaluating the impact of Generation Wild, rather than asking simply whether the programme works, I want to address the more complex central question of realist evaluation, "What works, for whom, in what circumstances and why?" (Pawson and Tilley, 1997: 24). This means understanding the ecological context of programme delivery: children are taught by individual teachers; teachers work within a school; the school sits within the wider education system, which is situated within the broader context of UK society in the 2020s.

In the earlier interviews I conducted as part of Study 1, I was extremely aware of inhabiting two roles: teacher and researcher. I introduced myself as a current PhD student, researching children's nature connection, but always mentioned my own previous teaching experience, making both my roles explicit. Identifying myself as a teacher made it easy to build up rapport with participants, and interviews became a conversation with a fellow teaching professional. This is often evident with the professional jargon used throughout the interviews; the assumption being that I spoke their language, which was mostly true. Sometimes, particularly with Welsh teachers, I did need to ask questions about aspects of curriculum and vocabulary that were unfamiliar. My teacher identity undoubtedly shaped both what participants told me, and how they told it. In many respects, this made me an insider researcher, as a teacher talking to other teachers. However, I remained aware of my own relative privilege, reflecting that my experiences teaching in small schools in a less deprived and very rural setting in Northern England made me, at times, something of an outsider to teachers who worked in very different contexts. This was something I tried to acknowledge during interviews, and was certainly very aware of at the analysis stage. When I realised this, it was reassuring to find in the literature of positionality that other

---

[2] There are deliberately very few of these types of activities and they are far outweighed by much simpler activities that can genuinely be done almost anywhere: dance in the rain, watch the clouds, listen to the sounds of nature, imitate an animal.

researchers have written about their own experiences of similar shifts and fluidity during their research (Bukamal, 2022; Hertz, 1997; Humphrey, 2007).

Initially, I found the two roles to be jarring, and struggled to balance the dual aspects of teacher and researcher. During interviews, this had the effect of me asking either too few questions or too many. My most successful interviews came later in the study, after I had begun to code early data. By this stage, I felt far more comfortable inhabiting both identities, and began to evolve a hybrid identity of researcher-teacher, based on my lived experiences, but more than the sum of its parts. This allowed me to listen to my participants as a peer, but also to generate questions in response that enabled them to reflect more deeply on what they were saying. I came to understand interviewing as a reflexive act in itself: as the first stage of my analysis, rather than separated from it.

Qualitative research is an inherently subjective process, and like any researcher, I brought my own experiences and assumptions into the process. Using reflexive thematic analysis to address my first two research questions required me, as researcher, to actively produce knowledge from the dataset. The final themes are constructed from my own perspective, and are shaped by my own worldview and theoretical positioning in ways that inevitably go beyond my conscious awareness. In line with Braun and Clarke's guidance (2021), I acknowledge my position but regard this as a necessary resource which enabled my interpretation of the data, rather than a weakness or limitation (Gough and Madill, 2012). Although I was intimately familiar with the context of English primary schools, I have not worked in schools where the majority of pupils are from economically disadvantaged backgrounds. As a White British woman, I also trod warily when the analysis began to touch on ethnicity, trying to be aware of the limits of my own lived experiences and how they affected my perspectives.

However, I am grateful for the balance provided by my supervisors, who work across the disciplines of Psychology, Geography and Architecture; none of whom had personal experience of teaching in UK schools. They varied from individuals trained in a strong positivist tradition who were most comfortable using rigorously designed quantitative experimental methods through to predominantly qualitative researchers from a more

interpretivist background. This wider range of perspectives was helpful to provide a critical voice and alternative viewpoints, preventing me from overinterpreting participants' responses exclusively through the lens of my own personal experiences. This was clearest when I was struggling to write up the themes in chapter 4. It took me many months to reach a point where I was able to critically engage with the material, and move beyond my emotional reaction to my own experiences of teaching through the COVID-19 pandemic.

3.4   Epistemology and ontology

Three key research philosophies in social sciences are positivism, interpretivism and pragmatism (Crotty, 1998; Willig, 2013). These paradigms are underpinned by differing philosophical assumptions about the nature of reality (ontology) and how we can know that reality (epistemology).

Positivist philosophers such as Comte and Mills describe a realist ontology, believing that a single reality exists, independent of the observer (Willig, 2013). Epistemologically, positivism assumes that this reality can be objectively known by measurement through objective observations, using reliable designs and validated measurement tools. Whilst positivism asserts that research should be value free, post-positivism critiques this view, acknowledging that research can never be entirely free from values, and accepts that reality can only be understood imperfectly (Lincoln and Guba, 2000).

Constructivism takes an opposing philosophical position: ontologically, that there is no independent single reality; and epistemologically, that reality is subjectively constructed and interpreted by the observer through their experience of it. Therefore, according to constructivism, reality can only ever be partially discovered through research (Willig, 2013). Constructivist philosophy also underlies Piaget's theory of cognitive development and Vygotsky's sociocultural developmental theory (1986, 1934).

Pragmatism takes a more practical and flexible approach, believing ontologically that reality is constantly negotiated and interpreted, and epistemologically that there are many different

ways of understanding the world, and therefore many different ways to conduct research investigating reality. Key tenets of classical pragmatism are that knowledge is constructed based on real-world experiences; truth is viewed as tentative, and changing over time; and that human experience can be understood through language (Dewey, 1931; James, 1904). Dewey also advocated for the importance of teachers engaging in pedagogic reflection and enquiry, something which was influential to me throughout my time in teaching, a field where research evidence can be slow to influence classroom practice, and is often misinterpreted (Castles, Rastle and Nation, 2018). Strengths of pragmatism are that it enables a holistic analysis, incorporating multiple factors of relevance. It is also easily described and reported, which is an important consideration for dissemination of findings when working with a partner organisation and practitioners. Pragmatism is well suited as a framework for the design and validation of a quantitative instrument (Kaushik and Walsh, 2019), which is important for addressing Research Goal 2. A potential limitation of pragmatism can be interpretation if there are discrepancies in findings from different types of data (Feilzer, 2009).

It matters to me that my research situates Generation Wild firmly in a real-world context. I believe that the knowledge produced from my research is likely to be local, situated and provisional rather than a universal truth. My time as a PhD student was an epistemological journey, in which I leant towards (but did not wholly align myself with) pragmatism. I have borrowed freely from different research traditions to reach my final mixed methods design, with different studies utilising both interpretivist and post-positivist approaches separately, where appropriate.

My epistemological and ontological stance influenced both my specific research goals, as set out at the end of chapter 1, and my choice of methodology. Whilst positivism is closely aligned with quantitative methods, and interpretivism with qualitative methods, mixed methods research designs can fit into both neo-pragmatist and interpretivist paradigms, focusing on which methods will work best to address the research goals rather than underlying philosophical assumptions. I was motivated by the desire to provide useful and applicable research findings to explain complex phenomena in a real-world context where

many variables could not be controlled. In the attempt to do this, I employed a combination of quantitative and qualitative techniques to fulfil diverse research aims.

3.5 The sequential mixed methods design

Combining different methods within a single research design can provide a better understanding of the complex reality of educational or health interventions (Burke and Onwuegbuzie, 2004). However, it has the drawback of being a time-consuming approach, requiring mastery of multiple different methods (Halcomb, 2018). Decisions around the ordering and timing of different components are critical in sequential designs (Teddlie and Tashakori, 2009). A sequential mixed-methods design (Teddlie and Tashakori, 2009) was adopted to address the research goals. Qualitative and quantitative data were collected in distinct phases, with data from each study analysed before the next study commenced. An exploratory sequential design, moving from qualitative to quantitative methods, was deemed particularly suitable to address the three Research Goals.

The sequential design is illustrated in figure 3.1, with arrows showing how findings from earlier studies were used to inform design decisions for later studies. This structure facilitated the selection of the most appropriate methods to both advance understanding of the broader research area and respond to the specific aims of the study.

Figure 3.1. The sequential mixed methods design linking the studies in this thesis
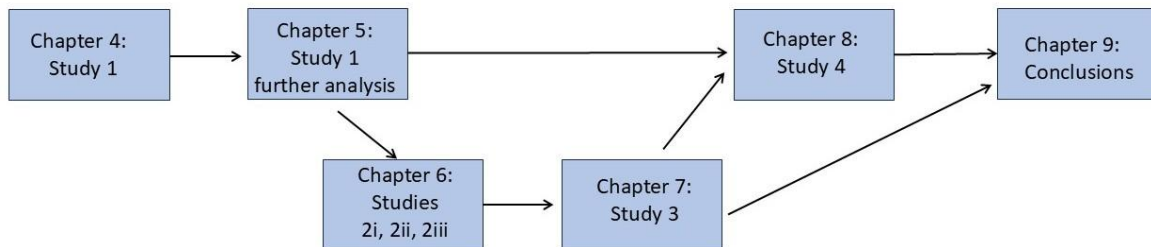
Research began with the initial exploratory Study 1, addressing **Research Goal 1** (The qualitative exploration of teachers' perceptions and experiences about schools as sites for enabling disadvantaged children to spend time in nature). A qualitative approach was intrinsic to addressing this goal, enabling exploration and understanding of individual teacher perceptions. This initial exploratory qualitative phase contributed to theory development and ensured that development of the novel SCOOL measure was grounded in participants' lived experiences. The findings of Study 1 were used to construct the ecological model of barriers and enablers of outdoor learning, which was in turn used in the development of the SCOOL scale.

In contrast, addressing **Research Goal 2** (The development and validation of a novel quantitative measure of School Contexts of Outdoor Learning) required a different, more quantitative approach. This work followed the systematic seven-step process outlined by DeVellis (2017) that emphasises an iterative, evidence-based progression from construct definition through to reliability and validity testing. In line with this framework, initial constructs were defined (Step 1) with reference to the ecological model of outdoor learning and informed by qualitative interviews with teachers (Study 1). A broad pool of potential items was then generated (Step 2) using both inductive insights from these interviews and deductive input from the literature, supported by an online survey with teachers (Study 2i). Items were refined through cognitive interviews to assess clarity and comprehension (Step

3; Study 2ii) and reviewed by an expert panel to ensure content validity (Step 4; Study 2iii). The resulting draft scale was then tested in a large national survey of UK teachers (Study 3), using exploratory and confirmatory factor analyses to determine and optimise model structure (Steps 5 and 6), followed by assessments of reliability and validity (Step 7). This staged process ensured that the final instrument is both theoretically grounded and psychometrically robust. The methods used in all studies are described fully in the methods sections of the relevant chapters.

Research Goal 3 (Assessing the impact of taking part in Generation Wild on teachers' attitudes and behaviour towards outdoor learning, and their personal nature connection and wellbeing) was addressed in Study 4. This study employed primarily quantitative methods, consisting of a pre-post survey design using psychometrically validated measurements, and testing of specific *a priori* models and hypotheses using inferential analyses. The new SCOOL scale was used as one of a raft of measures, alongside existing validated measures of nature connection, environmental concern, and wellbeing. The survey also contained items querying outdoor teaching practices, and a single open-ended item to elicit qualitative responses about experiences of participating in Generation Wild.

Overall, this thesis gives equal weight to qualitative and quantitative findings, with the different methods viewed as complementary, and findings from each approach informing the other. Whilst qualitative findings are considered valid and sufficient in their own right, and additional confirmation from quantitative methods is not needed, findings are compared and connected across different studies where it makes sense to do so. For example, the qualitative findings of Study 1 were used to formulate specific directional hypotheses that were tested using the data from Study 3. The results of the quantitative analyses supported these hypotheses, but it was the qualitative analysis which offered explanation of how and why these effects occurred and aided the formulation of the next set of research questions.

3.6   Ethical considerations

Research followed current British Psychological Society ethical guidelines (2021) and all studies received ethical approval from the Cardiff University School of Psychology Research Ethics Committee. Participants were given full written information describing: the purpose of the study; the potential risks and benefits; information regarding anonymity, confidentiality, data protection, and storage; and the right to withdraw. After reading this information, they were asked to give consent. Where interviews were recorded, a final check was made for verbal assent before recording began.

In acknowledgement of the reality that teachers are busy hardworking professionals, and there are real and impactful issues of workload, every effort was made to minimise study length and to remove any unnecessary items or measures. As data quality, participant retention, and the recruitment of diverse samples were key concerns, incentives were offered for research participation. Incentive types and values are detailed within the methods for each study.

A broader ethical principle underpinning this research was inclusivity, in line with the aims of the Generation Wild programme. This meant recruiting participants who represented the underlying population of UK teachers as closely as possible. Therefore, care was taken to accurately describe participant samples in all studies.

3.7   Conclusion

In this chapter, I have clearly stated my own positionality and discussed the impact this had on my research. I have provided a brief reflexive justification of the methodological framework underpinning the sequential mixed methods research design. However, more specific details of methods used for each study are given within the study chapters which follow.

Chapter 4: A qualitative exploration of teachers' perspectives on disadvantaged children's wellbeing and nature experiences

4.1. Introduction

This chapter presents Study 1, a qualitative study which explored the experiences and beliefs of UK primary school teachers taking part in Generation Wild through thematic analysis of semi-structured interviews. Chapter 1 described how Generation Wild requires teacher engagement before, during and after the wetland visit day, in order for children to engage with the programme. Therefore, teachers are a key stakeholder group for WWT, and it is vital to understand their perspectives. In addition, research into teacher participants in this programme offers a valuable opportunity to respond to Marchant et al's (2019) argument about the importance of measuring outdoor learning impacts across a greater range of schools than is currently in the literature. This will allow greater insight into the particular issues faced by teachers working in schools in disadvantaged areas.

The aim of this exploratory study was to address **Research Goal 1: The qualitative exploration of teachers' perceptions and experiences about schools as sites for enabling disadvantaged children to spend time in nature.** Interviewing teachers in the months after their wetland visit meant that longer term programme engagement could be discussed. Within this broad aim, the study initially set out to address three more specific subgoals:

RG1a) Teachers' perceptions and experiences of how children benefit from time in nature.

RG1b) Teachers' perceptions and experiences of how disadvantage affects children's access to nature, and how outdoor teaching can help address inequalities in access to nature.

RG1c) Teachers' perceptions and experiences of the barriers and enablers to outdoor teaching in UK primary schools.

Research Goals 1a and 1b are addressed within the analysis presented in this chapter. Research Goal 1c emerged during this analysis, and is partially realised in this chapter. This emerging research question justified undertaking a secondary deductive analysis of this dataset. This analysis is described in chapter 5, and fully addresses research goal 1c through an ecological systems framework (after Bronfenbrenner, 1979).

4.2   Methods

4.2.1   Participants and recruitment

Between January and June 2022, all teachers involved in Generation Wild (approximately 200) were invited to take part in an interview around 6 weeks after their wetland visit. Interviews were conducted with a self-selecting sample of 25 teachers between January and August 2022. All the participants taught in state primary schools across England, Wales and Northern Ireland with a relatively high proportion of children eligible for free school meals. 75% identified as female, and 12.5% as belonging to a minority ethnic group, which is broadly in line with the UK teaching workforce (Butler and Fisher, 2023). They ranged from newly qualified teachers to staff approaching retirement with over 30 years of experience. Individual participant characteristics are reported in table 4.1. Participants worked in different schools, with the exceptions of P1 and P2 who worked in the same school.

Table 4.1. Study 1 participant characteristics

ID	Gender	Ethnicity	Years in teaching[3]	School type	Region
P1	F	White Brit.	10+	Mainstream primary	South West England
P2	F	White Brit.	3	Mainstream primary[4]	South West England
P3	F	White Brit.	10+	Mainstream primary	North West England
P4	M	White Brit.	10+	Mainstream primary	North West England
P5	F	White Brit.	10+	Mainstream primary	North East England
P6	F	White Brit.	10+	Mainstream primary	North West England
P7	M	White Brit.	10+	Special school	North East England
P8	F	White Brit.	2	Mainstream primary	North West England
P9	F	White Brit.	10+	Mainstream primary	North West England
P10	F	Asian	5+	Mainstream primary	Wales
P11	F	White Brit.	5+	Mainstream primary	South West England
P12	F	White Brit.	20+	SEND unit	Wales
P13	M	White Brit.	5+	Mainstream primary	North West England
P14	M	White Brit.	10+	Pupil referral unit	Wales
P15	F	White Brit.	5+	Mainstream primary	North West England
P16	M	White Brit.	<1	Mainstream primary	London
P17	F	White Brit.	10+	Special school	South West England
P18	M	White Brit.	20+	Mainstream primary	Wales
P19	F	White Brit.	20+	Mainstream primary	North West England
P20	F	Black Brit.	10+	Mainstream primary	London
P21	F	Indian	<1	Mainstream primary	London
P22	F	White Brit.	5+	Mainstream primary	North West England
P23	F	White Brit.	20+	Mainstream primary	North West England
P24	F	White Brit.	10+	Mainstream primary	London
P25	M	White Irish	10+	Mainstream primary	Northern Ireland

[3] Estimated, based on interview content.
[4] P1 and P2 worked in the same school

4.2.2 Ethics

This research followed the British Psychological Society code of ethics (BPS, 2021). Ethical approval was provided by the Cardiff University School of Psychology Research Ethics Committee. Fully informed consent was obtained in advance of all interviews, with particular attention paid to information regarding anonymity, confidentiality, data protection, and storage; and the right to withdraw. At the start of each interview, a final check was made for verbal assent before recording began.

A family ticket for a wetland centre visit, valued at around £40, provided by WWT, was offered as thanks for participation.

4.2.3 Materials and procedures

Individual interviews were chosen for data collection to enable exploration of differences within and between schools, and allow all participants to offer individual viewpoints on equal terms. A semi-structured format was chosen as being a reasonably efficient way to collect rich data from a moderately sized sample whilst offering some flexibility. This enabled the interviewer to explore emerging areas of interest, to probe participant responses for clarity, and to investigate ambiguity and nuance- while also ensuring the same key topics were covered.

An interview guide was devised, with questions generated from observations of Generation Wild wetland visits, conversations with teachers during those visits, and discussions with the WWT on-site staff. This interview schedule is presented in Appendix 1. The main topics covered were: contextual information about the participant and their school; perceived benefits of nature for children; barriers to outdoor teaching and learning; and effects of disadvantage on opportunities to access nature.

As data collection began, an unanticipated topic of interest emerged from the interviews. When interviewing commenced, in January 2022, UK education was still in a phase of recovery from the COVID-19 pandemic, with high levels of disruption due to staff and pupil absences

(Department for Education, 2023c). Whilst it was to be expected that teachers would mention the impact of the COVID pandemic, this topic dominated interviews in an unanticipated way.

Early interviews highlighted how effects of the COVID-19 pandemic were seen as important and relevant to the interview content. Many participants explicitly linked the impact of lockdowns to questions about disadvantage, access to nature and wellbeing. In response, the interview schedule was amended from participant 5 onwards to deliberately incorporate questions about pandemic impact.

Interviews were conducted remotely over video call and audio recorded. Interview length varied from 13 to 47 minutes. Orthographic transcriptions of each audio recording were completed, following the guidelines of Willig (2013). Punctuation was added to improve readability, including quotation marks where participants directly reported speech. Repeated discourse markers such as 'like', 'you know' and 'sort of' were removed to render participants' remarks easier to understand. Regional dialect, slang and grammar were not corrected. Any identifying information, such as names of people, schools or places, was redacted during transcription. Participant names were replaced by a unique personal identifier (see Table 4.1).

As three interviews could not be fully transcribed due to poor sound quality, the final dataset consisted of 22 transcribed interviews containing over 100,000 words plus partial notes from the remaining three interviews. Although there are no verbatim quotes from these three interviews, some of the topics discussed were still influential in the analysis.

4.2.4   Analytical approach

Thematic analysis is a group of methods for identifying and reporting patterns of meaning in a data set. Whilst thematic analysis was formerly weakly demarcated from other qualitative methods with poorly described procedures, there is now a growing methodological literature outlining a range of differing approaches, following Braun and Clarke's seminal 2006 paper. Clarke et al (2019) describe three broad approaches to thematic analysis: coding reliability, reflexive, and codebook. Whilst thematic analysis as a generic method is

theoretically flexible, more specific approaches depend on different underlying philosophical assumptions, as well as varying in their analytical procedures.

Coding reliability approaches are generally deductive, driven by theory, and operate within a positivist or post-positivist framework, testing hypotheses (Boyatzis, 1998; Guest et al, 2012). With this approach, interview questions often determine themes in advance, with the coding process used as a way to find and test evidence for the themes in the data. A codebook is developed, with codes clearly defined and coding is performed by two or more independent analysts, with checks for reliability between coders.

Reflexive thematic analysis is a theoretically flexible approach. It uses inductive coding by one or more coders, and researcher subjectivity is valued and seen as integral to the process of analysis. Quality and rigour are considered to depend on the depth of coder engagement with the data (Braun and Clarke, 2006, 2021; Hayfield & Terry, 2020). This differs from a coding reliability approach in that coding is viewed as subjective and interpretative, with themes considered to be actively created by the researcher, rather than discovered as already existing in the data. In this approach, themes are the endpoint of the process; they are built from codes and refined and reviewed by the researcher through an iterative and recursive development process.

The analytical approach initially employed with these data was reflexive thematic analysis, as described by Braun and Clarke (2006; 2021). This method was selected as being most suitable for an initial exploratory study mainly conducted by a single researcher, with limited input from others. It aligned well with the pragmatist stance of the overall evaluation, and also offered the flexibility to code the data both inductively and deductively. A coding reliability approach would not have been compatible with the values of this research as articulated in chapter 3. However, research goal 1c, which emerged as a distinct question during the course of this analysis was well suited to a codebook approach, using the ecological framework proposed in chapter 2.

Analysis followed the six-phase process outlined by Braun and Clarke (2021): familiarisation with the dataset; coding; generating initial themes; developing and reviewing themes;

refining themes; and writing up. All interviews were conducted, transcribed and coded by myself, as lead researcher. Data were systematically coded line by line, using pen on paper, taking an inductive 'bottom-up' approach, with codes generated from the data rather than driven by theory. Coding used both semantic and latent levels of meaning (Terry et al, 2017).

As data collection took place over a period of six months, coding of earlier interviews began before the full dataset was available, and this undoubtedly influenced the direction of questioning in later interviews. The initial coding generated well over a hundred codes, but as coding progressed, similar codes were compared and combined, and this gradually reduced to dozens of codes. Inevitably, some interviews yielded less rich data than others, but in areas of transcript where coding appeared sparse, care was taken to revisit this data to ensure nothing was overlooked.

As an aid to reflexivity, other members of the research team- my supervisors and WWT staff- read and independently coded a small number of interviews. Once all interviews were coded, candidate themes were generated through grouping codes into patterns of meaning. These themes were discussed by the wider research team, to help with development and interpretation, before writing up.

Initially, the analysis process was inductive, driven by the data rather than dictated by ideas and categories from previous research. However, when these initial themes were reviewed, it became clear that the ecological model of outdoor learning presented in Chapter 2 provided a useful organising framework for addressing Research Goal 1c (Teachers' perceptions and experiences of the barriers and enablers to outdoor teaching in UK primary schools), and this became a further deductive analysis. For clarity, this second analysis of the data is presented separately as Chapter 5 of this thesis. In contrast, the four themes presented and discussed in the remainder of this chapter were constructed more organically, using a reflexive approach and the analysis remained inductive and data driven throughout. These themes were reviewed and refined through several iterations, in a recursive process lasting well over a year, and have evolved considerably from the initial candidate themes.

4.3   Results and discussion

4.3.1   Summary of findings

This section reports the four themes generated in the analysis, with each theme illustrated by several verbatim extracts from the interviews. Although all participants were taking part in Generation Wild, the semi-structured interview format allowed for the discussion of wider issues, and teachers also reflected on children's experiences of nature and outdoor learning beyond the programme. While the research did not initially aim to investigate the impacts of COVID-19, early study participants emphasised how they considered lockdown impacts to be of huge relevance, explicitly linking these impacts to questions about disadvantage, access to nature and wellbeing.

Theme 1 describes teachers' observations about how nature affects children's behaviour and has a positive impact on children's wellbeing. Theme 2 conveys the barriers experienced by disadvantaged children and families in accessing nature, and other opportunities. It also explores how teachers work to counter this lack of experiences and opportunities. Theme 3 explores the ongoing impact of COVID-19 lockdowns, and how teachers saw nature as part of children's recovery. Theme 4 articulates the conflict expressed by participants: although teachers understood very well how the disadvantaged children they taught could benefit from time in nature, in practice they often felt unable to deliver this to any meaningful extent due to the structural constraints imposed by the wider education system.

4.3.2   Theme 1. "You see a different side of them": the impact of nature on children's behaviour and wellbeing

The first theme describes teachers' beliefs that spending time in natural environments has positive effects for children's behaviour and wellbeing. Time in nature was seen as particularly beneficial for children who struggled with the demands of the classroom. As teacher P11 commented:

> *"You see a different side of them… those children that can't sit in their chair, they struggle sitting there listening… those constraints of being in a classroom, having to sit quietly… that's a lot for some children."* **P21**

The finding that children behave 'better' outdoors echoes other studies that have reported perceived improvements in children's behaviour during outdoor learning. Scott et al (2013) describe how many teachers saw children's behaviour as a barrier to getting outside and feared losing control of their class. However, once outside many reported improvements to children's behaviour. P9 described how a colleague had initially been reluctant to take part in Generation Wild, but later acknowledged the impact on children's behaviour, but also that the benefits of being in nature were fleeting, with behaviour reverting once back indoors:

> *"He said the behaviour difference was incredible… they were just completely different children outside… they were more calm, a lot more relaxed, they got on a lot better with each other… the minute that they came back into class, they just changed again!"* **P9**

Whilst it was rare for teachers to refer to named psychological theories, several of the extracts describe outdoor environments as calming, and offering children freedom and space. This language resonates with proposed mechanisms through which nature can restore psychological capacities such as Stress Reduction Theory (Ulrich, 1991) and Attention Restoration Theory (Kaplan and Kaplan, 1989).

> *"For younger children, when they're in the classroom… there's a lot going on… outside they've got more space… being outside just makes them a bit more calm."* **P2**

> *"Being outside, in nature, being able to explore somewhere different… new… exciting… not having any walls where you're stuck, where you can be free to explore, to enjoy nature, looking at things… taking those rules away… all of that helped them."* **P24**

Previous studies evaluating nature-based learning have found increased self-efficacy (Chawla et al, 2014); significant and sustained improvements in pupil wellbeing (Harvey et al, 2020); and reduction in social, emotional and behavioural difficulties (Richardson et al, 2017). Teacher P4 explained how for one of his pupils, time in nature provided an opportunity to express feelings:

> *"He had some of the most severe behavioural difficulties I've ever seen, but he would sit and build this bug hotel beautifully, and even make little beds to put in it, in case they wanted to go to sleep… so for a child who's incredibly difficult, and doesn't show emotions… well, he's showing a lot of empathy!"* **P4**

Teachers also gave many examples of how they believed time in nature could help children to heal and recover from traumatic events in their own lives. The extract below describing how regular time in nature helped a mute child begin to speak is strikingly similar to the account of an elective mute child 'talking to the trees' described by a teacher participant in Marsh and Blackwell (2023:7).

> *"I videoed their voices, and when I came in, that teacher cried. She'd never heard this little girl's voice! Now that little girl, currently sits in school and puts her hand up in class and asks questions. That's how much it works! It's magic!"* **P5**

Overall, the idea that time in nature can have a meaningful impact on children's wellbeing was echoed by many other teachers. Teacher P12 emphasised the ways she found to help the children in her Additional Learning Needs unit:

> *"There's so many opportunities to develop resilience… the children we work with, they may be going through trauma… they may have huge fears about things… but when you see them outdoors, and they have the opportunity to lift up a stone and find a worm, and then you say, 'Wow… you're brave, you're picking it up!' It gives them that confidence, that self-esteem."* **P12**

This theme captured teachers' beliefs about how time in nature is important for children. It showed that many teachers are highly motivated to take children outdoors into natural places. The next theme describes why teachers felt this was particularly important for the disadvantaged children they taught.

4.3.3   Theme 2. "A completely different space": inequalities in access to nature

This theme explores how teachers understand disadvantage as a lack of opportunities and experiences, including access to nature. Disadvantage was most often described in terms of poverty, probably because Generation Wild eligibility is based on the proportion of children in a school eligible for free school meals. Teachers understood the complexity of financial barriers affecting access to nature. As teacher P22 commented:

"People are working in very low paid jobs, or have caring responsibilities, and these things are all impacting on their ability to actually go and see places."

The same teacher explained how poor weather could act as a barrier to spending time outdoors in nature, especially when children lacked suitable clothing and footwear.

"To say, "Oh, it's free!" is kind of… it's not that simplistic really… it's… you might not even have the suitable shoes to walk that distance, or a warm enough coat?"

Previous research has shown that not having suitable clothing or footwear for poor weather is also a barrier in school time (Harris, 2021). However, there are also more hidden ways in which clothing can act as a barrier to visiting natural places, as Collier (2019) explains how values around clean and new looking clothes may vary between social groups. For urbanised families who have experienced poverty in recent generations, this may mean avoiding visits to certain types of outdoor space to prevent clothes and footwear becoming dirty and muddy. Teachers, as middle-class professionals, may not have fully understood these more nuanced issues relating to the *value* placed on owning (and maintaining) certain types of clothing and shoes, rather than the monetary cost of these items.

Looking beyond financial disadvantage, teachers also described the impact of poor parental mental health, temporary housing arrangements, and language barriers. For example:

> *"A lot of our parents, because of their learning difficulties, what they can actually offer as parents is so limited… a lot of them are very anxious."* **P12**

> *"We will often get new starters for a few weeks, and then they'll be moved on… new refugees might be here for three to six weeks, before being rehoused in another area, so we've got quite a lot of coming and going at our school…"* **P16**

Teachers were aware that access to safe local green space was not equitable and mentioned vandalism and antisocial behaviour as deterrents to children playing in public places.

> *"A lot of our children aren't allowed to play out on[name redacted] Park because of gang crime and violence… the play areas have been burned out… there are quite a few significant challenges that face the community around us."* **P15**

Birch et al (2020) found that public greenspaces which have been allowed to visibly deteriorate, and attract antisocial behaviour may be avoided, and have a negative impact on mental health. Whilst many socio-economic barriers may interact with race in intersectional ways to disproportionately disadvantage some minority ethnic communities, there were also explicit mentions of minority ethnic families facing the additional barrier of overt racism in public green spaces, as this teacher in North-West England reported:

> *"A lot of our Asian families don't use the local park, because of racist incidents… and they maybe don't have gardens, or live in flats, so aren't able to access the nature activities quite as easily…"* **P22**

There is evidence in existing literature to support the idea that minority ethnic families may avoid accessing public spaces such as parks due to fear of racism. As in the extract above, Cronin-de-Chavez et al (2019) found that fear of crime and antisocial behaviour was a barrier to park usage for low-income minority ethnic families in a northern English city. Birch

95

et al (2020) also refer to isolated experiences of racism and social exclusion in public spaces. There may also be more subtle barriers, such as those described by Smith and Pitt, who emphasise the problem of lack of representation of minoritized ethnic groups in natural outdoor places (2022). However, as the majority of teachers were themselves from a White British background, it is doubtful how well they understood the complexity of the barriers experienced by members of some racialised communities.

Teachers spoke about how the children they taught had fewer opportunities than those living in more affluent communities. They gave examples illustrating how this lack of direct experiences and knowledge can impair children's ability to access the curriculum.

> *"A couple of years ago, I was teaching mountains as a topic, and I said, 'You know, when you go to the top of a hill, and you look down… when you look over the top?' It was absolute blank faces… it was that moment I realised that these children had never actually experienced that."* **P21**

It could also be argued that the above extract demonstrates how the curriculum is flawed, in its lack of relevance to the lives which disadvantaged children were living. However, teachers did not suggest this, instead tending to conceptualise the problem as being the children's lack of experience and knowledge of nature. Dickinson (2013) suggests that framing children's disconnection from nature as a disorder oversimplifies the complex cultural and contextual factors underlying children's disconnection from nature.

Teachers saw spending time in natural places, such as the wetland sites, as beneficial for all children, but particularly so for those who had not had similar experiences before.

> *"Their faces when they first saw the big lake through the hides… it is just being in a completely different space for them… because they've not seen anything like that before… and they could hear noises."* **P19**

Many teachers believed that even a single wetland visit could make a genuine difference to disadvantaged children, helping them to understand the world around them.

"It was allowing the children that opportunity to go out into the world and go into an open space… and see animals and creatures that they've never seen before, in their natural habitat… most of them live in a high-rise block, so a bird flying past is going to be limited as to what they can see of that animal." **P4**

This theme conveyed why teachers believed that opportunities to access natural places were particularly important for the disadvantaged children they taught. It illustrated the range of barriers which may limit access to nature for financially disadvantaged families, and also how racism may be an additional problem for some ethnic minority communities. However, it also showed that teachers tended to construct nature as remote wilderness landscapes, such as mountains, forests and lakes, rather than the types of urban greenspaces and bluespaces that were nearer to their schools. The next theme describes how these inequalities were exacerbated by lockdown measures.

4.3.4   Theme 3. "We were given that opportunity to be free again": nature as a force for children's recovery from the impact of the COVID pandemic

In March 2020, UK schools closed to most pupils- with the exceptions of the children of key workers and vulnerable children- for an indefinite period. There was a partial reopening of primary schools in June and July 2020, but most children did not return until schools fully reopened in September 2020. The next few months were severely disrupted because staff and groups of pupils had to repeatedly isolate following contact with confirmed COVID cases. From January to March 2021, there was a further full national lockdown, and schools closed again to most pupils. From March 2021 onwards, schools reopened to all pupils, but education continued to be severely impacted throughout that school year and into the next due to high levels of staff and pupil absences (Holt and Murray, 2022).

This was a topic which emerged during data collection, as participants linked the impact of COVID closely to the original research questions. There is no doubt that that the effects of lockdown policies and school closures was profound, affecting children's educational attainment (Kim and Asbury, 2020); child mental health and wellbeing (Mazrekaj and De

Witte, 2024); parental wellbeing (Skripkauskaite et al, 2023); and adverse effects on teachers' mental health and wellbeing (Kim, Oxley and Asbury, 2022). A key strand of meaning running through the data, and connecting this with the other themes, was the sense that the impact had not been equal. Disadvantaged children and families had tended to be more severely affected, thus widening the inequalities described in the second theme.

> *"COVID has had a massive impact on some children… Some of the children in my class, they very much just stayed at home, did not go out, watching screens for hours and hours. I don't want to say all children, because… I think it's very family dependent."* **P24**

There is evidence from other studies that there was a differential impact on children's time spent outdoors, and that lockdown impact was greater for disadvantaged groups. The People and Nature Survey for England (Natural England, 2020) reported that in summer 2020, 60% of children were spending less time outside than before the COVID-19 pandemic, with only 25% spending more time outside. More specifically, 71% of children from ethnic minority backgrounds reported spending less time outside since COVID-19, compared to 57% of white children; and 73% of children from low-income households spent less time outdoors compared to 57% from households with higher incomes. Bingham et al (2021) reported drastic reductions in children's physical activity during the first UK lockdown, with children of Pakistani Heritage and other minority ethnic groups more severely impacted than white British children. Skripkauskaite et al (2023) found the impact on parental mental health during periods of lockdown restrictions was most pronounced for single parents, parents of primary school aged children and parents of children with SEND. Teachers in this study described low wellbeing, particularly high levels of anxiety over leaving home, for both children and parents:

> *"They've got a different culture some of them… of staying in, staying home… For the first time ever, I had parents say to me, "I'm really worried about them going on the coach… going out for the day." The parents try not to show it to their children, but they naturally pick up on things and worry themselves."* **P19**

For some families, in areas with good local access to green space, lockdowns were a time when outdoor activity and time in nature flourished. However, for others, who lived in more densely populated urban areas with poor access to green space locally, time spent outdoors decreased.

> *"It's a mixed picture… you've got the families who got out more than they did normally outdoors… you've got the families who just couldn't be bothered, to be honest… and there was a fearful group as well… because COVID was fearful, we forget how fearful it was."* **P18**

This aligns with the work of Friedman et al (2021), who found that whilst most parents reported an increase in their child's connection to nature during the Covid-19 pandemic, both socio-economic status and eligibility for pupil premium predicted negative change. They also report that the children whose connection to nature decreased had higher levels of emotional and behavioural problems, with children from less affluent families over-represented in this group.

Many teachers mentioned that the wetland visit was the first school trip their class had been on since the pandemic. There was a sense that children had missed out on important milestones.

> *"It was the first time that we've been anywhere since COVID, so a lot of these children haven't been anywhere for a very long time… I found it very emotional to be honest, just seeing them enjoying themselves, being with each other, being outside."* **P9**

Teachers saw time in nature as a force for recovery during a period of returning normality. There has been little published research to date that explicitly links the benefits of outdoor learning for children's wellbeing in relation to the consequences of COVID lockdowns on children's wellbeing and development. However, this resonates with Marsh and Blackwell's finding that outdoor learning was being deployed as a useful pedagogical tool to improve pupil wellbeing, behaviour, social skills and academic attainment post-pandemic (2023). P24 described how she used the nature connection activities from Generation Wild to

encourage her class to co-operate when they were struggling with social and emotional aspects of learning after missing out on significant portions of their early years education:

> *"I did it as a personal social emotional thing about working together, they all made bug hotels…. working as a team, working collaboratively… they needed a lot of help and support with that."*

This theme is summed up in this extract from P4 who spoke joyfully of the experience of taking his class to the wetland:

> *"We were out in the open, we were out with animals… and we were given that opportunity to be free again… we weren't caged into the houses or the school, we were walking around, we were in the fresh air, and we were living our best life at that moment in time."*

Overall, teachers were acutely aware of the impact of lockdowns and isolation on the children in their classes, and saw spending time in natural places as restorative, part of a process of emotional and physical recovery and regaining lost freedom.

4.3.5   Theme 4. "It's just not a priority": teachers experience conflict between their beliefs about the value of outdoor learning and their actual practice

The final theme contrasts sharply with the previous three. Despite these teachers expressing how they valued time in nature for their disadvantaged pupils, it was clear that many teachers felt unable to spend much time on Generation Wild activities after their site visit and were seldom able to teach outdoors. This theme describes how most teachers would like to teach outdoors more frequently, but often feel unable to do so because of the structural constraints within which they work. An extract from my own research journal, written in March 2022 recorded:

> *"There's something important in this data that I call The Buts. Every teacher I've spoken to so far has told me enthusiastically how much children benefit from time in*

nature, but when I ask them about their own outdoor teaching practice, they pull a
face, sigh, and start to explain, 'But...' Then they start to tell me all the reasons why
they're <u>not</u> teaching outdoors."

In describing these barriers as 'The Buts', I am neither criticising teachers, nor implying any personal disbelief in the scale of the barriers which they described. Both from my own experiences of teaching, and from listening to what my interviewees told me, I am acutely aware of current difficulties within the education sector. Rather, I thought of those Buts as the point of inflection within many interviews. The But was almost always followed by a change of tone, as teachers switched from telling me all about why they wanted to teach outdoors, and believed that children would benefit, to acknowledging the difficulties of doing so.

The barriers to outdoor learning described by participants were broadly similar to the findings of other recent studies with teachers in Europe and North America (Harris, 2021; Patchen et al, 2022; van Dijk-Wesselius et al, 2020; Walker, 2021). Constraints included issues in the school environment, such as lack of safe local green space and shortage of resources; and systemic issues such as lack of time to teach an overloaded curriculum and the need to prepare for standardised tests. There were also some issues more specific to this sample, relating to English education policies, or due to high levels of poverty in local communities. Description of these barriers has been deliberately kept brief in this section, in order to avoid repetition, as these issues are explored more fully in the following chapter 5. Instead, this theme focuses on how teachers experienced these pressures, and the conflict they expressed as a consequence.

A sense of being overwhelmed by multiple external pressures is conveyed by this teacher:

"It's the pressures of SATS, it's the pressures of the local authority, the pressures of
the government... that you have to get through your curriculum, and you have to get
these children at certain percentages, and so I think that's really a bit of a hindrance
to [...] going outside." **P9**

For many teachers, there was a real sense of conflict between their beliefs that children would benefit from time in nature, and the amount of time they felt able to spend on this. This supports Prince's finding that time was the most influential factor in provision of outdoor learning, and comment that this 'was almost always linked to performativity and testing' (2019:335). Many schools prioritise teaching core subjects, to the exclusion of outdoor learning, as this participant described:

> *"There's just no time in the timetable. Even though every single teacher here would love to be doing more field work, more outdoor learning, it's just not a priority… the priority is, of course, the core subjects, English, maths, etc… because that's what we're judged on."* **P20**

Previous research in other areas of education has shown that teachers may experience internal conflict between their own pedagogical beliefs and the practice imposed on them by school or national education policies (Kay, 2023; Rogers, 2010), but this study is the first to find this conflict with respect to the specific domain of outdoor learning.

4.4 Conclusions

4.4.1 Summary of findings

This analysis yielded an account of teachers' perspectives of the barriers experienced by disadvantaged children and families in accessing nature, and how many of these inequalities have been widened by the ongoing impact of COVID-19 lockdowns. The four themes described teachers' perceptions of disadvantaged children's restricted access to nature, widening inequalities in the aftermath of COVID-19 lockdowns, and the benefits for children of spending time in nature. This research addressed Research Goals 1a (Teachers' perceptions and experiences of how children benefit from time in nature) and 1b (Teachers' perceptions and experiences of how disadvantage affects children's access to nature, and how outdoor teaching can help address inequalities in access to nature). The final theme began to address Research Goal 1c (Teachers' perceptions and experiences of the barriers

and enablers to outdoor teaching in UK primary schools); this is explored in greater depth in the second analysis of this data set presented in chapter 5.

A novel finding that has not been previously reported is that teachers experienced considerable conflict over the disconnect between their beliefs about the value of time in nature for disadvantaged children described in theme 1, and the perceived barriers to delivering outdoor learning in practice summarised in theme 4. As children's nature experiences in school depend on teachers' facilitation, this has important implications for the time children spend learning outdoors, and the success of nature connection programmes such as Generation Wild.

4.4.2   Sample limitations

In adherence with qualitative principles, the sample size enabled the research to focus on the teachers' individual beliefs and experiences, whilst drawing out patterns of shared meaning. Due to the voluntary nature of research participation and the relatively high time commitment involved in interviews, the sample was likely to have been biased towards those teachers who had enjoyed taking part in the programme. Although all the schools taking part in Generation Wild have relatively high levels of financial disadvantage in comparison to other schools in their local area, they were not homogeneous in terms of pupil characteristics. The level of financial disadvantage across all schools participating in Generation Wild varied considerably from around 23% of children eligible for free school meals, to over 80%. This information was not collected from teachers taking part in Study 1, but was sometimes mentioned during interviews. In addition, the schools where participants worked are situated in different regions of the UK; in urban and rural settings; and where there is great variation in the ethnic diversity of children attending the schools. This is reflected in the range of participants' experiences.

4.4.3   Chapter conclusions

This study directly informed the subsequent studies presented in this thesis. The themes described above simultaneously highlighted the value teachers placed on nature

experiences for disadvantaged children, and the extent of the difficulties currently experienced by UK teachers in facilitating outdoor learning. These findings emphasised the importance of the wider environment in which teachers work and the need to take into account the structural constraints within which teachers work. The barriers to outdoor learning acknowledged in theme 4 vary between school contexts but may be felt particularly acutely by staff of schools in disadvantaged areas. It is also important to note that UK education policy is the responsibility of devolved nations, and curriculum, testing and inspection regimes all vary significantly between countries. Therefore, capacity for outdoor learning cannot be understood through examining only individual teachers, or even whole school capability. Instead, an ecological view of teacher agency should be employed, situating individual agency in the context of systemic constraints, as described by Priestley and colleagues (2015).

Chapter 5 presents a further analysis of the data set collected in Study 1, with the specific aim of addressing Research Goal 1c (Understanding the barriers to outdoor teaching and learning experienced by UK primary school teachers). Whilst the analysis presented in the current chapter was inductive and exploratory, this second analysis takes a deductive approach, using the ecological model of challenges and enablers to outdoor learning (proposed in Chapter 2) as a coding framework. The results of this analysis then lead directly into the development of a novel scale measure of School Contexts of Outdoor Learning which is described in Chapter 6.

Chapter 5: A further deductive analysis of the teacher interview data from study using an ecological systems framework

5.1   Introduction

This chapter presents a further analysis of the teacher interview dataset collected during Study 1, as described in chapter 4. Therefore, methodological information relating to the participants, the interview guide, and data collection procedure are shared with that chapter. However, the aims and analysis methods presented in the current chapter differ quite markedly from that in the previous chapter. This introduction sets out the rationale for a second analysis of this data, and states the specific aims of that analysis.

At the same time as the analysis reported in chapter 4 was being completed, it was becoming clear from visit observations that teacher engagement with the Generation Wild programme varied considerably. This was also reflected in WWT's own data on usage of the programme website and activity completion (see Chapter 1). Appendix 2 contains an extract from my research journal from November 2022 which captures a particularly critical visit observation and subsequent reflection. It was the combination of these observations, along with the conflict between beliefs and practice expressed by teachers in the final theme in Chapter 4 that prompted a further deductive qualitative analysis of these data.

The aim of the analysis was to address Research Goal 1c (Teachers' perceptions and experiences of the barriers and enablers to outdoor teaching in UK primary schools). In undertaking a distinct second analysis of the same data, I applied the ecological model of outdoor learning (see Figure 2.2) as an organising framework for coding. This model was initially based on a review of existing literature and shows challenges and enablers to outdoor learning at concentric system levels: the individual teacher; the school environment; and the national education system. This second analysis of the dataset took a largely deductive approach to analysis, and themes reflected the underlying model structure. However, this was an iterative cycle, and codes were also developed inductively, and these were used to refine the resulting themes and the theoretical model.

Whereas the previous chapter was chiefly concerned with teachers' perceptions of child outcomes of outdoor learning, the focus of this chapter shifts to explore teachers' views regarding their own capabilities as outdoor educators. Thus, this work leads directly into the development of the SCOOL (School Contexts of Outdoor Learning) scale.

5.2   Method

As this analysis used the same data set described in chapter 4, all details of participants, materials, data collection procedures and transcription have already been given in chapter 4.2. However, from the point where the analyses diverged, specific methodological details are given here.

Whereas the first analysis of this data had been entirely inductive, this second analysis was deliberately conducted using a hybrid approach (King and Brooks, 2017). Using the proposed ecological model of outdoor learning (Figure 2.2) as a framework, a codebook was developed with codes relating to concepts in each of the three proposed system levels: the individual teacher, the school environment and national education policies and systems. Codes were initially generated deductively, arising from a review of the existing literature (see chapter 2). However, in line with the principles of reflexive thematic analysis, further codes were generated inductively from the data as required.

A systematic coding process was used to find evidence in the data supporting the three themes, which mapped onto the three levels of the proposed ecological model. Despite every interview in the data set containing evidence to support the systemic barriers theme, it was noted that there were fewer distinct codes relating to this theme than to the other two themes. In contrast to the shifting themes of the analysis presented in chapter 4, these themes were determined early in the analytic process and remained stable, changing little during the subsequent months. However, in other ways, the analysis retained an underpinning qualitative philosophy more in common with reflexive thematic analysis as the author remained sole coder and analyst, and continued coding inductively as well as deductively.

5.3   Results and discussion

5.3.1   Summary of themes

This second analysis of the data generated three themes addressing Research Goal 1c (Teachers' perceptions and experiences of the barriers and enablers to outdoor teaching in UK primary schools). The themes complement those presented in chapter 4, expanding upon the final theme by exploring further some of the issues causing the pressures and conflict reported by teachers. These themes described different levels at which barriers to outdoor teaching and learning occur: the individual teacher; the school environment; and the national education system. The themes are illustrated in figure 5.1 below, shown as system levels within the ecological model on the left, with a summary of the main points of each theme on the right.

Figure 5.1. Individual teacher, school and systemic themes represented as system levels in a socio-ecological model of barriers to outdoor teaching and learning
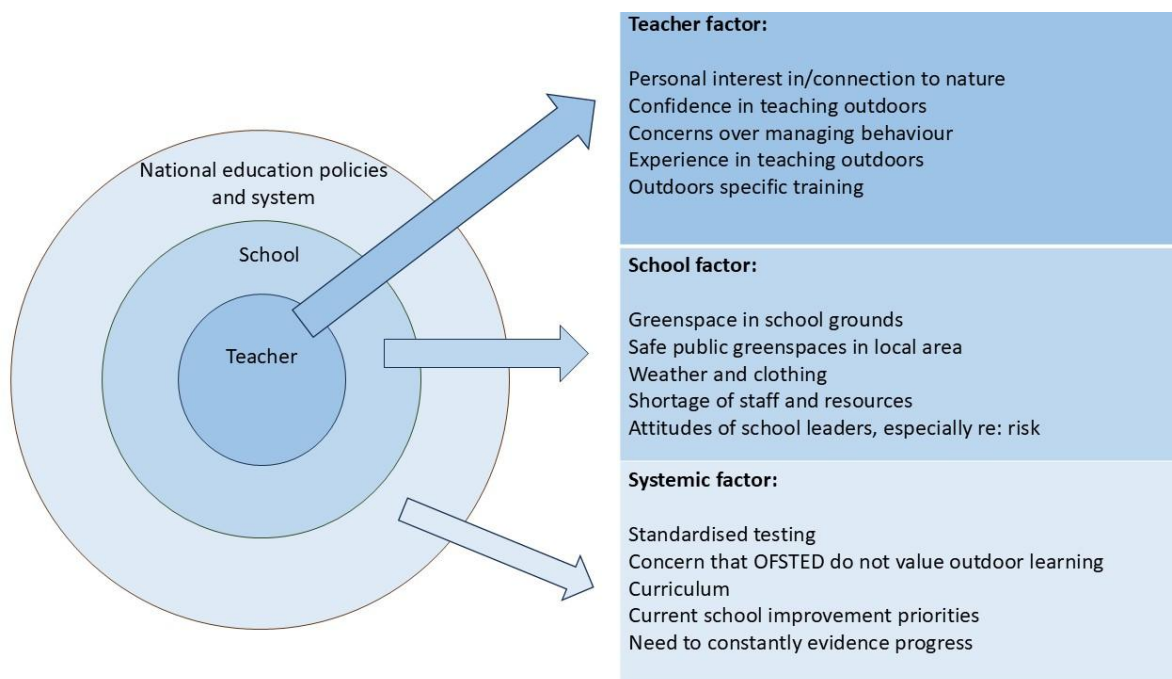
The three themes are reported in the following subsections, with each theme illustrated by several verbatim extracts from the interviews.

5.3.2   Individual teacher knowledge and experience

This theme describes issues, both positive and negative, affecting outdoor learning that were intrinsic to the teacher as an individual. These included: experience and training; confidence in teaching outdoors; personal nature connection and comfort level with being outdoors; and pedagogical beliefs relating to outdoor learning.

During interviews, several participants used comparisons with their colleagues to explain important points about their own beliefs and practice. P9 described how one of their colleagues was initially less enthusiastic about taking part in Generation Wild, but had subsequently acknowledged the impact on children's behaviour:

> *"He's not one for the outdoors at all, and he has quite a boisterous class, they end up having a few fights every so often! He was very reluctant, he knew he had to do it, because we'd been signed up, but he was like [whinging noise] and then, he did all the activities, and was outside as much as he could be, and he said the behaviour difference was incredible…"* **P9**

Whilst most of my participants described themselves as being confident teaching outdoors, they acknowledged that some of their colleagues felt differently.

> *"I think without having the prior knowledge… I'm quite good at outdoorsy stuff, but a teacher that might not have as much expertise… not that I've got expertise, but I can babble on a bit… I've got the confidence… but a teacher that doesn't have that confidence might struggle a little bit with some of those activities."* **P11**

P13, a teacher who had a specific role in outdoor learning within their school, spoke of their colleagues' attitudes, trying to understand why they were less keen to teach outdoors.

"Quite a few of them, they don't have the confidence to do it… as you can imagine, in any school situation, there's a bit of banter goes on about, 'Oh yeah, you're off playing in the woods!' … but there is a reluctance on the part of the majority to get involved… I think it's just not being able to have all the answers… you know, when children ask questions? Because you're not in a classroom situation, so they don't feel they're in control in the same way, outdoors… when you're outside, you don't know what you're going to come across…" **P13**

Although P13 described this as banter, the view that outdoor learning consists of 'playing in the woods' may reflect important pedagogical differences about what learning looks like, and where it can take place.

Low staff confidence as a barrier to teaching outdoors is a common theme in the literature (Rickinson et al, 2004; Dyment, 2005; Dillon and Dickie, 2012; Walker et al, 2021). Oberle et al (2021) found teachers felt themselves ill-prepared to teach outdoors due to a lack of training. In a qualitative study of student teachers, Barrable et al (2020) found that whilst mastery experiences where the individual had themselves taught successfully outdoors were the most valued, vicarious experiences such as observing a mentor teach were also seen as useful. Prince (2019) identified that teacher expertise in outdoor learning in the UK had decreased between 1995 and 2017, with initial teacher training providers no longer offering outdoor learning as a specialism.

P19 outlined how taking part in recent whole school training on teaching outdoors was helping to change attitudes of staff in her school:

"A lot of the teachers in our school shied away from it… 'I don't want to go outside. No, I'm not Forest School trained… I don't want to do fires!' But this is just taking your lesson outside… how can you take a fractions lesson outside using natural resources?" **P19**

Before taking part in Generation Wild, many teachers saw children's behaviour as a barrier to getting outside and were fearful of losing control of their class. However, there were no

accounts in the data of unruly behaviour actually occurring during outdoor learning tasks. In fact, it was common for teachers to comment on improvements in children's behaviour compared to conventional lessons in the classroom.

> *"The teachers that we've known be anxious about it, they actually find that behaviour's much better, and it's not nearly as worrying as you think taking them out. In fact, it's better than being in the classroom!"* **P14**

This echoes research by Glackin (2018) which found that after an initial fearful period when they employed a more authoritarian approach, teachers were able to find ways to use the skills and relationships developed indoors to teach in new ways outdoors. Harris (2021) also mentions concerns over pupil behaviour lowering teacher confidence to teach outdoors.

Teachers were clear that they valued the activities and resources provided as part of the programme, because it reduced their workload:

> *"It hasn't meant that I've had to do any extra work … particularly, finding resources … it's been really quite straightforward from a teacher point of view… the effort that I've put in has been well worth it, in terms of what we got back."* **P1**

It is important to acknowledge that there were some teachers who simply did not want to take part in Generation Wild, as the extract from my research journal at the beginning of this chapter suggests. Although none of these teachers chose to take part in this study, some of my participants were aware of colleagues who had been booked on to the programme but were not interested. This tended to occur where schools had a policy that parallel classes within a year group must cover the same topics and provide the same experiences. P4 described how his colleague's reaction to the wetland visit had been very different to his own, and how he felt this affected the engagement of the children in her class:

> *"When we came back to school, the Head met us and asked us how it went, and I said, 'It was absolutely amazing! Absolutely loved it.' And the kids in my class were like, 'Yeah, it was fantastic!' And then I heard [name redacted], as she got to the door,*

and was asked, 'How was your day?' and she was like, 'Meh!'… and so the kids in her
class heard that, and copied her attitude… She didn't enjoy the visit, or the follow-up
work… she struggled getting the children engaged." **P4**

He went on to explain this in terms of their colleague's personal interests:

"The passion wasn't there for her… she didn't have that same level of interest… Her
love is history, and if we did a history thing, my passion isn't history, so I wouldn't be
as passionate."

It is known that parents who are disengaged from nature are less likely to introduce their
children to it, reducing the likelihood that these children will develop a personal relationship
with nature or view it as part of their identity (Boyd et al, 2018; Waite et al, 2021). Empirical
studies support the idea that teachers' own (dis)engagement with nature may similarly
impact on children in their class. Barrable et al (2022) found that positive childhood
experiences in nature, and nature connection were an important source of confidence for
student teachers. Barrable and Lakin (2020) emphasise that teachers' own connection to
nature may be a key determinant for outdoor teaching. They found that nature connection
was positively associated with both willingness to teach outdoors and perceived
competence in student teachers. They also showed that an environmental education session
significantly increased student teachers' nature connection, and suggest that this should be
an aim of Initial Teacher Training.

5.3.3   The school environment

This theme describes issues affecting outdoor learning occurring within both the physical
environment and the leadership culture of the school. As with the individual theme,
teachers' accounts cover a range of experiences, describing issues that both facilitate and
prevent outdoor learning. The theme was not further divided, as these physical and cultural
barriers are often inextricably linked within the school organisation through a complex web
of interactions. Key topics within this theme were: lack of green space within school

grounds; difficulties accessing local offsite green spaces; risk averse leadership; financial pressures.

In England, DEFRA's 25-year Environment Plan (2018) recognised the importance of school grounds as sites for children to experience nature. Making school grounds greener was listed as a priority, and the Nature Friendly Schools programme provided £6.3 million to enable primary schools in disadvantaged areas to make grounds more nature friendly and increase children's access to greenspace. However, some schools where participants worked had little or no green space within their grounds.

> *"We do have a big field but… to cut a long story short, we can't use it due to safety reasons… it's not structurally safe… And we did on either side of the school have two quite big areas of brownfield land… but that's all been built on for affordable housing… so we don't really have a lot of green space at all, near us…"* **P15**

Walker et al (2021) investigated children's access to different types of natural environment in English schools and found that whilst 88% of schools had a public park or garden within walking distance, only 23% of schools were within walking distance of a nature reserve. Findings also showed that schools in urban areas had better access to certain types of green space within walking distance (such as parks and gardens) than those in rural areas. For one London teacher, public parks helped to mitigate the lack of green space within school grounds:

> *"The outside spaces are concrete, essentially… we don't really have green spaces at all. [borough redacted] has loads of amazing parks, but in the school, we just have concrete."* **P20**

Onsite and off-site green space may be best regarded as distinct issues, as the use of off-site spaces (even if very nearby) presents a significant barrier in some schools, because of health and safety concerns over traffic, pupil behaviour and staffing ratios (Dyment, 2005; Harris, 2021).

"We have a number of classes that have a child that will try and run… or they refuse to come back in… so when you don't have that additional adult, then you feel like you can't go outside school grounds…" **P9**

Of course, some schools had plentiful green space within their grounds for outdoor learning. One suburban school in North-West England was fortunate to have plenty of land, which had been deliberately managed over decades:

"The school itself has got quite a large area… we've got an area which was planted with trees about thirty years ago… and we've extended that… when I first came, I got some trees and we planted… so they're about ten years old now… and we've planted another patch two or three years ago." **P13**

It was clear that the attitudes held by school leaders affected how able teachers felt to take their class outdoors. Harris (2021) emphasised the importance of senior leadership support as vital in maximising impact and sustainability of an outdoor learning intervention. Whilst there was a reluctance for my interviewees to speak too critically of their current schools, teachers would often contrast their experiences in other schools where they had previously worked.

"I'm lucky to be in such a lovely school where the Head can see that… he's got a real vision of learning just doesn't happen in the classroom… if you have a Head who's not really on board… and not into understanding children's learning and open to new ideas and suggestions… then it's hard to get anything changed or done." **P24**

Risk averse leaders could be a particular barrier to teaching outdoors in some schools. P7's frustrations at being unable use his Forest School training to deliver outdoor learning to pupils were clear throughout a lengthy interview:

"People are just very, very risk averse… We got a new head in, and I was advised to have a meeting with our local authority health and safety person… she came in, and walked the path… which was by this stage, massively overgrown… and she said, 'You

need to have a path laid here, a concrete path…' About a fortnight ago, I got the invoice… five thousand pounds to lay this path, which is superfluous to requirement… and so there's nothing happening outdoors at the minute…" **P7**

Gill (2007) outlines how this aversion to risk may inhibit schools' approach to outdoor learning, particularly approaches such as Forest School, which recognise the benefits to children of encountering appropriate risk. It is worth noting that participants clearly distinguished between their personal attitudes to risk, and the school line which was imposed on them by school leadership, or higher forces at the local authority or academy trust level. Prince found teachers mentioned more concerns about safeguarding and risk management in 2017 than in 1995, yet describes a "culture of risk benefit amongst teachers who regularly take children outdoors" (2019:338). The idea that taking some risks could be beneficial to children is echoed in recent work by Dodd and Lester (2021), who propose that adventurous play may reduce childhood anxiety, and is present in the extract below:

"You've obviously got that element in this day and age of health and safety and being accountable for absolutely everything… everything has to have risk assessments… which I totally understand, but also, personally… I'm not talking for the school, I'm talking for myself… I think that children need to have those risks in their lives, because they're just going to end up being mollycoddled, and not aspire to anything and not take those risks." **P11**

Poor weather was frequently mentioned as a barrier to teaching outdoors all year round, especially when children lacked suitable clothing and footwear.

"The weather is pretty hit or miss, so that can sometimes be a concern… because a lot of our kids don't have decent waterproof coats… so you don't want to plan them an activity that you know is gonna get them soaking through." **P15**

Previous research has identified poor weather as a particular source of discomfort during outdoor learning (Nagi et al, 2025), with adverse conditions linked to reduced impacts (Barrable & Booth, 2021; Talebpour et al, 2020). Qualitative studies similarly suggest that

weather and participants' mood during outdoor learning sessions can shape effectiveness (Friedman et al, 2024). Ensuring children's comfort in nature may therefore be a particularly important aspect of interventions aimed at disadvantaged groups. Limited prior experience of natural environments may make these children more likely to experience negative emotions or discomfort, for example, when getting wet or dirty (Zaidi & Pitt, 2022; Nagi et al, 2025). If the barriers that children face when interacting with nature are not adequately addressed, these may further compound discomfort and mean that positive outcomes are unlikely.

Whilst teachers often recognised that children lacking adequate clothing and footwear could be linked to poverty, some felt that it could also reflect parental indifference. Some teachers did not see this as a problem they could solve, but this was an area where there was great variation in practice between schools. Whilst some teachers reported being unable to take classes outside because of children without coats and suitable shoes, other schools kept spare wellies and coats to lend to those children who did not have their own. Other schools went further, and used deliberate poverty proofing strategies, purchasing sets of outdoor clothing for everyone that were stored in school, so that all children wore the same during outdoor learning.

The pressure on school budgets, combined with rising transport costs, was seen as a serious barrier to trips beyond walking distance. The deepening cost of living crisis in the UK meant parents could not afford to pay for expensive trips, and their school would not have been able to afford the opportunity otherwise.

> *"A lot of our families would struggle to pay for trips, so… and there's nothing left in school budgets… and it just makes it harder…"* **P23**

Prince (2019) emphasised the importance of funded 'initiatives', in leveraging implementation of outdoor learning at a local or national level. Teachers were grateful for the opportunity provided by the free Generation Wild wetland trip (and particularly the programme covering transport costs).

5.3.4. Under pressure: how national education policies create barriers to outdoor learning

This theme describes how teachers feel their practice is constrained and restricted by national education policy and systems of external accountability, including: an overloaded primary curriculum; the pressure to achieve good results on standardised testing; and fear of an adverse inspection judgement. The extract below is repeated from chapter 4, as it sums up the sense of external systemic pressures expressed by many teachers:

> *"There's just no time in the timetable. Even though every single teacher here would love to be doing more field work, more outdoor learning, it's just not a priority… the priority is, of course, the core subjects, English, maths, etc... because that's what we're judged on."* **P20**

This belief that there was not enough time to permit outdoor learning resonates with Prince's findings that time was the most influential factor in provision of outdoor learning, and commented that this "was almost always linked to performativity and testing" (2019:335).

Teachers expressed concern that OFSTED inspectors did not value or pay much attention to outdoor learning- perhaps because of its absence from the English primary national curriculum. One relatively inexperienced teacher related remarks by their colleagues that:

> *"Nobody has said that Ofsted have ever gone outside to look at learning… someone said they were teaching a lesson outside and the inspector just looked through the window and watched them… so they couldn't actually hear!"* **P8**

A more experienced teacher described how they had ensured that an OFSTED inspector did engage with their outdoor lesson during a previous inspection:

> *"I have taken an Ofsted inspector outside in pouring rain… we were all in wellies and waterproofs, and they had high heels and an umbrella."* **P19**

Teachers also alluded to concerns over the need to evidence progress in every lesson.

"Working in a school setting, there's always a thing, 'Oh, we've got to see progression!'" **P13**

"They're always talking about evidence evidence evidence in your learning. I think my school probably don't want us to learn outdoors, because they'd be worried about how we can prove the quality of learning to OFSTED." **P6**

Whilst the OFSTED inspection framework does not define what constitutes evidence of progress, teachers described how at a local level this could be interpreted as the need for written evidence in books for each child for every lesson.

"The push on book evidence just really damages that [outdoor lessons]. I know you can have pictures and videos, but then it's a question of how I collect it for each child, and how I store it. Our SLT want evidence in books." **P15**

Whilst the curriculum was most frequently seen as a barrier to getting outdoors, teachers were aware of where opportunities did exist to link nature and outdoor learning to the curriculum:

"I think it's really important… we do a lot of work in school about it… it's in our PSHE curriculum… in science as well, at the moment, we're doing about David Attenborough… and various animals… lifecycles and things like that…" **P3**

This was one area where there was apparent conflict within the data, but this seemed to reflect differences in national curricula between different countries within the UK. Education policy is the responsibility of devolved nations, and curriculum, standardised testing and inspection regimes all vary significantly between Wales, Scotland, Northern Ireland and England. Although participant numbers were small in the current study, there seemed to be real differences between the views expressed by teachers in England and Wales. Whilst many teachers in England explicitly described the English national curriculum as a barrier to

outdoor learning, the Welsh participants in this study spoke far more positively of the new Curriculum for Wales (Welsh Government, 2022):

"Health and wellbeing is one of the six areas of learning, of course it's statutory [...] in a sense, we can design our own curriculum, that's the flexibility it has at the moment. Health and wellbeing was never on the curriculum before, but because it's there now, we've got to look for more opportunities to do that, so I think the new curriculum will help." **P18**

The new Welsh curriculum became statutory in primary schools from September 2022, and considers learning as a process rather than focusing on prescribed content or outcomes (Welsh Government, 2022). It allows schools to develop their own curriculum to meet local needs and tailor learning for their communities, balancing knowledge, skills and experiences. It was seen by the four Welsh teacher participants in this study as more accommodating of outdoor learning, with children becoming "healthy, confident individuals" and "ethical, informed citizens" stated as key purposes, and includes health and wellbeing as one of six core areas of learning.

"The new curriculum in Wales is... it's all about people." **P12**

This teacher, who worked with children with additional learning needs, went on to describe the wider curriculum links to a project her children had worked on:

*"They've raised money for the farm... it's fed into lots of financial literacy for them, and being 'ethical and involved', in the new curriculum... is it okay to make money out of lots of rubbish that people don't need? Or can we reuse things?"***P12**

Previous research (Dyment, 2005; Rickinson et al, 2004) has found that the requirements of school curricula are widely seen as a barrier to outdoor learning; this may be due to the mandated curriculum leaving little time or space for outdoor learning, and the requirements of standardised testing and assessments. Oberle et al (2021) also identified systemic factors, such as policies, funding and curriculum, as barriers to outdoor learning. Macquarrie (2018)

highlights the importance of school leaders understanding that outdoor learning can be used as a way of meeting curriculum objectives, rather than an extra. Those teachers who had timed their class's Generation Wild visit to fit in with a related curriculum topic were clear that this had helped them to spend more time on the follow-up activities:

"It fitted perfectly with what we were doing, because our topic we'd done…it was habitats in science, and after that we did animals, including humans, so our topics linked beautifully into the work we were doing." **P4**

Conversely, if teachers had been booked on to the Generation Wild programme at short notice, with other topics already planned in, they struggled to spend as much time on activities:

"If we did it again, we'd put it into our curriculum… plan it into our Geography, or our Science? We're doing life cycles now, but at that time that the trip had to be done, we were probably learning about space or something that didn't quite fit in!" **P3**

This is echoed in Harris (2021)'s evaluation of an intervention which concluded that project timing was critical, as it was so common for schools to have the next year's planning in place in its entirety before the start of the new school year.

One frequently expressed idea was that it was easier to justify classes with younger children spending time outdoors. In contrast, for older primary classes, and especially year 6, Standardised Assessment Tests (SATS) loomed on the horizon:

"There's such a lot we have to cram in… particularly in year six, my year group, because we've got to get it done before SATS. It's well, we've got to do this, we've got to get that done, we must do that, and… you have to make an effort to do it, to say, this is going to be an afternoon when we go outside." **P1**

Previous research has identified preparing for standardised tests as a barrier to outdoor learning (Edwards-Jones, Waite, and Passy, 2018; Shume and Blatt, 2019). Teachers

frequently commented that it was easier to link topics to outdoor learning for younger children:

> *"In key stage one, they do lots of work on farms, and the seaside, and links to their geography topics… whereas when you get higher up the school… if I look at our curriculum in terms of them exploring their local area… once you get higher up the opportunities for that are definitely less."* **P15**

In England, primary school children take SATs in year 2 and year 6, as well as other mandatory national assessments in Reception, Year 1 and Year 4. As of 2022, Wales had abolished all primary SATS, relying solely on a system of teacher assessments. However, this Welsh teacher still felt that there were differences between age groups in the ease and frequency of outdoor teaching:

> *"I think it's the pedagogy in key stage two… foundation phase are a bit more used to it… there's almost an outdoor activity every lesson in foundation phase, but key stage two just isn't quite so much… it tends to be more activity based days like what we've done today, as opposed to every lesson."* **P18**

This supports the findings of Waite (2010) who found that learning outside the classroom dropped off markedly between Early Years and key stage one, and again during key stage 2 due to differences in underlying pedagogy.

Overall, it is clear that the majority of teachers in England perceive the pressures caused by the national curriculum, and standardised testing as substantial constraints to outdoor learning. In contrast, teachers in Wales did not appear to regard the curriculum as such as constraint.

5.4   Conclusions

5.4.1   Chapter summary

This thematic analysis of interviews with teachers taking part in Generation Wild addressed Research Goal 1c (Teachers' perceptions and experiences of the barriers and enablers to outdoor teaching in UK primary schools). The three themes generated from a deductive analysis of the data show that teachers perceive considerable barriers (and also some facilitators) to outdoor learning at three distinct levels: the individual teacher, the school environment, and the national education system. These themes align with the levels in the ecological model of challenges and enablers to outdoor learning proposed in chapter 2.

5.4.2 Study strengths and limitations

The limitations of the participant sample described in chapter 4.4 also apply here. Qualitative research can never achieve replication, and nor should it aim to do so, as both variation between participant samples, and subjective differences in analysis between researchers are to be expected. Nevertheless, the current findings do broadly align with the findings of other recent studies with European and North American educators (Barfod and Bentsen, 2018; Edward-Jones, Waite and Passy, 2018; Oberle et al, 2021; Patchen et al, 2022; van Dijk-Wesselius et al, 2020). Whilst low staff confidence for teaching outdoors is a common theme in the literature (Rickinson et al, 2004; Walker et al, 2021), in the current study, few teachers expressed a lack of personal confidence or engagement, although they did describe this in colleagues. Due to the voluntary nature of research participation, the sample was likely to have been biased towards those teachers who had enjoyed taking part in the programme.

However, two aspects of the method of study 1 bring particular novelty to this research. Firstly, the focus on teachers working in schools with high levels of economic disadvantage meant that issues around family poverty, and lack of opportunities and resources were raised in almost every interview. Secondly, the timing of the study in 2022, following on from two years of disruption to education and socialisation caused by the COVID-19 pandemic. This was also a period of rapid inflation, with soaring food and fuel prices in the UK leading to increasing numbers of families living in poverty, exacerbating the problems mentioned above. Chapter 2 described how some recent research has considered these events as an

aspect of Bronfenbrenner's chronosystem. The themes presented in chapter 4 describe teachers' beliefs that spending time learning outdoors in natural environments is more important than ever before for their pupils, as a means to counteract the unequal impact of the pandemic, thus increasing their frustration that they were struggling to deliver this in practice.

5.4.3 Chapter conclusion

The findings of this study will enable the development and validation of a quantitative measure of capability for outdoor learning- the School Contexts of Outdoor Learning (SCOOL) scale. This work is presented in chapters 6 and 7 of this thesis. This novel measure will enable robust comparison to be made cross-sectionally between teachers and schools, to understand the determinants of teacher agency for outdoor learning. It will also enable the evaluation of impact of outdoor learning interventions through longitudinal studies.

Although the analysis presented in this chapter was primarily concerned with looking for shared meaning across the interviews with all participants, certain differences between groups of participants also emerged. Firstly, teachers in England described greater systemic barriers to outdoor learning than those in Wales. Welsh teachers felt their curriculum offered more agency, were less fearful of inspections and were not affected by standardised testing regimes. This is a finding of interest that has not been reported in previous research, and merits further investigation with a larger sample of teachers from across the four UK nations. Secondly, there were clear differences between teachers working with children of different ages. Teachers reported greater barriers to outdoor learning for older children, because of the demands of curriculum content and preparing for standardised assessments. Finally, teachers in urban schools saw the lack of local greenspace as a key factor restricting opportunities for outdoor learning. These specific findings of interest from the current study were used to formulate hypotheses for quantitative testing in Study 3, and are reported in chapter 7.

Chapter 6: The development and review of items for the SCOOL scale

6.1.   Introduction

6.1.1   Chapter summary and structure

This chapter describes a series of three studies (2i, 2ii and 2iii) conducted to address
Research Goal 2a: the development and review of items for the School Contexts Of Outdoor
Learning (SCOOL) scale. Section 6.1 explains the rationale for developing the SCOOL
measure, defines the measurement constructs, and outlines the methodological approach.
Then studies 2i, 2ii, and 2iii are presented in sections 6.2, 6.3, and 6.4, respectively. Finally,
section 6.5 discusses the results of all three studies. The endpoint of this chapter is a draft
version of the SCOOL scale, which will be used in Study 3 to address Research Goal 2b: the
psychometric validation of the SCOOL scale. Study 3 is reported in chapter 7.

6.1.2   The rationale for developing the SCOOL scale

Chapter 5 reported a deductive analysis of the interview data from Study 1, using the
ecological model of outdoor learning proposed in chapter 2 as a theoretical framework for
coding and analysis. Three themes were generated, mapping on to the three levels of the
model: the individual teacher, the school environment, and national education policies and
system (see figure 5.1). The application of this theoretical framework responds to the calls
by Oberle et al (2021) and Patchen et al (2022) to use systems thinking in addressing barriers
to outdoor learning, and fills a knowledge gap identified in section 2.5. A further key gap
identified in the literature review was the need to develop and validate a quantitative
measure of this construct. The SCOOL measure will be developed from the ecological model
of outdoor learning. The measure will assess teachers' beliefs about their own capability for
outdoor learning across the three levels of individual teacher, school environment and the
national education system.

The development of the psychometrically validated SCOOL measure will allow the ecological model of outdoor learning to be applied in research with larger samples of teachers working across a diverse range of school environments. The SCOOL scale will allow the systematic measurement of variation between teachers and schools, enabling the empirical testing of hypotheses derived from qualitative findings. It will also be a valuable tool for assessing the impact of school mediated nature interventions on teachers, and in longitudinal comparisons of changes across career stages. This will address the need to examine specific population subgroups to gain a better understanding of what works for whom (Dillon and Lovell, 2022; Mann et al, 2022). It will also address other limitations of existing research identified in chapter 2: small sample sizes, and failure to use validated measures. This combination of quantitative and qualitative methods in separate studies will permit generalisation of findings where appropriate, whilst enabling the deeper contextual understanding gained from using more idiographic methods.

6.1.3   Defining the measurement constructs and target population for the SCOOL scale

The construct definitions for the SCOOL measure are derived directly from the findings of Study 1, specifically the three themes presented in chapter 5 (i.e., the individual teacher; the school environment; and the national education system), which align with the three levels of the ecological model (see figure 6.1). For the sake of brevity and ease, the factors are henceforth referred to by the shorthand labels of 'Teacher', 'School' and 'Systemic'.

The target population for this initial version of the SCOOL measure is defined as teachers, teaching assistants and trainee teachers currently working in UK state primary schools. Careful consideration was given to the inclusion of trainee teachers in this development sample, as their duties and responsibilities may differ markedly from those of qualified teachers. However, as experiences of students in initial teacher training are known to impact on their attitudes to outdoor teaching and learning (Barrable and Lakin, 2020; Barrable, Touloumakos & Lapere, 2022; Cont et al, 2023), there was good justification for including trainee teachers in this development work. Educators in non-school settings, such as outdoor education centres; home educators; teachers working in private schools; teachers working in schools outside the UK, were excluded.

6.1.4 Methodological approach and structure of chapters 6 and 7

The development of the SCOOL scale followed the seven steps for scale development outlined by DeVellis (2017), as summarized in Figure 6.1, with additional guidance drawn from Boateng (2018).

Figure 6.1. The steps in the scale development process, studies and chapter structure

Scale development step (after DeVellis, 2017)	Related study	Reported in…
Step 1. Construct definition	Study 1	Chapters 5 and 6.1
Step 2. Item generation	Study 1, study 2i	Chapter 6.2
Step 3. Cognitive testing of items and measurement format	Study 2ii	Chapter 6.3
Step 4. Expert panel review	Study 2iii	Chapter 6.4
Draft version of scale ready for large scale data collection	Endpoint of chapter 6	
Step 5. Evaluate scale structure	Study 3	Chapter 7
Step 6. Optimise scale length and structure	Study 3	Chapter 7
Step 7. Tests of reliability and validity	Study 3	Chapter 7
Psychometrically validated scale ready to use		
Inferential analyses to explore predictors of teacher outcome measures	Study 3	Chapter 7

The scale development process is reported across two chapters, with this chapter covering steps 1 to 4. The first step in scale development involves clearly defining the constructs to determine "what it is you want to measure" (DeVellis, 2017:105). The current section 6.1 has outlined the constructs the SCOOL scale aims to measure, and defined the target population. Steps 2, 3 and 4 (item generation, review and reduction) were addressed respectively through studies 2i, 2ii, and 2iii. This chapter ends with a draft version of the SCOOL scale prepared for large-scale data collection.

Chapter 7 then covers the remaining steps 5 to 7 (determining scale structure and length, and enabling psychometric validation of the SCOOL measure). These were achieved through Study 3. Chapter 7 also reports inferential analyses based on data from that study.

6.2 Step 2: Item generation (Study 2i)

6.2.1 Aims of Study 2i

Following the definition of constructs, the next step in scale development (DeVellis, 2017) involves generating a pool of items suitable for measuring each of the three factors in the proposed model. Schinka et al (2013) suggest the initial item pool should contain at least double the number of items desired for the final scale, whilst DeVellis (2017) suggests generating three to four times the number of items expected to be included in the final scale. As a minimum of three items, and ideally four to six (Fabrigar et al, 1999), are required to define each factor, the aim of this second step was to generate a pool containing a minimum of 20 items suitable for measuring each of the three factors in the proposed model.

For a scale to demonstrate good face and content validity, its items must reflect the real-life situations faced by the target population and serve as valid indicators of the theoretical construct being operationalized (Bandura, 2006, DeVellis, 2017). The items for the SCOOL scale were therefore primarily generated inductively (Bandura, 2006; DeVellis, 2017) from the coded transcripts of interviews with Generation Wild teachers produced in study 1. However, the sample of teachers interviewed in that study may have differed from the overall UK teaching workforce in several respects. Firstly, the participants all taught in schools in areas of economic disadvantage, as that was the criteria for Generation Wild participation. Secondly, their willingness to be interviewed about the programme suggests a level of engagement that may not have been typical of all teachers. This was accepted as being both a strength and a limitation of Study 1. Therefore, an additional short study, Study 2i, was designed to gather responses from a more diverse sample of teachers.

6.2.2 Methods of Study 2i

Study 2i was a short Qualtrics survey consisting of three open ended items. It aimed to elicit both positive and negative experiences of teaching outdoors. 125 participants were recruited through social media posts on Twitter and posts on Facebook groups aimed

specifically at primary school teachers in the UK. These included some groups targeted specifically at trainee and early career teachers, as these groups had been underrepresented in Study 1. The wording of the social media posts read, "If you're a UK primary school teacher or student teacher, can you spare five minutes to answer two quick questions, please?" The research topic was deliberately not mentioned, to avoid biasing the sample towards individuals who were particularly interested in outdoor learning. The social media posts linked directly to the Qualtrics survey, which consisted of an information and consent page, followed by three open ended items asking about outdoor teaching.

The items were phrased as:

- what enables, facilitates or makes it likelier for you to teach outdoors?
- what acts as a barrier or deters or prevents you from teaching outdoors?
- is there anything else you'd like to tell us about your experiences of teaching outdoors?

Ethical approval was provided by the Cardiff University School of Psychology Research Ethics Committee. Informed consent was obtained via an electronic consent form. No demographic information was collected about participants or their schools, as the aim was to get responses from the widest possible sample. No participation incentive was offered.

6.2.3   Results and discussion of Study 2i

The responses to Study 2i were used as part of the process of item generation. As no information was collected about participants or their schools, it is not possible to judge whether the sample was more inclusive than that in study 1, but the neutral wording of recruitment posts sought to maximise the chances of recruiting teachers with a wide range of views and experiences on outdoor learning. Item generation should ideally use both inductive and deductive methods (Boateng, 2018). To ensure that items used appropriate vocabulary for the target population, retaining an authentic 'teacher voice', where possible item wording was based on extracts from the interviews (Study 1) and survey responses

(Study 2i). To establish thorough coverage of the domain for each factor, items were also generated deductively, from the review of the literature presented in chapter 2.

A total of 118 items were initially generated: 51 items relating to codes from the Teacher theme, 43 for the School theme, and 24 items for the Systemic theme. This initial pool of items was reviewed by three independent assessors, and then reduced during subsequent discussions.

In order to maximize the clarity, specificity, and shortness of the items, wording was reviewed for clarity and modified following guidelines stated by DeVellis (2017) and Boateng (2018). This meant avoiding ambiguous or difficult wording, double negatives, overly long or complex sentence structures, and "double-barrelled" statements, which are open to misinterpretation. Some items were reworded to simplify vocabulary or improve sentence structure; although, as the SCOOL scale is designed for UK teachers, a reasonable level of both reading ability and English language comprehension were assumed. Where it was not possible to shorten or simplify items sufficiently without losing their intended meaning, they were removed. Items were also reviewed to ensure that the wording was neither offensive nor biased in terms of aspects of social identity such as gender, religion, ethnicity (Boating et al, 2018).

Where several similar or overlapping items existed within a specific factor, reviewers considered removing redundant items. This review process also sought to balance positive and negatively worded statements as far as possible, in order to reduce the acquiescence and response bias that can be an issue when using Likert scales as a response format (DeVellis, 2017). To allow the SCOOL measure to be used both in longitudinal studies and for comparisons between different schools, care was taken that items would be applicable across all stages of a teaching career, from initial teacher training onwards, as well as for the full range of classroom and leadership roles in primary schools.

By the end of the item generation, reduction and review process, the pool of items had been reduced to 58 for use in the next stage of scale development, i.e., 25 for the Teacher factor, 20 for the School factor, and 13 for the Systemic factor. These items are shown in full in

appendix 3. This is in line with suggested item numbers prior to cognitive testing for a three-factor scale (DeVellis, 2017; Schinka et al, 2013). Whilst it was noted that there were substantially fewer items relating to the Systemic theme, it proved difficult to generate further items to measure this factor, despite codes relating to this theme occurring in almost every interview. Items measuring the Systemic factor also tended to be negatively valenced, as they more often described barriers to outdoor teaching rather than facilitators.

6.3   Step 3: Cognitive testing of item pool (Study 2ii)

6.3.1   Aims of Study 2ii

The third step of scale development, as set out by DeVellis (2017), is to establish face validity of scale items with the population on which the measure is intended to be used. Study 2ii aimed to test the reduced pool of 58 items developed in step 2, using cognitive interview techniques with a small number of participants from the intended target population for the SCOOL measure.

6.3.2   Method of Study 2ii

10 participants were recruited via posts on Twitter, and Facebook primary teaching groups. The initial recruitment posts deliberately did not mention the specific outdoor teaching focus of the study, aiming to reduce any bias in recruitment. A cash incentive of £20 was offered for participation lasting up to an hour and 15 minutes. Ethical approval was provided by the Cardiff University School of Psychology Research Ethics Committee. Informed consent was obtained in advance via an electronic consent form, with a verbal check of assent at the beginning of each interview.

Participants' ages ranged from 22 to 50 years with a mean of 32 years. One was a teaching assistant, two were trainee teachers, and the remaining seven were qualified teachers, with their experience ranging from newly qualified teachers to those with over 20 years' experience in teaching. All participants were currently teaching in state primary schools in

England or Wales. This sample reflects the population for whom the SCOOL scale was designed.

All interviews took place over video call, and were audio recorded. The recordings were transcribed, and participants' responses were reviewed by the main author and three other reviewers.

The full wording of the 58 items used in this study is given in appendix 3. Full instructions to participants are included in appendix 4. During the interviews, the interviewer shared their screen showing the items presented in randomised order. Participants were asked to read each statement aloud, and then answer using a Likert response scale (labelled strongly agree to strongly disagree) whilst 'thinking out loud' about how they reached their answer. The interviewer recorded their answer. If participants struggled to perform the thinking out loud, they were prompted with questions such as, "Can you tell me a little more about that?" or "Can you explain why you gave that answer?" Participants always had the option not to answer any question.

In order to determine the optimal response format, the sample was split. For half of the participants, a five-point Likert scale option was used to express responses, with ends labelled as strongly agree and strongly disagree. For the other half, a four-point response scale was used, with the neutral midpoint option removed, thus forcing participants to express a directional preference.

6.3.3   Results of Study 2ii

Descriptive statistics for each of the 58 items, are reported in table 6.1. To enable a single set of descriptive statistics to be calculated for all participants, responses given on the four-point scale were rescaled so that they corresponded to four equally spaced points on the five-point scale (i.e. 1, 2.33, 3.67, 5) and the mean, SD and range were calculated using these rescaled values. Missing responses (where participants felt unable to answer an item) are also noted, as is the number of respondent queries to each item.

Table 6.1. Descriptive statistics of participant responses during cognitive testing (Study 2ii)

Item number and wording[5]	Range	Mean (SD)	Did not answer	Queries[6]
T1. I don't enjoy teaching outdoors.	1-2	1.30 (0.48)	0	None
T2. I enjoy teaching outdoors.	4-5	4.60 (0.52)	0	None
T3. I'm happy teaching outdoors whatever the weather.	2-5	3.50 (1.35)	0	Some
T4. Bad weather puts me off teaching outdoors.	1-5	3.20 (1.75)	0	None
T5. Teaching outdoors is a high priority for me.	2-5	4.10 (0.99)	0	None
T6. I just don't see the point of taking my class outside.	1-2	1.10 (0.32)	0	None
T7. Outdoor learning feels like just another box I have to tick.	1-2	1.20 (0.42)	0	Some
T8. I believe that outdoor learning is important for children's physical health.	4-5	4.80 (0.42)	0	None
T9. I believe that outdoor learning is important for children's mental health and wellbeing.	4-5	4.90 (0.32)	0	None
T10. Getting my class ready to go outside takes too long.	1-5	2.20 (1.40)	0	Some
T11. I don't have enough time to plan and prepare outdoor lessons.	1-4	2.10 (1.45)	0	None

[5] Full wording for all items can be found in appendix 3
[6] "Some" indicates 1 or 2 queries, "Many" indicates 3 or more

T12. I need ideas for outdoor lessons.	1-5	2.90 (1.45)	0	None
T13. I have the skills to teach outdoors.	1-5	3.60 (1.43)	0	None
T14. I don't know enough about local nature to teach children outdoors.	1-4	1.75 (1.17)	1	Many
T15. I don't have enough experience to teach outdoors.	1-5	2.50 (1.43)	0	None
T16. I am not comfortable with the risks of taking children outdoors.	1-2	1.40 (0.52)	0	Many
T17. I feel confident teaching outdoors.	2-5	4.20 (1.03)	0	None
T18. I am able to answer children's questions when teaching outdoors.	4-5	4.78 (0.44)	1	Some
T19. I find teaching outdoors too unpredictable.	1-4	2.40 (1.08)	0	Some
T20. It's difficult for me to manage children's behaviour outdoors.	1-4	1.89 (1.27)	1	None
T21. Children are more distracted when learning outdoors.	1-4	2.70 (1.42)	0	None
T22. Children are more focused when learning outdoors.	2-5	3.70 (0.95)	0	None
T23. Children's behaviour is better outdoors.	2-5	3.90 (0.99)	0	Some
T24. It is difficult for pupils with SEND (Special Educational Needs and Disabilities) to access outdoor learning.	1-5	2.20 (1.23)	0	Many
T25. Children are more engaged with learning outdoors.	3-5	4.40 (0.70)	0	None
Sch1. There is not enough green space for outdoor learning in our school grounds.	1-5	1.40 (1.27)	0	None
Sch2. There are accessible green spaces we can use within walking distance of our school.	1-5	4.30 (1.34)	0	Some
Sch3. All children in my class have appropriate outdoor clothing and footwear.	1-5	2.70 (1.42)	0	Some
Sch4. Our school has spare outdoor gear to lend to children.	1-5	3.10 (1.79)	0	Some

Sch5. Parents complain if children get wet and muddy.	1-5	3.10 (1.52)	0	None
Sch6. Our school timetabling makes it difficult to take my class outside.	1-3	1.90 (0.74)	0	Some
Sch7. Staffing in our school makes it difficult to take my class outside.	1-5	2.40 (1.65)	0	None
Sch8. There is pressure from parents to do more outdoor learning.	1-5	2.22 (1.39)	1	Some
Sch9. Parents don't see the point of outdoor learning.	1-5	2.80 (1.40)	0	None
Sch10. I feel supported to teach outdoors by my headteacher.	1-5	3.33 (1.22)	1	Many
Sch11. Our school leaders are strong advocates for outdoor learning.	1-5	3.40 (1.58)	0	None
Sch12. Our school leaders think that teaching outdoors is a waste of time.	1-3	1.67 (0.87)	1	Some
Sch13. Our school leaders think that outdoor learning poses safety issues.	1-4	2.89 (1.27)	1	None
Sch14. Outdoor learning is a priority in our school.	1-5	3.00 (1.41)	1	None
Sch15. Outdoor learning is not valued in our school.	1-5	2.50 (1.35)	0	None
Sch16. There is pressure not to spend more time outdoors than other classes do.	1-5	3.00 (1.56)	0	Some
Sch17. Our outdoor space is not safe for children to learn in.	1-4	1.40 (0.97)	0	Some
Sch18. Our school has risk assessments in place to support outdoor learning.	2-5	4.30 (1.25)	0	Many
Sch19. Every teacher is responsible for outdoor learning with their own class.	1-5	4.20 (1.23)	0	Many
Sch20. Our school has a staff member who is a specialist in outdoor teaching.	1-5	3.90 (1.45)	0	Some
Sys1. The pressure to prepare children for standardised tests stops me teaching outdoors.	1-5	2.89 (1.45)	1	None
Sys2. Getting good results on standardised tests is more important than outdoor learning.	1-4	1.80 (0.92)	0	Some

Sys3. School inspectors regard teaching outdoors as a waste of time.	1-4	2.70 (0.95)	0	Many
Sys4. School inspectors see the value in outdoor learning.	2-5	3.00 (1.12)	1	Some
Sys5. The fear of a poor school inspection judgement stops me teaching outdoors.	1-4	1.60 (0.97)	0	None
Sys6. I'm too busy trying to get through the curriculum to teach outdoors.	1-3	1.80 (0.63)	0	None
Sys7. There are plenty of curriculum links you can make when teaching outdoors.	4-5	4.90 (0.32)	0	None
Sys8. If outdoor learning were on the curriculum, it would be easier to justify doing more.	1-5	3.90 (1.29)	0	Many
Sys9. The national curriculum in my country does not make outdoor learning a priority.	1-5	3.70 (1.06)	0	Many
Sys10. Teaching outdoors becomes more difficult as children get older.	1-5	2.70 (1.34)	0	None
Sys11. There are plenty of curriculum topics that can be taught outdoors.	4-5	4.89 (0.33)	1	Some
Sys12. It's difficult to assess progress during outdoor learning.	1-4	1.90 (0.88)	0	None
Sys13. It's difficult to evidence progress during outdoor learning.	1-4	2.30 (1.34)	0	None

6.3.4   Discussion of Study 2ii

The quantitative data reported in table 6.1 were used during the process of item reduction to inform decisions about whether items should be retained or removed. Verbatim extracts of interview transcripts were collated where items were queried, misunderstood, or differently understood, as well as experimenter notes made during interviews. All these materials were used as part of the decision-making process, being discussed with three other assessors to identify problematic items which needed to be reworded for clarity or removed.

In general, the items were well understood, and there were few queries about the overall concepts of the scale items. The definition of outdoor learning offered in the introduction to each interview, as "any outdoor activities taking place during lesson time, but not playtimes or lunch breaks" seemed to tally with teachers' understandings. Offering further guidance around whether PE or sporting activities were considered outdoor learning would perhaps have been helpful.

Nine items were removed due to lack of scoring variation in responses (for example, Sys11, "There are plenty of curriculum topics that can be taught outdoors" which all participants agreed with). Some items that had been generated from the literature did not seem to resonate with participants (for example, item Sch6, "Our school timetabling makes it difficult to take my class outside"). It is likely that these items would have been understood within the original research context, but did not translate well to the population for which the SCOOL scale is intended. Another eight items were removed at this stage because their content overlapped with other similar items (for example, Sys12 and Sys13, Sch14 and Sch15, T22 and T25). Two further items were removed as they evoked responses that were not relevant to the construct being measured (for example, T19, I find teaching outdoors too unpredictable). Nine further items were removed because they were frequently misunderstood or queried (for example, Sch19, "Every teacher is responsible for outdoor learning with their own class").

Other items were judged to need minor changes to wording to improve clarity, for example, Sch3, "All children in my class have suitable outdoor clothing and footwear" was changed to "All children in my class own suitable outdoor clothing and footwear" to distinguish between responses to Sch4, which referenced clothing provided by the school. The "green space" questions (Sch1, Sch2 and Sch17) were rewritten to give two new items which separately interrogated accessibility of green space, and safety of outdoor space, "There are green spaces around our school that are easy to access for outdoor learning" and "Our local green spaces are not safe for children to learn in."

The responses from this study were also used to determine the appropriate response format for the statements. The five-point response scale inevitably meant that some participants opted for the neutral midpoint rather than expressing a definite opinion. However, it was clear during interviews that the four-point response option, forcing a directional preference, was unpopular with participants, seeming to cause discomfort. Some respondents insisted they could not express an opinion in either direction, for certain items, choosing instead to skip that item. Therefore, to reduce the problem of missing data, a five-point Likert scale was chosen as the response options, with ends labelled as strongly agree and strongly disagree.

At the end of this step, the pool of items had been reduced to 29: 6 Systemic items, 12 School items, and 11 Teacher items (see appendix 5). The School and Teacher sections of the scale were judged to be well balanced in terms of positive and negative wordings, with sufficient high-quality items to measure the relevant constructs. There were some concerns over the Systemic section, which contained fewer items than the other two sections, and 5 of the 6 items were negatively framed. However, this was undoubtedly an accurate reflection of the contents of this theme, as national education policies and systems were overwhelmingly seen by teachers as a barrier to outdoor learning, rather than an enabler.

6.4 Step 4: Expert panel review (Study 2iii)

6.4.1 Aims of Study 2iii

The fourth step in DeVellis's scale development process (2017) involves a review of scale items by a panel of external experts with subject matter knowledge to ensure content validity. The aim of Study 2iii was to convene a meeting of an expert panel to review the pool of 29 items remaining after study 2ii (appendix 5). The meeting agenda included validating factor constructs, evaluating item clarity and content validity, and suggesting additional items relevant to the domain.

6.4.2 Methods of Study 2iii

Potential members for the panel of external experts were suggested by the wider team involved in the research collaboration, including colleagues from Cardiff University and WWT. This process produced a list of individuals considered to have expertise and interest in school-mediated outdoor learning in the UK. The list included academics from the fields of Psychology, Geography, and Education; representatives from major UK nature and outdoor education organizations such as Learning Through Landscapes and the Council for Learning Outside the Classroom; staff from quangos like Natural England and Natural Resources Wales; and experienced educators. In May 2023, an invitation email was sent to 12 experts, outlining the purpose and content of the panel meeting. Eight individuals replied expressing an interest in being involved. The online panel meeting was arranged for July 2023 and consisted of the author, plus four other individuals[7], who came from diverse professional backgrounds.

The Panel members were asked to review the draft scale items that emerged from Study 2ii (see appendix 5), and to note anything that they found unclear or confusing about either

---

[7] Merideth Gattis, Cardiff University; Alexia Barrable, Queen Margaret University; Louise Montgomery, Engagement, Recreation and Access Researcher at Natural England; Mary Jackson, Head of Education and Communities at Learning Through Landscapes.

item wording or the response process. The meeting was recorded, and the content reviewed afterwards by the author and another team member.

6.4.3   Results and discussion of Study 2iii

Following the expert panel meeting, a number of minor modifications were made to the item wording. For example, "There are green spaces around our school that are easy to access for outdoor learning" was changed to "There are outdoor spaces suitable for learning in or around our school." "I have the skills I need to teach outdoors" was changed to "I have the knowledge I need to teach outdoors." The two items relating to outdoor clothing (which had previously been separated to distinguish between clothing owned by the child and clothing provided by the school) were combined, as following discussion, it was determined that who provided the clothing was less important than whether a lack of clothing formed a barrier to outdoor learning. These changes reflected panel opinions about core concepts for the constructs being measured.

It was agreed that it would be desirable to include more items in the Systemic factor, and for these to be positively framed where possible, in order to balance the number of positive and negative items. Panel members suggested a number of additional items to measure this construct (items 6, 7, 8 and 10 in appendix 6). It was accepted that whilst these items covered topics such as curriculum and assessment that fit with the Systemic factor, there was also the possibility that they might also be measuring aspects of the Teacher construct. Similarly, item 7, "I don't have enough time to plan and prepare outdoor lessons" was moved from the Teacher factor to the Systemic factor following panel discussion about what underlying issues were really being measured by this item.

At the end of step 4, the draft version of the SCOOL scale consisted of 31 items measuring three factors. The teacher factor had 11 items (6 positive, 5 negative); the School factor had 10 items (4 positive, 6 negative); and the Systemic factor had 10 items (5 positive, 5 negative). These items are reported in table 6.2. Note that at this stage, items were renumbered from 1 to 31, with Systemic items numbered 1 to 10, School items 11 to 20, and Teacher items 21 to 31. This sequence of numbering reflects how the model was

conceptualised at the time, although as my thinking developed, I preferred to order the model Teacher, School, Systemic, reflecting the central role of the teacher. This instrument was used for data collection in Study 3, reported in chapter 7, to enable the remaining steps in the scale development process to be completed.

Table 6.2. The draft SCOOL scale

Factor	No.	Item wording[8]
Teacher	21	I enjoy teaching outdoors.
	22	*Bad weather puts me off teaching outdoors.*
	23	Teaching outdoors is a high priority for me.
	24	*Getting my class ready to go outside takes too long to make it worthwhile.*
	25	I have the knowledge I need to teach outdoors.
	26	*I don't have enough experience to teach outdoors.*
	27	*It's more difficult to manage children's behaviour during outdoor lessons.*
	28	*Children are more distracted when learning outdoors.*
	29	Children are more engaged with learning outdoors.
	30	I have seen other teachers deliver successful outdoor lessons.
	31	There is nothing stopping me from teaching outdoors.
School	11	There are outdoor spaces suitable for learning in or around our school.
	12	*I am not able to take my class outdoors as much as I'd like because children lack suitable clothing and footwear.*
	13	*Staffing in our school makes it difficult to take my class outside.*
	14	*Parents don't see the point of outdoor learning.*
	15	Our school leaders are strong advocates for outdoor learning.
	16	*Our school leaders think that outdoor learning poses safety issues.*
	17	Outdoor learning is a priority in our school.
	18	*Our school leaders limit how much time I can spend outdoors with my class.*
	19	*School policies prevent me from teaching outside.*
	20	Our school grounds are designed for outdoor learning.

[8] Items in italics are negatively valenced

Systemic	1	*The pressure to prepare children for standardised tests stops me teaching outdoors.*
	2	School inspectors see the value in outdoor learning.
	3	*The fear of a poor school inspection judgement stops me teaching outdoors.*
	4	*I'm too busy trying to get through the curriculum to teach outdoors.*
	5	*Teaching outdoors becomes more difficult as children get older because of the pressures of standardised testing.*
	6	I understand how to evidence progress during outdoor learning.
	7	Teaching outdoors is an effective way to cover the curriculum.
	8	I feel confident about delivering the curriculum outdoors.
	9	*I don't have enough time to plan and prepare outdoor lessons.*
	10	I have had training in teaching the curriculum outdoors.

6.5 Chapter conclusion

6.5.1 Summary of Studies 2i, 2ii and 2iii

This chapter set out to address Research Goal 2a: the development and review of items for the School Contexts Of Outdoor Learning (SCOOL) scale. This objective was achieved through Studies 2i, 2ii and 2iii. The work followed four of the seven scale development steps outlined by DeVellis (2017), as depicted in Figure 6.1.

In step 1, measurement constructs were defined, with reference to the ecological model proposed in chapter 2. In step 2, a pool of items was generated using both inductively using data from Studies 1 and 2i, and deductively, based on the review of existing literature in chapter 2. In step 3, the items were refined and reduced through cognitive testing (Study 2ii) to establish face validity. Subsequently, in step 4, items were reviewed by a panel of external experts (Study 2iii) to evaluate their relevance and representativeness and ensure content validity. This systematic process yielded a draft 31 item scale (see table 6.2) measuring teachers' perceived capability for outdoor learning. The scale comprises three factors,

aligned with the three levels of the ecological model, and referred to by the shorthand labels of 'Teacher', 'School', and 'Systemic'.

6.5.2 Strengths and limitations of this research

The use of qualitative data from UK teachers and trainee teachers grounds the SCOOL items in the real-world context and ensures the measure has face validity. Cognitive testing, in Study 2ii, showed items to be easily understood, and relevant to participants' day to day tasks. The inclusion of initial teacher training students in the participant sample for Study 2ii ensures the scale will be suitable for use at all career stages, enabling longitudinal investigation of changes through training and early career development. Evaluation by experts during Study 2 provided further assurance that the items are relevant to the domain being measured, and established content validity.

However, the specificity of the intended population is also a potential limitation for the use of the current version of the SCOOL scale. Whilst the constructs measured by the SCOOL scale may still have considerable relevance to educators in a wider range of settings, the SCOOL items were explicitly developed to be relevant and applicable to UK primary school teachers. This means that the specific concepts and wording of some of the items, particularly those measuring the Systemic factor, may not be so applicable and relevant to other populations. Therefore, the SCOOL measure would require some degree of adaptation and revalidation in order to be used with teachers working in a different school system or country.

6.5.3 Next steps

The following Chapter 7 details Study 3, a large-scale data collection effort designed to complete steps 5 to 7 of DeVellis' scale validation process, thereby addressing Research Goal 2b—the psychometric validation of the SCOOL scale. Additionally, the data from this study were used for inferential testing of hypotheses derived from Study 1. Chapter 8 describes Study 4, which used the validated SCOOL measure to investigate the impact on teachers of taking part in the Generation Wild programme.

Chapter 7: The testing and validation of the SCOOL scale

7.1   **Introduction**

7.1.1   **Chapter summary**

Chapter 6 set out the rationale for developing the School Contexts of Outdoor Learning (SCOOL) scale, an empirical measure of teachers' perceptions of capacity for outdoor learning based on the ecological model of outdoor learning proposed in chapter 2. The SCOOL scale was designed to measure three factors, corresponding to three levels in that model: Teacher, School and Systemic. Scale development and validation followed the seven-step process described by DeVellis (2017) and shown in figure 6.1. Steps 2 to 4 were achieved through the three studies described in chapter 6 (Studies 2i, 2ii, and 2iii), addressing Research Goal 2a: the development, testing and reduction of items for the SCOOL scale. Chapter 6 ended with the draft version of the SCOOL scale ready for use in large scale data collection. This draft scale consists of 31 items designed to test the Teacher, School and Systemic factors (see table 6.3). The current chapter reports Study 3, which used the draft version of the SCOOL scale in a large-scale survey study with UK teachers.

7.1.2   **The aims of Study 3**

The primary aim of Study 3 was to complete the remaining steps 5 to 7 of the scale development and validation process (DeVellis, 2017). These steps address Research Goal 2b (the validation of the SCOOL scale) and comprise:

- Step 5- determining model structure through exploratory factor analysis (EFA);

- Step 6- optimising scale structure through confirmatory factor analysis (CFA);

- Step 7- tests of internal consistency, test-retest reliability and convergent validity with other related measures.

A secondary aim of Study 3 was to conduct inferential analyses testing the individual and school level predictors of SCOOL scores. The predictor variables included nature connection, wellbeing, scores on the overall SCOOL scale and its separate scale factors, and the reported frequency of outdoor teaching. The findings of Study 1 suggested that both the age of children taught and school location might be associated with differences in SCOOL scores.

It should be noted that as responses for negatively framed items were reverse scored, then **high** scores on the SCOOL scale (and factors) indicate **greater** perceived capability for outdoor learning.

Teachers perceived greater barriers to outdoor learning for older children, because of the demands of curriculum content and preparing for standardised assessments. Therefore, SCOOL scores and frequency of outdoor teaching are expected to be higher for teachers working with younger age groups. Teachers also regarded the availability of local greenspace as a key determinant of outdoor learning. Therefore, teachers working in suburban and rural schools are expected to have higher scores on the School factor of the SCOOL scale than those working in city schools, because of greater availability of greenspace in the local area. Finally, there were differences in teachers' perceptions of how the national education system in which they work restricts their capacity for outdoor learning. In Study 1, teachers in England described greater systemic barriers to outdoor learning than those in Wales or Northern Ireland, who spoke more positively of their curriculum and inspection systems and were not subject to standardised testing regimes. Therefore, scores on the Systemic factor of the SCOOL scale are expected to be lower for teachers in England compared to those in devolved nations.

Whilst no specific hypotheses relating to teacher age or gender arose from the findings of Study 1, there are some consistent findings of relevance in the literature which justify exploring the association between these variables and SCOOL scores. Researchers have suggested that nature connection dips to a low point during adolescence and then tends to increase with age (Hughes et al, 2019; Richardson et al, 2019). Age also serves as a proxy for experience in teaching, which may affect both the type of training teachers have received,

and their sense of agency. It has also been suggested that women have higher nature connection (Rosa et al, 2023) and greater environmental concern (Zelezny et al, 2000). Additionally, as a research team, we had observed that although primary teachers were predominantly female, male teachers were overrepresented in those responsible for a specific outdoor specialism, and this justified the inclusion of gender in the analyses.

7.2   Method

7.2.1   Design

The design of Study 3 was determined by the analyses required to fulfil the aims outlined above. In order to conduct both EFA and CFA (step 5 and step 6), a sufficiently large number of participants was needed to allow the sample to be split in two, with one half used for each of the analyses. For a three factor, 31 item scale, a minimum sample size of 155 for each procedure was estimated to be sufficient, using the rule of thumb of five times the number of items stated by Hatcher, 1994 (cited by DeVellis, 2017). However, Tabachnick & Fidell (2019) advocate for a larger sample size of 300 for EFA. A pragmatic decision was made, balancing recruitment costs and the likely number of UK teachers active on the Prolific platform against the optimal sample size; therefore, the design aimed to collect data from 600 participants in total. It was also necessary to collect data from the same participants at a second timepoint to calculate test-retest reliability (step 7). A two-week interval was selected, as it is the most commonly recommended timeframe for evaluating test-retest reliability (Streiner, Norman & Cairney, 2014). Time 1 data collection took place during late September 2023, and time 2 data collection during early October 2023.

To test convergent validity of the new SCOOL measure (step 7), other relevant measures were included that were considered to be related to the overall SCOOL scale and the constituent Teacher, School and Systemic factors. It was expected that personal nature connection and environmental concern would be most strongly associated with scores on the Teacher factor of the SCOOL scale. Conversely, it was expected that teacher autonomy scores would be more strongly associated with scores on the School and Systemic factors of

the SCOOL scale. Both overall SCOOL scores and separate factor scores were expected to correlate with outdoor learning frequency.

7.2.2 Participants

The time 1 sample consisted of 516 teachers. Participants were recruited through the Prolific online platform (https://www.prolific.com). The inclusion criteria were that participants had identified themselves as currently working in education and being resident in the UK. An eligibility check at the beginning of the survey asked more precisely, "Are you currently teaching in a UK state school?" The time 1 sample included teachers working across all phases of education, from early years to tertiary (3 to 18 years). Two attention checks were included to optimise data quality. Participants were removed from the sample if they failed either of these checks. Of the 542 participants who initially completed the survey at time 1, 26 were removed for failing the attention check, leaving 516 valid cases.

The time 2 sample consisted of 186 participants. Two weeks after the initial data collection, all participants (n=265) who had identified themselves as working in primary schools were invited via the Prolific platform to participate in a second survey. The inclusion criteria were deliberately narrowed to correspond more closely to the teachers taking part in Generation Wild, the majority of whom worked in primary schools. In total, 200 participants completed this second survey. Fourteen participants who failed the attention checks were removed, resulting in 186 valid cases.

The sample characteristics for time 1 and time 2 are reported in table 7.1. The samples are broadly similar in characteristics, apart from differences in gender and job role for time 2. The gender differences were to be expected, as school workforce census data shows that only 13% of teachers working in primary schools are male, compared to 35% in secondary (Butler and Fisher, 2023).

Ethical approval for this study was obtained from the Cardiff University School of Psychology Research Ethics Committee. Informed consent was obtained at the beginning of each survey.

Table 7.1. Participant characteristics of time 1 and time 2 samples

Variable	Response category	Time 1[9]	Time 2[10]
Mean (SD) age in years	n/a	40(10.9)	40 (10.6)
Gender %	male	25	13
	female	74	86
Ethnicity %	White British	82	88
	White (other)	6	2
	Asian	6	5
	Black	2	3
	Mixed	3	1
	Other	1	0
	Prefer not to say	0	1
Teaching experience %	Student teacher	3	4
	< 2 years	10	8
	2-5 years	19	17
	5-10 years	19	17
	>10 years	49	54
Key stage %	Early Years (<5 years)	6.6	14
	Key stage 1 (5-7 years)	26.2	50.5
	Key stage 2 (7-11 years)	18.2	35.5
	Secondary (11-18 years)	49.1	0
Role %	Primary class teacher	34	71
	Secondary subject teacher	29	0
	Teaching assistant	13	16
	Senior leaders	9	6
	Other	14	7
Country %	England	86	86
	Scotland	4	5
	Wales	9	7
	Northern Ireland	2	3
School location (urban/rural)	City	37	28
	Suburban	49	60
	Rural	14	12

---

[9] At time 1, n=516
[10] At time 2, n=186

7.2.3   Measures

Participants were asked to report the location and size of the school where they taught; their own age, ethnicity and gender; their teaching experience, teaching role and the age group they taught.

Outdoor lesson frequency. Participants were asked, "How often do you teach lessons outdoors?" with categorical response options of "never", "very occasionally", "several times per term", "every week" and "every day". These data were collected in order to test convergent validity of the SCOOL scale and factors.

Subjects taught outdoors. Participants were asked, "Which subjects do you teach outdoors?" Seven categories were listed and participants could select as many as applied, "English/Literacy", "Maths/Numeracy", "Science", "Humanities", "Art/Technology", "Physical Education" and "Other". Therefore, as well as considering frequency at which different subjects were taught outdoors, it was possible to see whether individual participants taught a range of subjects taught outdoors.

Closeness to family was measured using the Inclusion of Others in Self item (Aron et al, 1992). Participants were asked to, "Choose the picture which best shows how close you feel to the other people in your family" from five pairs of circles with differing degrees of overlap.

Closeness to colleagues was measured using the Inclusion of Others in Self item (Aron et al, 1992). Participants were asked to, "Choose the picture which best shows how close you feel to your colleagues in school" from five pairs of circles with differing degrees of overlap.

Nature connection was measured using both the single item Inclusion of Nature in Self (Schultz, 2002) and the NR-6 nature relatedness scale (Nisbet & Zelenski, 2013). The nature connection measures were used to test convergent validity of the SCOOL scale and factors.

For the INS, participants were asked to, "Choose the picture which best shows how close you feel to nature" from five pairs of circles with differing degrees of overlap.

The Inclusion of Others in Self items were presented on the same page as the Inclusion of Nature on Self item, and were included to help participants understand the item format, which can appear unusual and confusing otherwise.

For the NR-6, participants were told, "We would like to understand more about your personal relationship with nature. To what extent do you agree or disagree with the following statements?" and presented with six statements, which they responded to on a five point scale from strongly disagree to strongly agree. An example item is, "I feel very connected to all living things and the earth."

School Contexts of Outdoor Learning Participants completed the full draft 31 item version of the SCOOL scale (see table 6.2). However, scores were calculated using only the 18 items in the 3 factor model reported in table 7.2. For each item, participants were told, "We would like to understand your beliefs and knowledge about teaching outdoors. Please answer to what extent you agree or disagree with each statement." Participants gave responses on a five-point Likert scale with ends labelled strongly agree to strongly disagree.

Time spent in nature was measured with two items. The first asked, "In the last year about how often have you spent time in nature?" (Meis-Harris et al, 2021). Responses were given using seven categories ranging from 'never', through to 'every day'. The second item asked, "Yesterday, did you spend time in nature?" and participants gave a binary yes or no response (after White et al, 2019).

Subjective wellbeing was assessed through four items used in Office for National Statistics surveys, and frequently employed in other studies examining nature connection and wellbeing (ONS, 2011; White et al, 2019). These items are all answered on a 0-10 scale and ask:

-Overall how anxious did you feel yesterday?

-Overall how happy did you feel yesterday?

-Overall how satisfied are you with life nowadays?

-Overall to what extent do you feel that the things you do in your life are worthwhile?

Environmental concern was measured with the biospheric concern subscale of the Environmental Concern scale (Schultz, 2001). Items used the stem, "I am concerned about environmental problems because of the consequence for…" and ended with different natural entities, such as plants, marine life, birds and animals. Participants were asked to rate each item on a seven-point scale, from 'not important' to 'supreme importance'.

Teacher autonomy was measured with the teacher autonomy scale (Worth and van den Brande, 2020). Participants were told, "We would like to understand how autonomous you feel in your current job role. Please choose the answer that describes how much influence you have over each of these aspects of your teaching role." There are 12 items, describing different aspects of their job, for example, "The content of the curriculum" and "How your classroom is physically laid out." Items were answered on a four-point response scale from 'none' to 'a lot'.

7.2.4 Procedure

The Prolific online platform (https://www.prolific.com/) was used to recruit and pay participants, and the survey presented using Qualtrics (https://www.qualtrics.com).

A full copy of the Qualtrics survey is contained in appendix 6.

The study was available to eligible participants (as per inclusion criteria described above) for a period of one week. Two weeks later, a subsample of participants was invited to complete the survey a second time. Both surveys fell during the school term and were posted on Prolific on the same time and day of the week, in order to reduce sources of variation as far as possible. The survey began with an eligibility check, followed by an information and consent page. Participants were then presented with the demographic items to be used as independent measures, followed by the dependent measures. Measures were presented in

the same order for each participant, as described above, but items within each scale were presented in randomised order. The survey took an average of six minutes to complete, and participants received an incentive payment of £1.80 after each survey was completed.

7.2.5   Analysis

EFA and CFA were conducted using Stata version 17. All other analyses were conducted using SPSS version 27. For existing validated measures, scale scores were generated as per author instructions. For the SCOOL scale, unit-weighted mean scores were calculated for each factor, and for the overall scale, using the final model as reported.

Step 5: Exploratory factor analysis (EFA)

First, the suitability of the data for EFA was checked. EFA assumes that data are normally distributed and that relationships between variables are linear. Therefore, skewness and kurtosis were calculated for each item to check there were no values of skewness >2.0 or kurtosis ≥7.0 (Curran, West and Finch,1996). Pearson's correlation coefficient was computed for all pairs of items, and a visual check of the correlation matrix performed to ensure numerous coefficients greater than >.30, and no coefficients greater than <.90, indicating suitability for EFA (Tabachnick & Fidell, 2019). Bartlett's test of sphericity was conducted to test the hypothesis that the correlation matrix was an identity matrix. The Kaiser-Meyer-Olkin measure (KMO) was calculated for the overall sample, and for each item individually. To reduce the possibility of skew affecting results in EFA, all scale items should be scored in the same direction (Norman & Streiner, 2014). Just over half (16/31) of the items in the draft SCOOL scale were written with negative valence, so responses for these items were reverse scored before any subsequent statistical procedures took place. Therefore, **high** SCOOL scores always indicate **greater** capability for outdoor learning.

Common factor analysis with maximum likelihood estimation was used, in preference to principal components analysis (PCA), as the purpose was to identify the latent structure underlying the scale (Fabrigar et al,1999; Widaman, 2018). For theoretical reasons, it was assumed that the factors would be correlated. Therefore, Promax rotation was used (kappa

= 4), (Costello and Osborne, 2005). A factor loading threshold of 0.5 was applied in all analyses. Whilst values as low as 0.32 are commonly used as a threshold for item loading salience, using higher thresholds aid factor interpretation and results in a better performing measure (Hair et al, 2009; Stevens, 2002).

Several methods were used to support a decision about the number of factors to extract. DeVellis (2017) recommends using parallel analysis (Horn, 1965) as the primary basis for deciding how many factors to extract, followed by subjective examination of the scree plot (Cattell, 1966). Both methods were used, however, they yielded conflicting results and therefore a series of three analyses were performed, restricting the number of factors to 2, 3 and 4 in turn, resulting in the extraction of three different models. The factor adequacy of each model was then considered, applying the principles of simple structure: that each factor should have at least 3 items loading; and that items should load on to only one factor (Thurstone, 1947). In addition, the factors should be theoretically meaningful (Watkins, 2018).

Step 6: Confirming scale structure and length through confirmatory factor analysis

CFA was conducted to test the statistical fit of the model derived from EFA versus the theoretically derived draft version of the scale. Details of both models are given in the section 7.3.1. Goodness-of-fit indices were calculated for each model, and evaluated using Hu and Bentler's recommendations (1999), that ideally both the Comparative Fit Index (CFI) and Tucker-Lewis index (TLI) should be greater than 0.95; the Root Mean Squared Error of Approximation (RMSEA) less than 0.06; and the Standardized Root Mean Squared Residual (SRMR) less than 0.08.

Step 7: Scale reliability and validity

Once the best fitting model had been confirmed in step 6, then tests of reliability and validity were conducted. Descriptive statistics were calculated for all outcome measures. To measure internal consistency, Cronbach's alpha was calculated for the overall SCOOL scale, as well as for the three separate factors, for both time 1 and time 2 data.

Test-retest reliability was calculated for all participants with complete data at both time 1 and time 2. To test convergent validity, correlations were calculated between the overall SCOOL and SCOOL factor scores, and measures of relevance such as personal nature connection and teacher autonomy. Pearson's r was calculated for continuous data and Spearman's rho for ordinal data.

Inferential analyses of time 1 data

Regression analyses were conducted to test for effects of age, gender, school location and country, and pupil age group on all outcome measures. Gender was treated as a binary male/female category, and data from a handful of participants who gave other responses, or did not answer this item, were excluded from this analysis. Similarly, school location and country were also entered into the model as binary coded dummy variables. Location was divided into city schools vs suburban and rural schools. Country was divided into teachers working at schools in England versus those working in other UK nations (Scotland, Wales and Northern Ireland). Pupil age group was divided into: early years and key stage one (3 to 7 years); key stage two (7 to 11 years); secondary (11 years upwards). Numbers of participants in each category were reported in table 7.1.

7.3   Results

The results are presented in four sections, reflecting the main and subsidiary aims of this chapter. First, an EFA is reported in 7.3.1 (Step 5), then CFA to check model fit in section 7.3.2 (Step 6). Section 7.3.3 presents descriptive statistics for all outcome measures and then reports the analyses conducted to test the internal consistency, test-retest reliability and validity of the SCOOL scale (Step 7). These findings complete the validation steps for the SCOOL scale. Finally, in section 7.3.4, the validated SCOOL scale is used in a series of inferential analyses to explore individual and school level variables associated with differences in SCOOL scores.

7.3.1　Step 5: Exploratory factor analysis

This analysis used 31 item responses from 258 participants (half of the time 1 sample). Each item had responses ranging from 1 to 5. There were no missing data, and no outliers. For negatively framed items, responses were reverse scored. Therefore, for all items, **high** scores indicate **greater** perceived capability for outdoor learning.

Mean, SD, skewness and kurtosis and communality were calculated for all items (see appendix 7). All item responses showed sufficient variability for EFA. Skewness and kurtosis values were acceptable (Curran, West and Finch, 1996). Six items with communality less than 0.4 were dropped from the analysis at this stage (Tabachnick & Fidell, 2019). Bartlett's test of sphericity (χ^2 = 3886.45, df = 465, p < .001), indicated that correlations were sufficiently large for factor analysis. The overall KMO value was .912, with values of .87 to .95 for each individual item, well above the acceptable level of .50, verifying the sampling adequacy for the analysis (Tabachnick & Fidell, 2019).

Parallel analysis suggested extracting three or four factors, whilst visual examination of the point of inflexion of the scree plot suggested two factors. As these methods yielded conflicting results, several exploratory analyses were run, specifying the extraction of solutions with 4, 3 and 2 factors in turn. The four-factor solution is reported in appendix 8; the three-factor solution in appendix 9; and the two-factor solution in appendix 10. The solutions were sequentially examined for theoretical fit, i.e., that the solution matches the proposed theoretical model, and adequacy, using the "simple structure" criteria, i.e., that each item should load highly on to one factor and only to that factor (Thurstone, 1954).

The four-factor solution explained 59% of the variation in the data and was easily interpretable in terms of the theoretical model. However, it was considered inadequate due to insufficient items loading on to the fourth factor. The three-factor solution explained 53% of variance, and was judged to be adequate, having a simple structure with no strong cross-loading items and all factors having four or more strongly loading items. This solution also closely matched the proposed theoretical model. The two-factor solution had a satisfactory simple structure, but could not be easily interpreted in light of the proposed theoretical

model and explained only 46% of the variance in the data. This solution was therefore rejected, and the three-factor solution preferred.

Item loadings for the three-factor model are reported in table 7.2. Seven items did not load strongly onto any of the factors (<.50). These items were removed from the model, resulting in a final scale with 18 items. The model explained 53% of the variance in the data, with the Teacher factor accounting for 37% of variance, the School factor 9% and the Systemic factor 7%.

Table 7.2. Factor loadings for items in the SCOOL scale

Item wording[11]	Factor loadings		
	Teacher	School	Systemic
25. I have the knowledge I need to teach outdoors	**.888**	-.168	.006
8. I feel confident about delivering the curriculum outdoors	**.847**	.069	-.007
6. I understand how to assess progress during outdoor learning	**.754**	-.043	.087
26. I don't have enough experience to teach outdoors	***.660***	*-.174*	*.170*
21. I enjoy teaching outdoors	**.597**	.228	-.150
7. Teaching outdoors is an effective way to cover the curriculum	**.586**	.278	-.056
23. Teaching outdoors is a high priority for me	**.558**	.273	-.134
10. I have had training in teaching the curriculum outdoors	**.541**	.239	-.026
15. Our school leaders are advocates of outdoor learning	.005	**.763**	.033
20. Our school grounds are designed for outdoor learning	.009	**.709**	.010
17. Outdoor learning is a priority in our school	.085	**.692**	.048
11. There are outdoor spaces suitable for learning in and around our school	.106	**.648**	-.059
19. School policies prevent me from teaching outside	*-.207*	***.609***	*.251*
16. Our school leaders think that outdoor learning poses safety issues	*-.236*	***.540***	*.172*
5. The pressure to prepare for SATS stops me teaching outdoors	*-.031*	*.27*	***.760***
1. Teaching outdoors becomes more difficult as children get older	*-.003*	*-.071*	***.688***
4. I'm too busy trying to get through the curriculum to teach outdoors	*.222*	*.076*	***.624***
9. I don't have enough time to plan and prepare outdoor lessons	*.302*	*-.017*	***.518***

---

[11] Italics indicate negatively worded items.

7.3.2 Step 6: confirming scale structure and length through confirmatory factor analysis

This analysis used 31 item responses from 258 participants (the other half of the time 1 sample). Two different models were specified using maximum likelihood estimation. Model A, a three-factor model using 31 observed variables (as per the draft scale in table 6.3). The results of the confirmatory factor analysis for model A are shown in figure 7.1. Model B, a three-factor model specified using 18 observed variables (as per the solution of the EFA reported in step 5). The results of the confirmatory factor analysis for model B are shown in figure 7.2. The fit indices for both models are reported in table 7.3.

Figure 7.1. Results of confirmatory factor analysis for model A
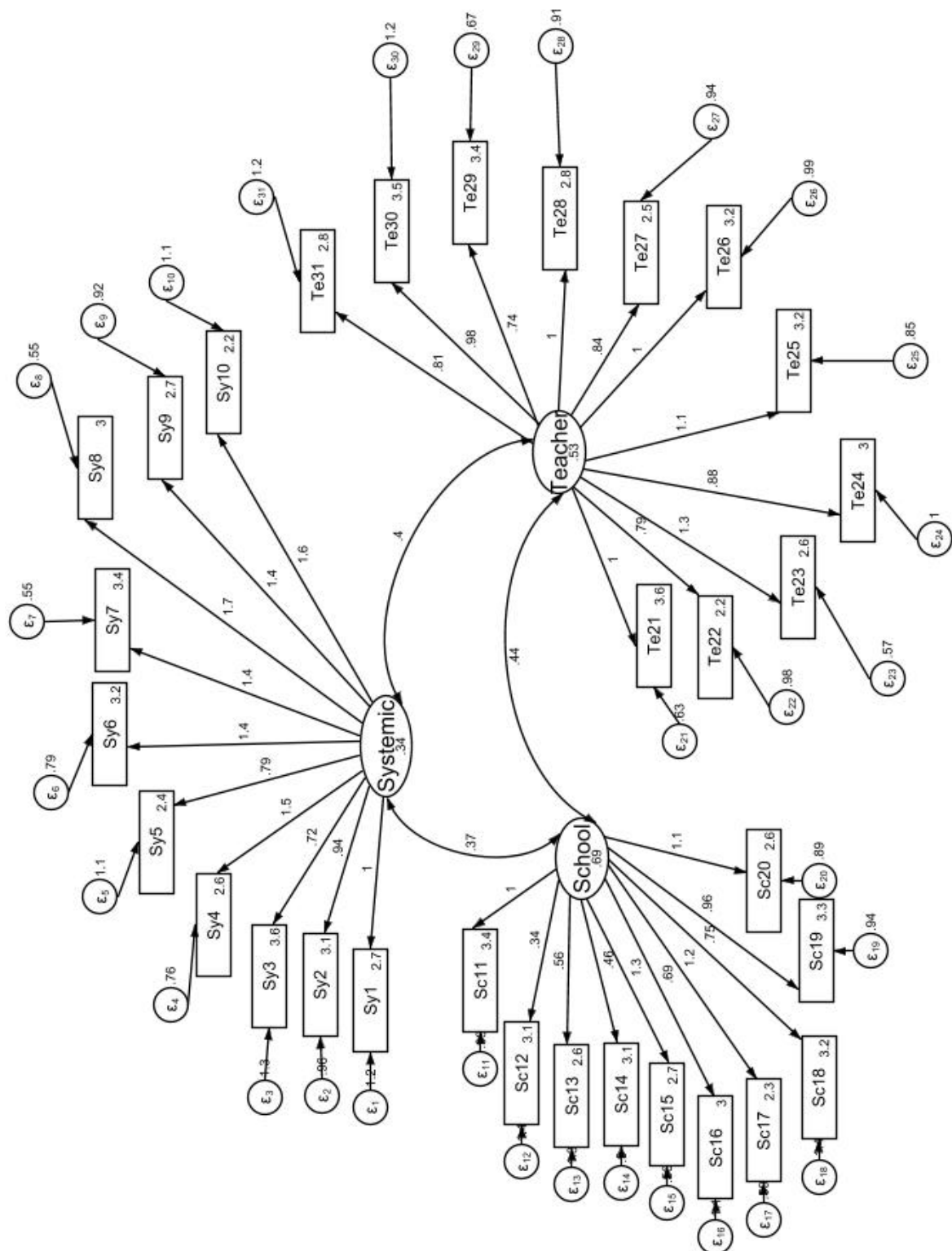
Figure 7.2. Results of confirmatory factor analysis for model B
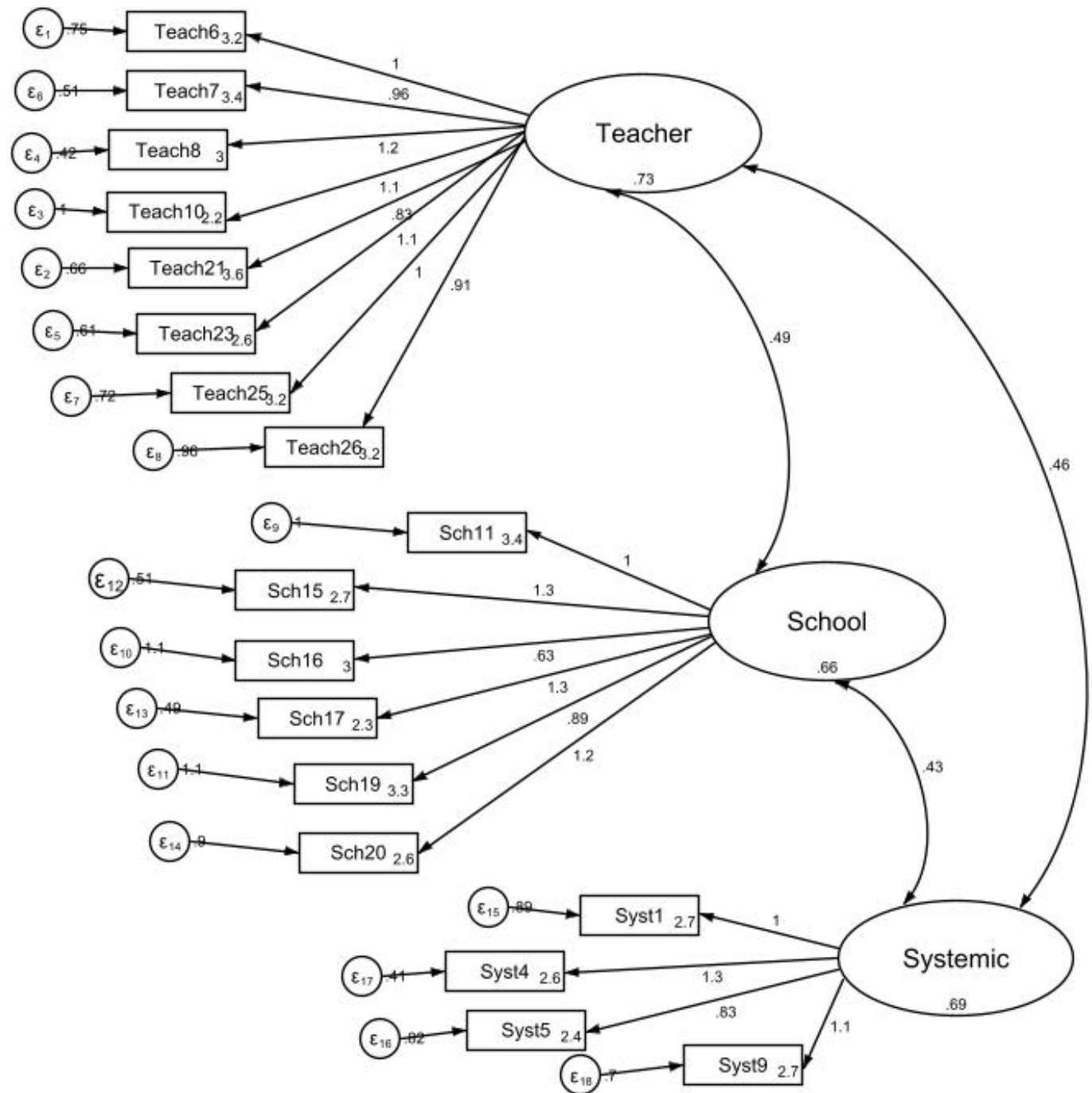
Table 7.3. Fit indices for model A and model B

	Model A	Model B
Number of items	31	18
Number of factors	3	3
Chi-square	1436.41	394.61
Root mean square error of approximation	0.095	0.088
Comparative Fit Index	0.720	0.886
Tucker Lewis Index	0.698	0.868
Standardised Root Mean Square Residual	0.093	0.071

As model B (the three-factor 18-item model derived from EFA and reported above in table 7.2) has better fit indices, it will therefore be used to calculate SCOOL scores in the remainder of this chapter and thesis.

7.3.3 Step 7: Confirming validity and reliability of the SCOOL scale

In this section, descriptive statistics are reported for all outcome measures, and then the results of inferential tests used to evaluate scale validity and reliability.

Table 7.4 reports descriptive statistics for the SCOOL scale and other outcome measures at time 1.

Table 7.4. Descriptive statistics of all outcome measures for 516 participants at time 1

Outcome measure	Range of possible scores	Mean (SD)
Overall SCOOL score	1-5	2.95 (.78)
SCOOL Teacher factor	1 – 5	3.13 (.89)
SCOOL School factor	1 – 5	2.92 (.96)
SCOOL Systemic factor	1 – 5	2.61 (.96)
Nature connection (Inclusion of Nature in Self)	1 – 5	2.96 (1.02)
Nature connection (NR-6)	1 – 5	3.48 (.88)
Personal time in nature	1 – 7	4.80 (1.61)
Biospheric concern	1 – 7	5.65 (1.16)
Teacher autonomy	1 – 5	3.37 (.79)
Wellbeing (life satisfaction)	0 – 10	6.46 (1.80)
Wellbeing (life meaning)	0 – 10	7.04 (1.90)
Wellbeing (happiness)	0 – 10	6.49 (2.13)
Wellbeing (anxiety)	0 – 10	4.29 (2.66)

Overall SCOOL scores and SCOOL factor scores were also visualised as histograms. Figure 7.3 shows the distribution of overall SCOOL scores; figure 7.4 shows the distribution of Teacher factor scores; figure 7.5 shows the distribution of School factor scores; and figure 7.6 shows the distribution of Systemic factor scores.

Figure 7.3. Distribution of overall SCOOL scores at time 1 (n=516)
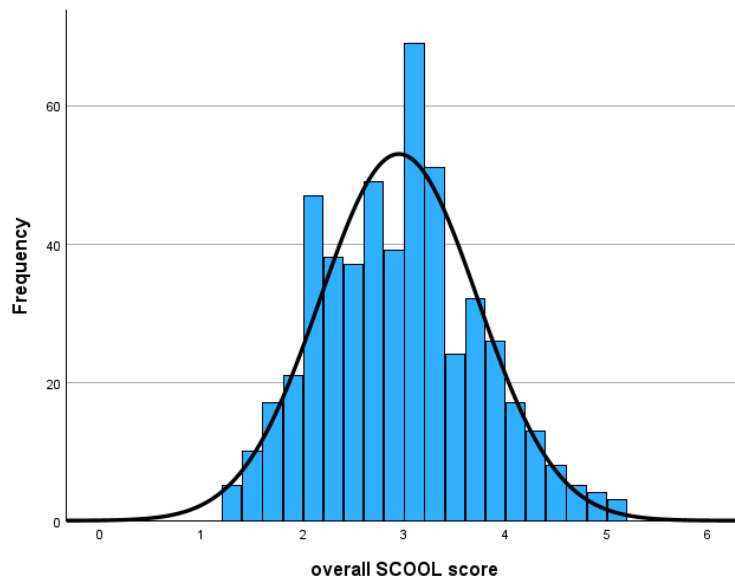
The distribution of overall SCOOL scores appears normal.

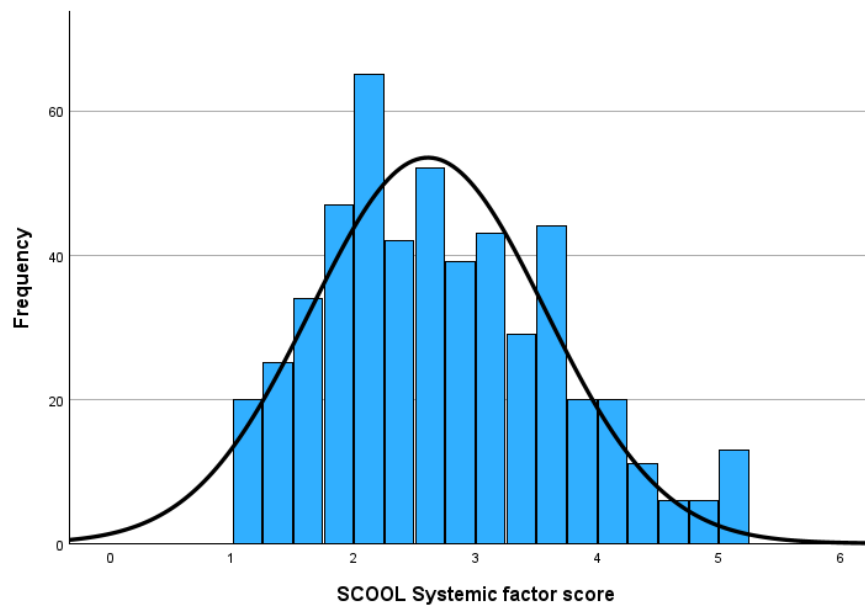**Figure 7.4. Distribution of SCOOL Teacher factor scores at time 1 (n=516)**
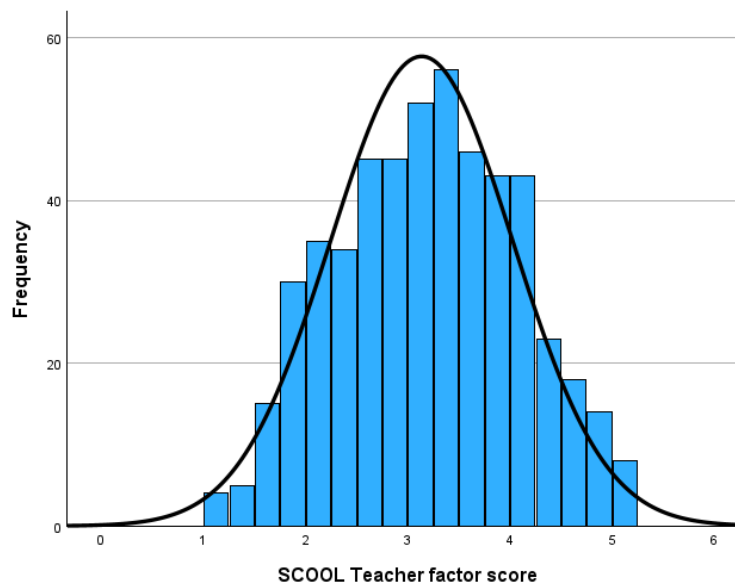
The distribution of SCOOL teacher factor scores appears normal.

Figure 7.5. Distribution of SCOOL School factor scores at time 1 (n=516)
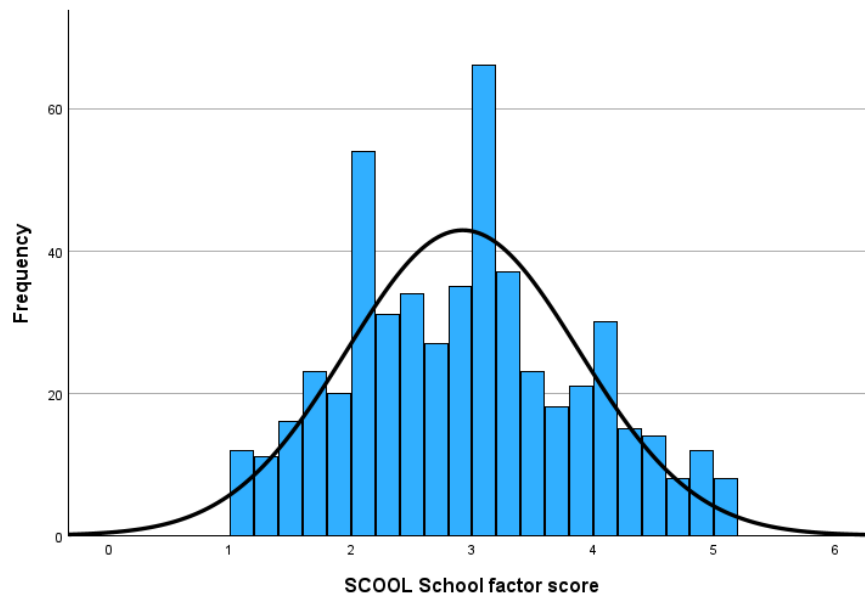
The distribution of SCOOL School factor scores appears normal.

Figure 7.6. Distribution of SCOOL Systemic factor scores at time 1 (n=516)

The distribution of SCOOL Systemic factor scores has a slight positive skew.

Cronbach's alpha, test-retest reliability and correlations between the separate SCOOL scale factors are reported in table 7.5.

Table 7.5. Internal consistency and reliability of the SCOOL scale and factors

	Cronbach's alpha Time 1 (n=516)	Cronbach's alpha Time 2 (n=200)	Test-retest reliability (n=186)
SCOOL scale overall	.913	.901	r=.884 **
Teacher factor	.881	.899	r=.871 **
School factor	.846	.789	r=.824 **
Systemic factor	.813	.803	r=.782 **

**correlation is significant at p< .001 level (2 tailed)

Internal consistency was very good for both the overall SCOOL scale, and for the three separate factors, at Time 1 and Time 2. The test-retest reliability was good for the overall scale, and for the Teacher and School factors. The test-retest reliability was a little lower for the Systemic factor, but still well within the acceptable range.

Table 7.6 reports the reported frequency of outdoor teaching at time 1 for teachers working with different age groups.

Table 7.6. Frequency of reported outdoor teaching by pupil age group

Response	Early Years %	Key stage 1 %	Key stage 2 %	All primary %	Secondary %
Never	0	4	9	4	43
Very occasionally	18	29	45	31	41
Several x per term	15	30	21	24	7
Every week	21	29	37	31	6
Every day	47	8	4	11	3

Teachers working with older age groups generally reported teaching outdoors less frequently, with 84% of secondary teachers never or rarely teaching outdoors, compared to 35% of primary teachers. There are also differences between key stages within primary schools, with 47% of early years staff reporting teaching outdoors daily, compared to 8 5 in key stage 1, and 4% in key stage 2.

Table 7.7 reports the percentage of primary teachers reporting teaching outdoors by subjects. Physical education was the subject most often taught outdoors, followed by Science.

Table 7.7. Percentage of teachers reporting teaching outdoors by subject

Subject	Early Years	Key stage 1	Key stage 2	All primary
English/Literacy	44	47	33	42
Maths	53	54	39	49
Science	65	69	65	67
Humanities	35	32	21	29
Art/technology	56	48	31	43
Physical Education	82	81	82	81
Other subjects	18	12	15	14

PE (physical education) is the subject most commonly reported to be taught outdoors for all age groups, followed by science, maths and art.

Table 7.8 reports correlations between SCOOL scores and other outcome measures used to establish validity. Overall SCOOL scores were significantly correlated with individual nature connection, environmental concern, and the teacher autonomy scale. Nature connection and biospheric concern correlated with the Teacher factor but not with the School or Systemic factors. Teacher autonomy scores correlated with all three factors but were

strongest for the Systemic factor, followed by the School factor, and weakest for the Teacher factor. The overall SCOOL scale and all three factors were strongly associated with the frequency of outdoor teaching. It should be noted that- with the exception of outdoor lesson frequency- these correlations between SCOOL scores and other measures were weak.

Table 7.8. Correlations between SCOOL scores and other measures for 516 teachers at time 1

	SCOOL overall	Teacher factor	School factor	Systemic factor
Nature connection (NR-6)	.270**	.383**	.105	.111
Biospheric concern	.183**	.255**	.108	.032
Teacher autonomy	.248**	.171**	.213**	.266**
Outdoor lesson frequency	.662**	.598**	.616**	.352**

**correlation is significant at p< .001 level (2 tailed)

In addition, correlations between the separate factors of the SCOOL scale were: Teacher and School factors, r=.570, p<.001; Teacher and Systemic factors, r=.469, p<.001; School and Systemic factors, r=.526, p<.001.

7.3.4 Inferential analyses of time 1 data

This section reports the findings of a series of multiple linear regression models exploring teacher age, teacher gender, nature connection, teacher autonomy, pupil age, school location and country as predictors of overall SCOOL scores, and separate factor scores. In all cases, the regression model was significant. The output of each model is reported in table 7.8.

Overall SCOOL score was significantly predicted by teacher nature connection, teacher autonomy and pupil age. Overall SCOOL score was not significantly predicted by teacher age or gender, or by school location or country.

The SCOOL teacher factor was significantly predicted by teacher nature connection, teacher autonomy and pupil age. SCOOL Teacher factor was not predicted by teacher age or gender, school location or country.

The SCOOL School factor was significantly predicted by teacher nature connection, teacher autonomy, pupil age and school location. School factor was not predicted by teacher age or gender, or by country.

The SCOOL Systemic factor was significant predicted by teacher age, teacher autonomy, pupil age and country. SCOOL Systemic factor was not predicted by teacher gender, teacher nature connection or school location.

Table 7.8. Output of multiple regression models predicting SCOOL scores

Predictors	Overall SCOOL score			SCOOL Teacher factor			SCOOL School factor			SCOOL Systemic factor		
	B	SE	p	B	SE	p	B	SE	p	B	SE	p
(Intercept)	1.986	.202	<.001	1.900	.240	<.001	2.441	.255	<.001	1.474	0.290	<.001
Teacher age	.004	.003	.108	.002	.003	.616	.005	.003	.117	.008	.004	.032
Teacher gender	-.037	.067	.581	-.065	.079	.413	.043	.084	.610	-1.00	.096	.294
NR6- nature connection	.212	.033	<.001	.372	.039	<.001	.087	.041	.037	.077	.047	.100
Teacher autonomy	.261	.036	<.001	.200	.042	<.001	.300	.045	<.001	.324	.051	<.001
Pupil age group	-.359	.029	<.001	-.343	.034	<.001	-.468	.037	<.001	-.229	.042	<.001
School location	-.115	.059	.051	-.060	.070	.392	-.234	.074	.002	-.047	.084	.576
Country	.129	.079	.106	.071	.094	.451	.139	.100	.167	.228	.114	.046
Overall model	$R^2 = .367$ F (7, 500) =41.39 p<.001			$R^2 = .321$ F (7, 500) = 33.84 p < .001			$R^2 = .343$ F (7, 500) = 37.22 p < .001			$R^2 = .155$ F (7, 500) = 13.089 p < .001		

7.4   Discussion

7.4.1   Summary of Study 3

This chapter described Study 3, which had the primary aim of addressing Research Goal 2b: the psychometric validation of a theoretically derived scale of School Contexts of Outdoor Learning (SCOOL). Scale development and validation followed a seven-step process set out by DeVellis (2017). The current chapter covered steps 5 to 7, completing the validation process: determining model structure through EFA (Step 5), optimizing scale structure through CFA (Step 6), and assessing consistency, reliability and validity (Step 7). This process resulted in a three-factor, 18-item scale with strong psychometric properties.

The SCOOL scale was then used to fulfil the secondary aim of Study 3- conducting inferential analyses using the Time 1 data to explore the impact of individual and school-level predictors on SCOOL scores. These results were triangulated with the qualitative findings of Study 1.

7.4.2   The psychometric validation of the SCOOL scale

Exploratory factor analysis (EFA) was conducted to determine empirically the latent factor structure of the SCOOL measure (Step 5, DeVellis, 2017). Three possible factor solutions were generated and are reported in appendices 8, 9 and 10. These solutions were evaluated according to the principles of simple structure (Thurstone, 1947), and in terms of their fit with the proposed theoretical model. A three-factor solution was preferred as it was both parsimoniously structured and theoretically plausible. Factor loadings for this solution were reported above, and full wordings of all scale items are given in table 6.3.

Confirmatory factor analysis (CFA) was then used to test the fit of the three-factor model generated from EFA, and of the theoretical model using the draft version of the scale (Step 6, DeVellis, 2017). Fit indices were reported for both models, and the model derived from EFA had the best fit and was therefore used in the rest of this chapter. While some fit indices did not meet the threshold values suggested by Hu and Bentler (1999), when considered

alongside other findings, they provide support for the validity of the three latent factors in explaining key influences on SCOOL. Marsh, Hau and Wen (2004) have critiqued the rigid application of these cutoff values, arguing that goodness-of-fit indices should serve as guidelines rather than definitive decision rules. The modification indices procedure in Stata indicated that model fit could be improved by adding covariances between certain item pairs. However, following Jackson and colleagues (2009), who caution against excessive post-hoc model adjustments that may overfit the sample data, these modifications were not pursued, as other analyses supported the adequacy of the model fit for the present research.

In Step 7 (DeVellis, 2017), the consistency, reliability and validity of the SCOOL scale and its three factors were assessed. At Time 1, the overall SCOOL measure had very good internal consistency, as assessed by Cronbach's alpha, with similarly high values for each factor. Cronbach's alpha remained high in the Time 2 sample, indicating consistent internal consistency across resampling. As Cronbach's alpha tends to underestimate internal consistency where factors have fewer than 10 items, true values may be even higher. A future option would be to use an alternative measure of internal consistency such as McDonald's omega, or average inter-item correlation. The test-retest reliability was good for the overall scale, and for the Teacher and School factors. The test-retest reliability was a little lower for the Systemic factor, but still well within the acceptable range.

SCOOL scores were significantly correlated with individual nature connection, environmental concern, and the teacher autonomy scale. However, examining the strength of these correlations across the three SCOOL factors provided more nuanced insights. The moderate to high correlations among the three SCOOL factors suggest they measure related aspects of a unified construct, yet their associations with external measures indicate some divergence. As expected, nature connection and biospheric concern correlated with the Teacher factor but not with the School or Systemic factors. Teacher autonomy scores correlated with all three factors but were strongest for the Systemic factor, followed by the School factor, and weakest for the Teacher factor. Notably, the overall SCOOL scale and all three factors were significantly associated with the frequency of outdoor teaching, reinforcing the validity of the measure

7.4.3 Individual and school level predictors of perceived capability for outdoor learning

A number of individual and school level variables were shown to be predictive of SCOOL scores, and frequency of outdoor teaching. Whilst some of these findings align with existing literature, others have not previously been reported. The implications of these results for policy and practice are considered.

At the individual level, teacher age and nature connection were both positive predictors of SCOOL scores. As agency is "rooted in past experience" (Priestley et al, 2015: 20), older teachers, who have usually accrued more experience of teaching both inside and outside the classroom, may feel more able to achieve agency despite systemic constraints than younger colleagues. The association between nature connection and attitudes to outdoor learning aligns with previous findings (Barrable and Lakin, 2020; Barrable et al, 2022; Cont et al, 2023). This suggests that one possible route to increasing teachers' feelings of capability for outdoor learning could be for initial teacher training and outdoor learning initiatives to aim to increase teachers' personal connection to nature.

Looking beyond the individual teacher, to consider the wider school and systemic factors, teacher autonomy was also a positive predictor for all three factors of the SCOOL scale. This resonates with the qualitative findings of Study 1, but has not previously been reported. Pupil age group, school location and country all predicted capability for outdoor teaching. As hypothesised, teachers working with younger children had higher SCOOL scores. This aligns with the findings of Study 1, which indicated that teachers perceive greater barriers to outdoor learning for older students due to curriculum demands and standardized testing pressures. Teaching at a school located in a city was negatively associated with capability for outdoor learning. This aligns with Study 1 findings that a lack of local greenspace is a key barrier to outdoor learning for some schools situated in urban areas. Teaching at a school in Scotland, Wales or Northern Ireland (rather than in England) was a significant positive predictor for the Systemic factor of the SCOOL scale. This provides additional support for the findings of study 1, that teachers in England describe greater systemic barriers to outdoor learning. This is a novel finding that has not previously been reported.

Overall, these findings support the proposed ecological model of outdoor learning. They also provide evidence to support making environmental and systemic changes in order to increase teacher autonomy and reduce systemic barriers to outdoor learning.

7.4.4   Other findings of note

In addition to the aims stated in the introduction to this chapter, there were further incidental findings of interest, concerning frequency of outdoor teaching and teacher wellbeing, which are discussed briefly below.

This study provides much-needed data on current outdoor teaching rates in the UK, establishing a baseline for future research (see tables 7.5 and 7.6). The use of detailed response categories captured more nuanced variations in outdoor learning frequency compared to binary yes/no questions. While most teachers in the sample reported occasionally teaching outdoors, few did so regularly beyond the Early Years stage. Despite broad recognition of the benefits of outdoor learning, only 31% of primary teachers and 6% of secondary teachers reported teaching outdoors at least weekly. Differences in outdoor teaching rates between primary and secondary teachers are unsurprising, because of organisational differences between primary and secondary education in the UK. Whilst primary classes in state schools are almost always taught by a single teacher throughout the week, secondary classes have different specialist teachers of each subject. This has an impact on the flexibility of timetabling for outdoor lessons and trips. However, even within primary schools, there were marked differences by age group. Whilst 47% of teachers working with early years classes (children under 5 years) taught outdoors every day, only 8% of key stage 1 and 4% of key stage 2 teachers did so. These figures also include outdoor PE lessons, and there may be an argument for considering these lessons as distinct from other types of outdoor learning, as it is unlikely the natural environment plays a significant role. These quantitative data support the qualitative findings of Study 1 (chapter 5).

Whilst teacher wellbeing was not the primary focus of this study, the summary statistics reported in Table 7.4 highlight potential issues, with teachers in this sample reporting lower life satisfaction, lower happiness, and higher anxiety compared to UK population averages

(ONS, 2023). For life satisfaction, the teachers in Study 3 had a mean score of 6.5 out of 10 (UK average 7.5); for feeling that their life was worthwhile 7.0 (UK average 7.7); for happiness 6.5 (UK average 7.4). For anxiety (which is reverse scored, so higher scores indicate more anxiety), the mean for this sample was 4.3 compared to a UK average of 3.2. As nature connection and time in nature are both associated with greater wellbeing, increasing outdoor learning rates is a plausible strategy to increase teacher wellbeing as well as pupil wellbeing.

7.4.5   Conclusions

The final section of this chapter first considers the strengths and limitations of Study 3 before discussing further potential applications of the SCOOL scale.

The new SCOOL scale fills an important gap, offering a theoretically grounded and psychometrically validated measure of School Contexts of Outdoor Learning, with three constituent factors: Teacher, School and Systemic. The use of qualitative data from UK teachers grounds the SCOOL items in the real-world context and ensured that items are easily understood, and relevant to participants' day to day tasks. The scale demonstrates strong internal consistency, and excellent test-retest reliability. Its associations with other measures support the scale's convergent validity with other measures of relevance. Taken together, these indicators provide strong evidence for the SCOOL scale's validity as a measure of teachers' perceived capability for outdoor learning, as well as for the reliability and consistency of both the overall scale and its three separate factors.

However, the study design relied on opportunity sampling from a national recruitment platform, meaning there may have been some bias to participation, and the sample of teachers may not have been truly representative of the wider population. Future research should therefore focus on further validating the SCOOL scale in nationally representative and cross-cultural samples that incorporate more detailed demographic data.

This study confirmed that the SCOOL scale has good test-retest reliability over a short time period. However, it did not assess the stability of scores over an extended period, or their

responsiveness to intervention. In Study 4, the SCOOL scale will be used as part of an evaluation of the impact of Generation Wild on teachers. Chapter 2 highlighted a significant gap in high-quality research on teacher outcomes related to outdoor learning. Incorporating the SCOOL scale within a robust study design could help address this gap.

Understanding and addressing individual, school-level, and systemic barriers to outdoor learning is critical, as findings from this study reveal some inconsistencies between what teachers perceive as barriers and what actually influences their practice. Both the qualitative findings of Study 1 and the SCOOL factor scores suggest that teachers view systemic issues as the most significant barrier to outdoor learning. However, the results of EFA indicate that the Teacher factor accounts for the greatest proportion of variance in the data, and the Teacher factor is also the mostly strongly associated with outdoor teaching frequency. It seems that teachers' own perceptions of Systemic barriers may constitute a barrier in themselves, particularly if these Systemic issues are regarded by teachers as being unchangeable and insurmountable.

The following chapter 8 explores whether taking part in Generation Wild may change these perceptions, and thus increase SCOOL scores and frequency and duration of outdoor teaching. The Teacher factor seems the most likely to change through taking part in a relatively short-term, low-intensity outdoor learning programme. Generation Wild has the potential to bring about changes at the individual teacher level through provision of incentives, simple achievable outdoor activity ideas, and modelling successful outdoor learning during the wetland trip. In contrast, the Systemic factor is expected to remain stable, as issues such as curriculum pressures and standardised assessments are not targeted by programmes such as Generation Wild, delivered by third sector organisations. Addressing these barriers would require top-down systemic changes at the national policy level.

Chapter 8: Assessing the impact of Generation Wild on teachers

8.1   Introduction

8.1.1   Chapter summary

This chapter presents Study 4, which uses the new School Contexts of Outdoor Learning (SCOOL) measure as part of a pre-post design to measure the impact on teachers of participating in Generation Wild.

Chapter 2 summarised the literature on outcomes of nature-based learning interventions. There is strong evidence for a range of positive outcomes for children, including increased physical activity, better mental health and wellbeing, and improved educational attainment. However, despite teachers playing a key role in delivering school-based programmes, little is currently known about the impact on teachers. The few studies which have included teacher outcomes were limited by small sample sizes, lack of robust design, and failure to use validated outcome measures.

Chapter 4 (Study 1) found there was conflict between teachers' personal beliefs that spending in nature is beneficial for children, and the barriers they perceived as restricting opportunities for outdoor learning in practice. The SCOOL measure uses a three-level model (Teacher, School and Systemic) to assess teacher agency for outdoor learning. The ecological view of agency is used, with agency regarded as the product of individual capacity and the environment in which that individual works (Priestley et al, 2015). Chapter 7 (Study 3) showed that the SCOOL scale has good internal consistency and test-retest reliability, and is strongly associated with outdoor lesson frequency. These findings suggest that the SCOOL scale offers a useful outcome measure for teachers. In this chapter, the SCOOL scale is used to evaluate the effect of the Generation Wild nature connection programme on teachers.

8.1.2 The aims of Study 4

The main aim of Study 4 was to address Research Goal 3: Assessing the impact of taking part in Generation Wild on teachers' attitudes and behaviour towards outdoor learning, and their personal nature connection and wellbeing. WWT's stated aims for Generation Wild are to improve children's nature connection, care and concern for nature, and wellbeing. Building on the findings from Study 1 (chapter 4), it was hypothesised that engagement in the programme would similarly enhance teachers' connection to nature and wellbeing, while also potentially increasing their frequency and duration of outdoor teaching. Furthermore, it was hypothesised that taking part in Generation Wild would increase teachers' perceived capability for outdoor learning, as measured by the SCOOL scale. It is probably that most of this change will occur at the Teacher level of the ecological model, rather than the School or Systemic level, as Generation Wild does not focus on these levels.

A secondary aim of Study 4 was to assess the internal consistency and convergent validity of the SCOOL scale (and its three separate factors) with a different participant sample. This will provide further evidence for the psychometric properties of the scale, addressing Research Goal 2. DeVellis (2017) suggests that validation with other samples is an important part of the ongoing process of scale development and validation.

8.2   Method

8.2.1   Design

This study employed a pre-post design to evaluate the impact of the Generation Wild programme on teachers who were participating in the programme with their class. Teacher participants completed surveys at two timepoints: in the week immediately before their class visit to a wetland centre, and then approximately six weeks later. WWT recommends that class engagement in the programme should continue for around six weeks post visit, making this a suitable interval for assessing the programme's impact.

8.2.2 Participants and recruitment

All class teachers taking part in Generation Wild between February and July 2024 were invited to participate in this study (517 teachers from 274 schools). Ethical approval was provided by the Cardiff University School of Psychology Research Ethics Committee, and informed consent was obtained at the beginning of each survey. Participants were asked if they were willing to provide their school email address for the specific purpose of enabling linkage to school level data, and also so that the time 1 and time 2 responses could be linked for individual participants. However, there was also the option to withhold this information if participants preferred to remain anonymous.

The survey was completed by 220 teachers at Time 1, and 179 teachers at Time 2. Time 1 and Time 2 responses could be matched for 126 teachers from 104 schools. Participant characteristics for these samples are reported in Table 8.1.

Table 8.1. Teacher characteristics

Variable	Response	All time 1 teachers[12]	Linked time 1 and time 2 data[13]
Age in years	Mean (SD)	38.09 (9.59)	38.51 (10.02)
gender (%)	male	13	12
	female	87	88
	prefer not to say	1	0
Ethnicity (%)	White British	86	91
	White (other)	6	2
	Asian	5	4
	Black	0	0
	Mixed	3	3
	Prefer not to say	1	0
teaching experience	Mean (SD) in years	12.53 (8.87)	13.22 (9.04)
job role	Class teacher	63	61
	Teaching assistant	1	2
	Leadership	34	34
	Other	1	3
Age range taught (%)	Early Years	7	6
	Key stage 1	56	61
	Key stage 2	47	42
School nation (%)	England	91	91
	Wales	2	2
	Northern Ireland	7	7
School type (%)	Academy	32	30
	Local authority	67	68
	Missing	1	2

[12] Data for 220 time 1 participants
[13] Data for 126 participants with linked time 1 and time 2 data

School-level data on pupils eligible for free school meals, pupils who were of White British origin, and pupils for whom English was not their first language, were obtained from the school census data for England (DfE, 2024e). These school-level characteristics are presented in Table 8.2, with mean values for all English schools provided for comparison.

Table 8.2. Pupil characteristics for the schools where participants taught

Characteristic	All England mean[14]	Sample[15] mean (SD)	Sample range
% of pupils eligible for free school meals	24	41.5 (12.6)	23-72
% of pupils of White British origin	64	59.7 (30.7)	1-95
% of pupils with English not first language	21	25.7 (22.3)	10-98
% of pupils with SEND	13	21 (9.3)	6-41

8.2.3   Measures

Participants were asked to report school location and numbers of pupils attending; their own age, ethnicity and gender; their teaching experience, teaching role and the age group they taught.

Outdoor lesson frequency. Participants were asked, "How often do you teach lessons outdoors?" with categorical response options of "never", "very occasionally", "several times per term", "every week" and "every day". This data was used to assess change over time, and also to test convergent validity of the SCOOL scale and factors.

Subjects taught outdoors. Participants were asked, "Which subjects do you teach outdoors?" Seven categories were listed and participants could select as many as applied, "English/Literacy", "Maths/Numeracy", "Science", "Humanities", "Art/Technology", "Physical

---

[14] Mean value for all schools in England (DfE, 2023)
[15] Sample consists of 197 schools in England where teacher participants worked.

Education" and "Other". Therefore, as well as considering frequency at which different subjects were taught outdoors, it was possible to see whether individual participants taught a range of subjects outdoors.

Closeness to family was measured using the Inclusion of Others in Self item (Aron et al, 1992). Participants were asked to, "Choose the picture which best shows how close you feel to the other people in your family" from five pairs of circles with differing degrees of overlap.

Closeness to colleagues was measured using the Inclusion of Others in Self item (Aron et al, 1992). Participants were asked to, "Choose the picture which best shows how close you feel to your colleagues in school" from five pairs of circles with differing degrees of overlap.

Nature connection was measured using both the single item Inclusion of Nature in Self (Schultz, 2002) and the NR-6 nature relatedness scale (Nisbet & Zelenski, 2013). For the INS, participants were asked to, "Choose the picture which best shows how close you feel to nature" from five pairs of circles with differing degrees of overlap. For the NR-6, participants were told, "We would like to understand more about your personal relationship with nature. To what extent do you agree or disagree with the following statements?" and presented with six statements, which they responded to on a five point scale from strongly disagree to strongly agree. An example item is, "I feel very connected to all living things and the earth."

The Inclusion of Others in Self items were presented on the same page as the Inclusion of Nature on Self item, and were included to help participants understand the item format, which can appear unusual and confusing otherwise.

School Contexts of Outdoor Learning Participants completed the full draft 31 item version of the SCOOL scale (see table 6.2). However, scores were calculated using only the 18 items in the 3 factor model reported in table 7.2. For each item, participants were told, "We would like to understand your beliefs and knowledge about teaching outdoors. Please answer to what extent you agree or disagree with each statement." Participants gave responses on a five-point Likert scale with ends labelled strongly agree to strongly disagree.

Time spent in nature was measured with two items. The first asked, "In the last year about how often have you spent time in nature?" (Meis-Harris et al, 2021). Responses were given using seven categories ranging from 'never', through to 'every day'. The second item asked, "Yesterday, did you spend time in nature?" and participants gave a binary yes or no response (after White et al, 2019). These items were used to assess change over time.

Subjective wellbeing was assessed through four items used in Office for National Statistics surveys, and frequently employed in other studies examining nature connection and wellbeing (ONS, 2011; White et al, 2019). These items are all answered on a 0-10 scale and ask:

-Overall how anxious did you feel yesterday?
-Overall how happy did you feel yesterday?
-Overall how satisfied are you with life nowadays?
-Overall to what extent do you feel that the things you do in your life are worthwhile?

Environmental concern was measured with the biospheric concern subscale of the Environmental Concern scale (Schultz, 2001). Items used the stem, "I am concerned about environmental problems because of the consequence for…" and ended with different natural entities, such as plants, marine life, birds and animals. Participants were asked to rate each item on a seven-point scale, from 'not important' to 'supreme importance'. This data was used to assess change over time, and also to test convergent validity of the SCOOL scale and factors.

All the other measures were used at both time 1 and time 2. The additional three items described below were presented in the Time 2 survey only.

Change in confidence item: Participants were asked to rate on a five-point scale how confident they felt about teaching outdoors now, as compared to before taking part in Generation Wild.

Change in preferred frequency of outdoor teaching item: Participants were asked to rate on a five-point scale how often they would like to teach outdoors in the future as compared to before taking part in Generation Wild.

Open-ended item: This item sought to elicit qualitative responses about teachers' experiences by asking, 'Can you describe one moment that sums up the experience of Generation Wild?'

8.2.4   Procedure

Teachers participating in the Generation Wild programme were contacted seven to ten days before their wetland visit date and asked to complete the Time 1 survey. They were contacted again six weeks after their wetland visit and asked to complete the Time 2 survey. For teachers whose visit date fell towards the end of the summer term, the recall period was shortened to four weeks, allowing the Time 2 invitation email to be sent before the school term finished.

The survey was presented using Qualtrics (https://www.qualtrics.com). Item wording and response options are provided in appendix 6.

The survey began with an eligibility check, followed by an information and consent page. Participants were then presented with the demographic items to be used as independent measures, followed by the dependent measures. Measures were presented in the same order for all participants, as shown in the materials section, but items within each scale were presented in randomised order. The survey took an average of six minutes to complete, and participants were offered an incentive payment of a £5 shopping voucher if they completed both surveys.

8.2.5   Analysis

All data handling and statistical analyses were conducted in SPSS version 27. Data were cleaned by removing unfinished submissions. Two instances of repeated submission at Time 1, and three instances where the Time 1 survey was completed late (i.e. after the class wetland visit had taken place) were also removed. The amount of missing data in the remaining cases was < 0.1%.

For existing validated measures, scale scores were generated following the authors' guidelines. In the case of the SCOOL scale, negatively valenced items were reverse-scored, and unit-weighted mean scores were calculated for each factor as well as for the overall scale, as described in Chapter 7.

Of the 220 teachers who completed the Time 1 survey, 126 were successfully matched with Time 2 data. To assess potential bias caused by participant attrition, mean values of outcome measures at Time 1 were compared between the 126 participants who completed the Time 2 survey and the 94 who did not. Group mean values for dependent and independent measures were analysed using independent samples t-tests for continuous variables and chi-square tests for categorical variables.

To fulfil the main aim of addressing Research Goal 3 - the impact of taking part in the Generation Wild programme for teachers- values of Time 1 and Time 2 outcome measures were compared using paired samples t-tests for the 126 participants with data linked at both time points.

The open text responses were also coded, and data relating to the impact of taking part in Generation Wild for teachers is briefly presented.

To measure internal consistency of the SCOOL scale, Cronbach's alpha was calculated for the overall SCOOL scale, as well as for the three separate factors, for both Time 1 and Time 2 data. To test convergent validity, correlations were calculated between the overall SCOOL and SCOOL factors scores and other measures of relevance such as outdoor teaching time,

and personal nature connection. Pearson's r was calculated where data were continuous, and Spearman's rho where data were ordinal.

8.3 Results

8.3.1 Descriptive statistics

Table 8.4 reports descriptive statistics for all continuous outcome measures at Time 1 and Time 2. Comparable statistics were reported for the sample of UK teachers in Study 3 in table 7.4.

Table 8.4. Descriptive statistics for all continuous outcome measures

measure	Possible range	Time 1 (n=220) mean (SD)	Time 2 (n=179) mean (SD)
INS (nature connection)	1 - 5	3.04 (1.05)	3.12 (.96)
NR6 (nature relatedness)	1 - 5	3.48 (.79)	3.57 (.74)
Biospheric concern	1 – 7	5.95 (1.02)	5.97 (1.03)
Life satisfaction	0-10	6.74 (1.83)	7.02 (1.73)
Life worthwhile	0-10	7.32 (1.73)	7.48 (1.62)
Happiness	0-10	6.80 (2.05)	7.25 (1.90)
Anxiety	0-10	4.41 (2.73)	4.12 (2.59)
SCOOL overall	1– 5	3.17 (.52)	3.23 (.50)
SCOOL Teacher factor	1 – 5	3.25 (.64)	3.38 (.61)
SCOOL School factor	1 – 5	3.53 (.73)	3.44 (.70)
SCOOL Systemic factor	1-5	2.45 (.77)	2.57 (.82)
Hours of outdoor lessons	open	1.43 (1.53)	2.13 (1.97)
Subjects taught outdoors	0-12	3.84 (2.09)	4.20 (2.04)

As in Study 3, scores on the SCOOL Systemic Factor were lower than scores on the other two factors. However, in this study, SCOOL School Factor scores were higher than SCOOL Teacher Factor scores, whereas in Study 3, the Teacher Factor scores were highest.

Table 8.5 reports frequency of outdoor teaching. Comparable statistics for the general UK sample of teachers in Study 3 were reported in table 7.5.

Table 8.5. Frequency of teaching outdoor lessons

Frequency (%)	Study 4 Time 1 (n=220)	Study 4 Time 2 (n=179)	Study 3 primary sample (n=186)
Never	4	1	4
Very occasionally	52	47	31
Several times per term	33	36	24
At least each week	12	16	31
Every day	0	0	11

This data suggests very low rates of outdoor teaching for the current sample of teachers working in schools in economically disadvantaged areas. In comparison, 42% of primary teachers in Study 3 reported teaching outdoors at least once a week.

Table 8.6 reports the frequency at which individual teachers reported they had spent time in nature over the last year.

Table 8.6. Frequency of individual time in nature

Frequency (%)	Time 1 (n=220)	Time 2 (n=179)
A few times a year	9.1	4.1
At least once a month	12.7	11.5
At least once a fortnight	7.7	11.5
At least once a week	30.9	27.9
A few times per week	30.0	32.0
Every day	9.5	13.1

Despite low rates of outdoor lessons, most teachers reported that they spent time in nature, with over 70% reporting that they did so at least once a week over the last year.

Attrition analysis

No significant difference was found in participant age or gender between the 126 participants who returned to complete the Time 2 survey and the 94 who did not. Nor was any significant difference found for nature connection, wellbeing, environmental concern, overall SCOOL score, SCOOL Teacher factor or SCOOL School factor. However, teachers belonging to BAME groups were less likely to return at Time 2 (chi square=3.978, df=1, p=.046), as were teachers with lower scores on the SCOOL Systemic factor (t=227.128, p=.027).

8.3.2   Time 1-Time 2 comparison

Table 8.7 reports mean values of outcome measures before and after taking part in Generation Wild, and outcomes of paired samples t-tests, for 126 participants with data at both timepoints.

Table 8.7. Comparison of outcomes for 126 teachers pre and post Generation Wild

	Time 1 mean (SD)	Time 2 mean (SD)	Effect size (Cohen's d)	Significance (p)
Nature connection (INS)	3.04 (1.06)	3.14 (1.02)	.129	.152
Nature connection (NR6)	3.44 (.80)	3.59 (.75)	.285	.002**
Biospheric concern	5.91 (1.14)	5.94 (1.04)	.032	.720
Personal time in nature	4.86 (1.40)	5.11 (1.33)	.213	.018*
Duration outdoor teaching	1.69 (2.36)	2.26 (2.08)	.340	<.001***
Subjects taught outdoors	3.84 (2.09)	4.20 (2.04)	.167	.064
Satisfaction	6.80 (1.86)	7.10 (1.74)	.243	.007**
Worthwhile	7.31 (1.77)	7.58 (1.65)	.235	.010*
Happy	6.83 (2.14)	7.18 (2.04)	.190	.036*
Anxious	4.37 (2.75)	4.20 (2.66)	-.053	.556
SCOOL Teacher factor	3.26 (.67)	3.39 (.60)	.247	.007**
SCOOL School factor	3.52 (.72)	3.48 (.68)	-.097	.283
SCOOL Systemic factor	2.34 (.69)	2.53 (.78)	.271	.003**
SCOOL overall	3.15 (.52)	3.22 (.49)	.227	.014*

*p<.05   **p<.01   ***p<.001

After taking part in Generation Wild, teachers reported improved wellbeing as measured by three items (life satisfaction, sense that their life is worthwhile, and happiness). There was no significant change in reported anxiety scores.

Teachers also reported increased nature connection, as measured by the NR-6 scale, and that they were spending more personal time in nature than before Generation Wild. There was no significant change in nature connection as measured by the INS, or in biospheric concern.

Overall scores on the SCOOL scale increased after taking part in Generation Wild. Scores on the Teacher and Systemic factors also increased at Time 2, but there was no change in scores on the School factor. Teachers reported increased duration of outdoor teaching, but there was no significant change in the number of subjects taught outdoors.

In response to the item, "How confident do you feel now about teaching outdoors?" 72% of participants said they felt a little more confident after taking part in Generation Wild, and 7% said they felt a lot more confident than before. 20% said there was no change in their confidence, and a single participant said they felt less confident than before.

In response to the item, "How often would you like to teach outdoors going forwards?" 68% of teachers said they would like to do so a little more than before Generation Wild, and 18% said they would like to teach outdoors a lot more. 13% said they would not want to change, and a single participant said they would prefer to teach outdoors a little less than before.

8.3.3   Open text responses

The open text responses provided evidence to support Generation Wild having a positive impact on teachers through two mechanisms: giving teachers ideas and increasing teacher confidence.

Teachers mentioned that taking part in Generation Wild had given them ideas for nature activities to use with their class:

> *"I now know lots of activities that I can do in the outdoors, especially on our school grounds."*

> *"It has given us lots of new ideas to incorporate into our planning"*

> *"The ideas for the badges help with ideas for outdoor learning."*

Teachers also mentioned that after taking part in Generation Wild, they felt more confident to teach outdoors:

"I now feel a little more confident in teaching outside of the classroom."

"It has given me the confidence to take them outside and enjoy nature more often."

8.3.4   Reliability and validity of the SCOOL scale and factors

Table 8.8 reports internal consistency at Time 1 and Time 2 for the overall SCOOL scale, and for the three separate factors.

Table 8.8. Internal consistency of the SCOOL scale and factors

	Cronbach's alpha Time 1 (n=220)	Cronbach's alpha Time 2 (n=179)
SCOOL scale overall	.826	.819
SCOOL Teacher factor	.796	.809
SCOOL School factor	.770	.737
SCOOL Systemic factor	.748	.777

Values of Cronbach's alpha, indicating internal consistency, were good for the overall scale and for the three separate factors at both timepoints.

Table 8.9 reports the value of Pearson's correlations between overall SCOOL and SCOOL factor scores and outdoor teaching time, nature connection, environmental concern and individual time in nature.

Table 8.9. Correlations between SCOOL scores and other measures at Time 1[16]

	SCOOL Teacher	SCOOL School	SCOOL Systemic	SCOOL overall
Nature connection (INS)	.529***	.054	.140	.382***
Nature connection (NR6)	.504***	.037	.149	.350***
Biospheric concern	.250**	.106	-.033	.181*
Time in nature	.504***	.061	.121	.355**
Outdoor teaching time	.363***	.209*	.241**	.365***

*p<.05   **p<.01   ***p<.001

The Teacher factor showed a moderate association with measures of nature connection and environmental concern, and with personal time in nature, whilst the School and Systemic factors did not. All three factors, and the overall SCOOL scale, were significantly associated with outdoor teaching time (although the magnitude of these correlations was small).

8.4   Discussion

This chapter has reported Study 4 which used the newly developed SCOOL scale as an outcome measure in a pre-post design with teachers before and after taking part in Generation Wild. The primary aim of this study was to address Research Goal 3: Assessing the impact of taking part in Generation Wild on teachers' attitudes and behaviour towards outdoor learning, and their personal nature connection and wellbeing. The analysis showed significant changes for a wide range of outcomes, including teacher wellbeing, nature connection and outdoor teaching time. Data from this study were also used to confirm the internal consistency and validity of the SCOOL scale (and its factors) for a different participant sample. Additionally, this study provided a further dataset on outdoor teaching frequency, subjects and duration in UK primary schools.

---

[16] Data from 220 participants

8.4.1 The impact of Generation Wild on teachers

After taking part in Generation Wild, teachers reported improved wellbeing as measured by three items (life satisfaction, sense that their life is worthwhile, and happiness). Teachers also reported increased nature connection, as measured by the NR-6 scale, and that they were spending more personal time in nature than before Generation Wild. These impacts on teachers have not previously been reported in quantitative studies evaluating the effects of outdoor learning.

Overall scores on the School Contexts of Outdoor Learning (SCOOL) scale increased after taking part in Generation Wild, indicating that teachers' feelings of capability for outdoor teaching had increased. Considering the separate factors of the scale, scores on the Teacher and Systemic factors also increased at Time 2, but there was no change in scores on the School factor. This increase in the Teacher factor scores aligns with responses to the two subjective items, which suggested that teachers felt more confident about teaching outdoors, and wanted to do more outdoor teaching, after taking part in Generation Wild. Responses to an open-ended question also provided evidence for Generation Wild having an impact on teachers.

The increase in Teacher factor scores, and the lack of change in School factor scores were hypothesised, and fit with the theoretical model. There are a number of plausible mechanisms through which Generation Wild could increase individual teachers' sense of capability for outdoor learning. Responses to the open-ended item supported two distinct pathways: that Generation Wild gave teachers ideas for outdoor lesson activities, and that participation in the programme increased teacher confidence for outdoor learning. There are no likely mechanisms for the programme to bring about change at the School or Systemic level (and nor does it aim to). Therefore, the increase in scores for the Systemic factor was unexpected. A better explanation could be that as the Systemic factor of the SCOOL scale is measuring teachers' attitudes to the wider education system, it is these attitudes that change through taking part in the programme, with teachers feeling less constrained by the system. As well as these changes in attitudes, teachers also reported that they taught outdoors more frequently, and for longer duration, after taking part in

Generation Wild. These changes to teachers' attitudes and behaviour could have an impact on the children in the teacher's class, by increasing engagement with Generation Wild. Future work should investigate whether these changes to teachers' attitudes and behaviours relating to outdoor learning are sustained beyond six weeks. If the changes persist, this has the potential to impact children in future classes taught by that teacher- even if the children themselves have not taken part in Generation Wild.

8.4.2   Internal consistency and validity of the SCOOL scale

Study 4 also provided an opportunity to confirm the psychometric properties of the SCOOL scale, addressing Research Goal 2b. Internal consistency of the overall scale and the three separate factors were good in this sample at both timepoints, providing further psychometric evidence, in addition to that reported in chapter 7 (Study 3). Correlations with criterion measures also followed the same pattern as in Study 3, with the Teacher factor associated with measures of nature connection and environmental concern, and personal time in nature, whilst the School and Systemic factor were not. As in Study 3, all three factors and the overall SCOOL scale were significantly associated with outdoor teaching time.

As Study 3 had shown SCOOL scores to be consistent over time, the finding of significant differences in SCOOL scores between Time 1 and Time 2 in the current study suggests that SCOOL scores are malleable through intervention. This supports the use of the SCOOL scale as an outcome measure to detect change in teachers' attitudes and beliefs about outdoor teaching.

8.4.3   Strengths and limitations

Study 4 used a robust design and psychometrically validated measures to assess the impact on teachers of taking part in a nature connection programme. Chapter 2 identified several limitations in existing research evaluations of environmental education programmes. These included: small sample sizes, lack of a control group, failure to use validated measures, lack of longer term follow-up. The design of Study 4 sought to overcome these issues. It was

successful in collecting data from a far larger sample of teachers than previous studies; response and retention rates were also higher than in previous research with teachers (Marchant et al, 2019; McKaskill et al, 2023; White, Eberstein and Scott, 2018). The study used validated measures, including the newly developed SCOOL scale. It was expected that teachers may have had a positive affective response to the class wetland trip element of Generation Wild, as Study 1 showed the free trip was particularly valued. Therefore the post intervention data were collected after six weeks, rather than within days of the wetland visit, in order to measure longer term impact rather than immediate affective response.

A particular strength of this research was the inclusion of a diverse sample of teachers working in a variety of schools. The school level data reported in table 8.2 serves as a reminder that although each school met Generation Wild's eligibility criteria of relative economic disadvantage, the participating schools were not a homogeneous group but showed considerable variation. The percentage of children in each school eligible for free school meals varied from 20 to 76%; the percentage of children of White British origin varied from 1 to 98%; and the percentage of children for whom English was not their first language ranged from 0 to 85%. In addition, schools were located across five regions of England, as well as South Wales and Northern Ireland. These differences between Generation Wild schools also emerged from the teacher interview data in Study 1.

However, there were limitations with the design of this study meaning that caution must be exercised in interpreting these results. The use of a control group would have improved this research design and strengthened the conclusions. However, this research took place in the context of a real-world educational initiative with a small budget for research costs. Despite consideration of several options, no solution could be found to enable the inclusion of a true control group of teachers from comparable schools in this study. The absence of a control group limits the ability to make causal inferences, meaning that the observed pre-post changes cannot be definitively attributed to participation in Generation Wild. A possible confounding variable was that teachers' participation in Generation Wild took place from January to June, and both seasonal change and the stage of the school year may have influenced some outcome variables such as wellbeing and nature connection. Therefore alternative explanations should be considered, and future research could be designed to

avoid such potential confounds- which were unavoidable in the current research because of the external constraints on programme delivery. Chapter 9 will discuss how the design of future programme evaluations might be approached to overcome this issue. However, some reassurance can be gained from the findings of Study 3, which found the outcome measures used to be stable over time for a group of participants who were not known to have received any environmental education intervention.

A second limitation is the use of self-report measures to assess socially desirable constructs, introducing the risk of response bias. Social desirability has been documented to be a confounding factor within psychological research into both wellbeing (Moser et al, 2024) and environmental attitudes and behaviours (Vesely & Klockner, 2020). Teachers' responses may also have been influenced by gratitude that they had received a free class trip (and perhaps hoped to participate again in the following school year).

As is often the case in longitudinal designs evaluating existing initiatives in a real-world situation, both non-response and attrition were potential causes for concern. Of over 500 teachers participating in Generation Wild who were initially contacted, 43% completed the Time 1 survey, of whom 57% could be identified as completing the Time 2 survey. Not all of these 'missing' participants necessarily represent genuine dropouts from the research but could be merely a preference for anonymity (as data could only be linked if participants waived their anonymity). Attrition analysis showed that black and minority ethnic (BAME) participants who had completed the Time 1 survey were less likely to be identified as returning at Time 2. This is a cause for concern and could potentially bias the sample and reduce the validity of findings. In future work, this issue could be addressed through oversampling BAME participants, or weighting results.

The final sample size was sufficient to allow robust comparisons between Time 1 and Time 2, and was considerably larger than sample sizes in previous studies (see Chapter 2). However, participant numbers were too small to have the statistical power necessary for analyses comparing demographic groups, such as comparing teachers working in schools in England versus other nations. These therefore remain interesting questions for future work.

8.4.4 Conclusions

This study has measured the impact on teachers of taking part in Generation Wild. It also yielded further validation data for the SCOOL scale, and served to establish the suitability of the SCOOL scale as an outcome measure when assessing the impact of outdoor learning on teachers. Finally, it has provided further data into outdoor teaching practices across a diverse sample of UK primary schools serving economically disadvantaged communities. Reported frequency of outdoor lessons in this sample was notably lower than in Study 3, suggesting that teachers in these schools may face greater barriers to outdoor learning than the general UK sample. Based on these findings, there still remains a need for more rigorous designs to establish the enduring impact of programmes such as Generation Wild on teacher outcomes of outdoor learning, using the ecological model of outdoor learning as a framework to explore Teacher, School and Systemic factors. Chapter 9 will discuss the findings of all five study chapters, making suggestions for future research directions.

Chapter 9: Discussion

9.1 Chapter introduction and aims

This thesis has explored the role played by primary school teachers in facilitating children's nature experience through outdoor learning, and documented the development of the School Contexts of Outdoor Learning (SCOOL) measure. This concluding chapter brings together the results of the six studies presented in chapters 4 to 8. Section 9.2 summarises how the findings of these studies met the three research goals, emphasising how the series of studies fit together within the overall sequential mixed methods design. The novel contributions of this research are highlighted in section 9.3. This section discusses the findings in the context of existing literature and interprets them from an ecological systems perspective. Section 9.4 considers the strengths and limitations of both the overall mixed methods design, and the specific research methods of each separate study. Section 9.5 suggests directions for future research building on the findings presented in this thesis. Section 9.6 looks wider, considering the potential application of these findings. It offers evidence-based recommendations for the design of future environmental education programmes. Finally, section 9.7 presents a brief concluding statement, advocating for changes to education policy in order to increase rates of outdoor learning.

9.2 Summary of research findings

9.2.1 The specific research goals of this thesis

This thesis had three main research goals. **The first research goal** was the qualitative exploration of teachers' perceptions and experiences about schools as sites for enabling disadvantaged children to spend time in nature. The overarching aim was divided into three specific areas of interest:

- **1a)** Teachers' perceptions and experiences of how children benefit from time in nature.

- **1b)** Teachers' perceptions and experiences of how disadvantage affects children's access to nature, and how outdoor teaching can help address inequalities in access to nature.

- **1c)** Teachers' perceptions and experiences of the barriers and enablers to outdoor teaching in UK primary schools.

The **second research goal** was the development of a novel quantitative measure of School Contexts of Outdoor Learning (SCOOL), based on an ecological model of the barriers and enablers of outdoor learning. This was broken down into two subgoals, representing distinct stages in the process:

- **2a)** The development, testing and reduction of items for the SCOOL scale;
- **2b)** The psychometric validation of the SCOOL scale.

The third (and final) research goal focused specifically on assessing the impact of WWT's Generation Wild programme on outcomes for participating teachers:

- **3)** Assessing the impact of taking part in Generation Wild on teachers' attitudes and behaviour towards outdoor learning, and their personal nature connection and wellbeing.

The following sections summarise the research findings relating to each research goal in turn.

9.2.2 Research Goal 1: The qualitative exploration of teachers' perceptions and experiences about schools as sites for enabling disadvantaged children to spend time in nature.

Chapter 4 reported Study 1, which addressed Research Goals 1a and 1b. It consisted of semi-structured interviews with 25 teachers working in primary schools in relatively disadvantaged areas who were taking part in Generation Wild. The qualitative interview data were analysed inductively using reflexive thematic analysis, and four broad themes generated. Theme 1 described teachers' observations about how nature affects children's behaviour and has a positive impact on children's wellbeing. Theme 2 conveyed the barriers experienced by disadvantaged children and families in accessing both nature, and other opportunities. It also explored how teachers work to counter these barriers and provide their disadvantaged pupils with a wider range of experiences. Theme 3 explored the ongoing impact of COVID-19 lockdowns, and how teachers saw nature as part of children's recovery from this time. Theme 4 articulated the conflict expressed by participants: although teachers understood very well how the disadvantaged children they taught could benefit from time in nature, in practice they often felt unable to deliver this to any meaningful extent due to the structural constraints imposed by the wider education system. It was the conflict expressed within this final theme that prompted a further deductive thematic analysis of this data set.

Chapter 5 reported this second analysis of the Study 1 data, addressing Research Goal 1c. Following a review of the literature on barriers to outdoor teaching and learning, an ecological model of outdoor learning was proposed. The model described challenges and enablers occurring at three levels: the individual teacher, the school environment, and national education policy and systems. Three themes were constructed from a deductive coding of the data, mapping onto the three levels of the ecological model.

9.2.3 Research Goal 2a: The development and testing of items for the SCOOL scale

All the research described in this thesis ultimately contributed to the development and validation of the School Contexts of Outdoor Learning (SCOOL) scale, an instrument

designed to capture the multi-level influences on teachers' capacity to deliver outdoor learning in primary schools. The development of the scale was based on the ecological model of outdoor learning, which conceptualises barriers and enablers to outdoor learning operating at the individual, school, and national levels, with a particular emphasis on teachers as agents in providing children with equitable access to nature.

The development and validation of the SCOOL scale followed the systematic seven-step process outlined by DeVellis (2017) to ensure that the final instrument is both theoretically grounded and psychometrically robust. Initial constructs were identified through qualitative interviews (Study 1). A broad item pool was generated using both inductive insights and deductive guidance from the literature, supported by an additional short survey (Study 2i). Subsequently, items were refined through cognitive interviews (Study 2ii) and expert review (Study 2iii) to ensure clarity, relevance, and content validity. The resulting draft scale was then administered in a large national survey (Study 3), with exploratory and confirmatory factor analyses used to determine and refine the scale structure alongside its reliability and validity.

Findings from Study 1 highlighted that primary teachers widely recognised the benefits of outdoor learning for pupils' wellbeing, academic engagement, and behavioural outcomes. However, teachers' capacity to implement it was shaped by a complex interplay of factors operating across the individual, school, and national levels. At the individual teacher level, confidence, training, and personal connection to nature emerged as significant enablers. However, these were often constrained by resource limitations, risk-averse school leadership, and systemic pressures, including curriculum demands and accountability measures at the national level.

Studies 2i–2iii focused on item generation and refinement. An initial pool of items that were generated through the qualitative interviews and a short survey was refined and reduced through cognitive interviews and expert review. Cognitive interviews identified items that were unclear, redundant, or poorly aligned with the target population. Further expert panel review refined wording, balanced item valence, and strengthened the national context factor. These processes resulted in a 31-item draft version of the SCOOL scale.

In Study 3, exploratory and confirmatory factor analyses supported a three-factor solution consistent with the ecological model of outdoor learning. The final 18-item instrument demonstrated reasonable fit, high internal consistency, and strong test-retest reliability over a two-week interval. Criterion validity was established through significant correlations with nature connection, environmental concern, teacher autonomy, and frequency of outdoor teaching. Study 4 also addressed Research Goal 2 through enabling further validation of the new SCOOL measure, with a different sample; and establishing that the SCOOL measure can be used as an effective tool to assess impact over time.

9.2.4   Research Goal 3: Assessing the impact of taking part in Generation Wild on teachers' attitudes and behaviour towards outdoor learning, and their personal nature connection and wellbeing.

Chapter 8 reported Study 4, the final phase of the sequential mixed methods design. Study 4 used a pre-post survey design to measure outcomes for teachers taking part in Generation Wild, to assess the impact of the programme. After taking part in Generation Wild, significant changes were found across a range of measures. Scores increased on the Teacher and Systemic factors of the SCOOL scale, suggesting that teachers felt more individually capable of teaching outdoors, but also perhaps more able to overcome or ignore systemic constraints. Teachers also reported increased personal nature connection, improved wellbeing and greater outdoor teaching time.

9.3   The novel contributions of this research

This section initially focuses on the major contributions of this research, the ecological model of outdoor learning and the SCOOL scale, but then goes on to acknowledge further contributions of note.

9.3.1 Key contributions: the ecological model of outdoor learning and the SCOOL scale

This research makes three major interconnected contributions to the existing literature on outdoor learning, addressing key gaps which were identified in chapter 2. Firstly, through conceptualising teacher agency, or capability, as an ecological construct being shaped through interactions and processes at multiple systemic levels. Secondly, the development and validation of the first psychometric instrument designed to measure teachers' capacity to facilitate outdoor learning. Thirdly, providing empirical evidence about how individual, school, and systemic factors shape outdoor teaching practice.

First, by adopting an ecological systems perspective, this study addresses a notable gap in the literature, which has frequently examined enablers and barriers to outdoor learning in isolation (Oberle et al, 2021; Patchen et al, 2024; Prince, 2019). The proposed ecological model integrates individual-level influences such as teacher confidence, training, and nature connection with school-level resources, leadership attitudes, and risk cultures, as well as national-level factors such as national-level curriculum, policy, and accountability pressures. This approach aligns with theories of teacher agency (Biesta et al, 2015; Priestley et al, 2015), that emphasise the interaction between personal capacities and structural affordances in shaping professional action. It also reflects the 'people, place, and policy' model of challenges associated with teaching outdoors in natural environments (Edwards-Jones et al, 2022).

Second, this research provides a measurement tool for systematically assessing teachers' perceived enablers and barriers to outdoor learning. It captures variation between teachers and schools in its provision, and evaluates the impact of school-mediated nature interventions on teachers themselves. The SCOOL scale captures variation between teachers and schools in their provision of outdoor learning and enables the evaluation of school-mediated nature interventions on teachers themselves. In doing so, it extends evaluation of environmental and nature-based education programmes beyond the more usual focus on child outcomes. The SCOOL scale captures structural and institutional conditions alongside individual-level factors that have previously been identified in qualitative research but rarely operationalised to enable large-scale quantitative analysis. This offers new prospects for

identifying the role of teachers and schools in delivering outdoor learning and for evaluating how these factors contribute to the success of nature engagement programmes in achieving positive child outcomes. For example, the scale could be used to examine whether outdoor learning interventions alter teachers' perceptions of what is possible within their systems, thereby enhancing not only children's wellbeing but also teacher confidence and agency.

Third, the empirical findings obtained using the SCOOL scale offer new insights into patterns of capability across contexts. Notably, while nature connection and environmental concern were positively associated with the Teacher factor they were not significantly related to either the School or Systemic factors. In contrast, teacher autonomy and frequency of outdoor lessons were positively associated with all three factors and with the overall SCOOL score. This suggests that teachers' personal nature connectedness and environmental concern are primarily individual-level attributes whereas autonomy and teaching practice are also shaped by broader institutional and policy-level factors. Furthermore, while most teachers expressed strong support for outdoor learning, capacity to implement it regularly was lower among those teaching older pupils working in urban settings: patterns consistent with previous findings of declining outdoor learning with age and increased performativity pressures (Prince, 2019; Waite, 2020). Importantly, teachers outside England reported higher levels of systemic support that most likely reflecting differences in curricula and inspection regimes across the UK nations (Bilton & Waters, 2017; Greer et al, 2023; Prince & Diggory, 2024). Across all contexts, teacher autonomy emerged as a particularly strong enabler of outdoor learning. This reinforces self-determination theory's proposition that autonomy supports intrinsic motivation, extending this principle to the domain of outdoor pedagogy (Worth & Van den Brande, 2020).

Taken together these contributions position the SCOOL scale as a theoretically informed and empirically grounded instrument that can enhance understanding of the multi-level influences shaping outdoor learning in schools. It can help bridge the gap between the documented benefits of nature contact for children and the practical realities of delivering outdoor learning within contemporary educational systems.

9.3.2 The impact of Generation Wild on teachers

A further use of the SCOOL scale is as an outcome measure to assess change over time. An additional gap in the literature identified in chapter 2 was the scarcity of research on the impact of teaching outdoors on teachers themselves. As individual teachers are critical in delivering outdoor learning over sustained periods, the lack of knowledge around their beliefs, motivations and agency is a significant gap in understanding how to increase rates of outdoor learning. The role played by teachers in ensuring children's ongoing engagement with the Generation Wild programme, beyond the wetland visit, was described in chapter 1. Study 4 was designed to address this gap, collecting data from teachers before and after taking part in Generation Wild. This study used validated outcome measures, including the new SCOOL measure, and aimed for a larger sample size to avoid the limitations of previous evaluations (see chapter 2).

Study 4 found that teachers' personal nature connection increased, and wellbeing improved after taking part in Generation Wild. There are many reasons why improving teachers' wellbeing should be a high priority, and this is an important finding. Teacher wellbeing has been shown to influence child wellbeing (Roffey, 2012), educational outcomes (Braun et al, 2021; Glazzard & Rose, 2019) and retention in the profession (Dreer, 2023). There is substantial evidence that teachers' wellbeing was impacted by the COVID pandemic (De Oliviera-Silva et al, 2021; Katsarou et al, 2023). In addition, there is currently serious concern over the recruitment and retention of teachers in England (McLean & Worth, 2025). Stress, anxiety and depression are a leading cause of teacher sickness absence in England, responsible for over 2 million days of absence each year (Department for Education, 2024f).

Teachers also reported that by the end of the six-week GW programme, they spent more time teaching outdoors than before the programme began, which has a direct impact on children in their class. In addition, there were significant changes to teachers' perceived capability for outdoor teaching, as measured by the SCOOL scale. Scores on the Teacher factor of the SCOOL scale increased after taking part in Generation Wild. As personal nature connection was a strong predictor for Teacher factor scores, this is unsurprising. However, scores also increased on the Systemic factor of the SCOOL scale, suggesting that engagement

with the programme may have reduced the extent to which teachers regard systemic issues as a barrier to teaching outdoors. As the greatest barriers perceived by teachers were at this Systemic level, this is a significant finding. These findings of increased capability for outdoor teaching are valuable, as initiatives which can increase teachers' sense of their own capability are likely to have longer term sustained impact through increased rates of outdoor learning. These changes to teachers' own attitudes and behaviour offer new mechanisms for impact, and justify the further use of the SCOOL scale across wider contexts. Directions for future research will be discussed in section 9.5.

9.3.3   Additional contributions

An additional gap identified in the literature review was the scarcity of data on the current prevalence of outdoor learning in the UK, with a particular lack of data on English schools. Although not one of the original research aims, an important contribution of this research was the collection of two data sets on outdoor learning prevalence across a range of UK schools. Studies 3 and 4 provided quantitative data on outdoor teaching for two different samples of teachers in UK schools, which can serve as a benchmark for future research. These data supported the qualitative findings of Study 1- that despite understanding the benefits for children, many teachers were doing little or no outdoor learning in practice. In Study 3, only 44% of primary teachers reported teaching outdoors at least once a week. Additionally, the frequency of outdoor lessons was negatively predicted by pupil age, i.e. as children get older, they spend less time learning outdoors. This was true even between primary age groups, with Early Years staff reporting teaching outdoors most frequently, and KS2 staff least frequently. The findings of Study 1 suggest that this is due to systemic barriers, particularly the perceived need to focus on preparing children for SATS in year 6. Previous research by Waite (2010) reported similar findings, with a decline in learning outside the classroom between Early Years and Key Stage 1, and again during Key Stage 2. Waite explicitly links this observed phenomenon to the need to prepare for standardised tests, as do other studies (Edwards-Jones et al, 2018; Shume and Blatt, 2019).

Reported frequency of outdoor learning was lower still for teachers in Study 4, compared to the sample of primary teachers in Study 3. Only 12% of these teachers reported teaching outdoors at least once a week at Time 1, with a small increase to 16% at Time 2. These findings align with the findings of study 1, that teachers working in schools in disadvantaged areas reported substantial barriers to teaching outdoors.

A final gap identified in the literature review was the need for more research into teachers working in schools in disadvantaged communities, in order to address 'what works for who' in outdoor learning (Dillon & Lovell, 2022). The thematic analysis presented in chapter 4 gave insight into the particular context in which teachers worked. The themes interlink to form a narrative of the realities of teaching in primary schools in economically disadvantaged areas of the UK. These issues are situated within the wider social context of life in the UK during 2022 (and the years immediately preceding). Like all qualitative findings, they are specific to the participants, time and place. In this case, the themes tell the story of how systemic inequalities, exacerbated by the effects of the COVID pandemic, have intersected in recent years to form a 'perfect storm' where children desperately need the wellbeing benefits associated with outdoor learning. Teachers perceived nature to be an important way to meet the particular socioemotional needs of children living in disadvantaged communities, echoing the findings of Moula et al (2023). Unfortunately, the interviews also showed that teachers experienced a range of substantial barriers to getting children outdoors, and into nature. Some of these reported barriers were directly related to either economic disadvantage, or wellbeing and behaviour concerns following the Covid pandemic. However, other issues such as systemic pressure caused by national education policies are widely reported in the existing literature on barriers to outdoor learning summarised in chapter 2.

There is little published research that explicitly links the benefits of outdoor learning for children's wellbeing in relation to the consequences of COVID lockdowns on children's wellbeing and development. However, a qualitative study by Marsh and Blackwell (2023) reached similar conclusions to this research, finding that outdoor learning is being deployed as a useful pedagogical tool to improve pupil wellbeing, behaviour, social skills and academic attainment. The evaluation of the Children and Nature programme also acknowledged how

many schools saw time in nature as part of post-pandemic recovery, with a practitioner involved in programme delivery quoted as saying that, "Schools really valued it, and saw the significance of it; the need to get out into nature" (Passy and Cutting, 2023: 13).

9.4   Methodological strengths and limitations

This section first evaluates the strength of the overall mixed methods research design. Then the strengths and limitations of the specific studies are summarised, with the limitations caused by the lack of a control group in study 4 discussed in greater depth. This is followed by reflection on the wider issues presented by the collaboration between delivery organisation and a university based team of researchers, with both strengths and potential problems highlighted. Finally, suggestions are made about how this could be approached in future, in order to ensure robust evaluation of environmental education initiatives.

9.4.1   The sequential mixed methods design

The systematic, sequential mixed-methods design follows best-practice guidelines for scale construction (Boateng et al, 2018; DeVellis, 2017) i.e., qualitative findings from earlier phases directly informed the development of the SCOOL scale, and subsequent quantitative analyses confirmed its factor structure, tested reliability, and examined construct validity. This integration of inductive and deductive approaches allowed the work to combine ecological validity and depth with statistical robustness and generalisability, ensuring that the final instrument remained grounded in teachers' lived experiences while meeting established psychometric standards. Validation used a diverse national sample of teachers to ensure the scale is contextually relevant to the UK education system while offering clear potential for adaptation and cross-cultural validation in other educational contexts.

A strength of the mixed methods approach is in enabling a better understanding of complex realities (Burke and Onwuegbuzie, 2004). This was important when attempting to understand the constraints experienced by teachers in delivering outdoor learning. Previous

studies have tended to either measure individual teacher beliefs or explore perceptions of systemic constraints in the educational context, but have not considered both aspects together. The inclusion of qualitative methods allowed a broader understanding of a complex real world research issue.

The results of different methods were triangulated where appropriate, to provide further support for findings. For example, the qualitative findings of Study 1 were used to develop specific directional hypotheses that were tested using the data from Study 3. The quantitative analyses supported these hypotheses, but it was the qualitative analysis which offered explanation of how and why these effects occurred and aided the formulation of the next set of research questions.

9.4.2   Strengths and limitations of individual studies

The specific methodological limitations of individual studies have already been described and discussed within each study chapter but key issues are summarised below.

Study 1 had the strengths and limitations often associated with qualitative research in that it collected rich data from a relatively small sample. This allowed sufficient depth of analysis, but means that findings cannot be generalised to teachers working in different contexts.

The development of the SCOOL measure followed best practice guidelines in scale development (DeVellis, 2017). The use of qualitative methods in both Study 1 and Study 2i grounded this work in the context of teachers working in UK primary schools in disadvantaged areas of the UK. Basing item wording on interview data ensured that the SCOOL measure was relevant and accessible, in line with recommended good practice (Boateng et al, 2018).

Several limitations in the design of Study 3 are acknowledged. While the sample was geographically and institutionally diverse, recruitment relied on online platforms and teachers involved in a national nature engagement programme. This approach risks self-selection bias and may overrepresent teachers with a pre-existing interest in outdoor

learning as observed in similar studies of environmental attitudes (Oberle et al., 2021; Waite et al., 2023). Validation in stratified, nationally representative samples would strengthen the generalisability of findings. Second, the study did not capture detailed demographic information on participants' or schools' ethnic and cultural backgrounds, limiting the ability to examine intersectional barriers related to race, gender, or religion. This is an important omission given evidence that access to nature is shaped by structural inequities and cultural norms (Smith & Pitt, 2022; Waite et al., 2023; Zaidi & Pitt, 2022). Third, while criterion validity was established through associations with relevant external constructs (e.g., nature connection, teacher autonomy) and behavioural indicators (i.e. outdoor lesson frequency), divergent validity was not assessed, and the scale was not compared with other pertinent instruments, such as outdoor learning self-efficacy measures. However, at the time of the study, no relevant measures had been identified, and survey length was deliberately kept to a minimum to reduce respondent burden. Finally, although the SCOOL scale and subscales demonstrated a clear structure aligned with the ecological model of outdoor learning, strong internal consistency, and good test–retest reliability, the fit of the ultimate confirmatory model was below commonly accepted standards. While model fit could have been further improved through multiple post-hoc modifications such as correlating error terms, these were not pursued in the absence of clear theoretical justification.

A key limitation of Study 4 was the lack of a control group, which meant that the true impact of the Generation Wild programme could not be isolated from possible measurement effects or confounding factors. This study was initially designed to include a matched waiting list control group of teachers working in eligible schools but who had not yet participated in Generation Wild. Unfortunately, this was ruled out by time and budgetary constraints as with phase 1 of the programme coming towards an end, capacity was limited, and it was not clear at that point whether the second phase would be funded. Therefore, caution is needed when attributing the detected changes to participation in Generation Wild. However, the finding that SCOOL scores were stable over time in Study 3 supports this causal explanation, rather than the detected changes being the consequence of a repeated measurement effect.

The original design for study 4 had also included collecting data from teachers and the children in their classes, alongside school level data, hypothesising that teachers' scores on

the SCOOL measure would be a predictor of child outcomes. However, the research design had to be rationalised for pragmatic reasons of the time and cost involved in collecting this linked data on a large scale, so this remains an avenue for future research. These design compromises are acknowledged as a significant limitation but must also be regarded as inevitable when undertaking evaluation of an existing externally funded initiative which is delivered in a complex real-world setting, such as schools. This is discussed further in the next section.

9.4.3 Wider issues in conducting research with external partners

This research took place in the context of a nature connection programme, Generation Wild, which was developed and delivered by an external organisation, WWT. A major issue encountered during this research was that the research collaboration only became operational after Generation Wild had already been fully designed, and at the point when phase 1 delivery was beginning. Attempting to retrofit research plans to a complex programme involving over 45,000 children and almost 2,000 teachers from more than 600 schools was challenging. As noted above, some scientifically interesting ideas proved to be impossible to carry out under the constraints of time and budget. Pragmatic choices had to be made, with trade-offs between what would have been ideal- a randomised trial with control group- versus what was possible and realistic to achieve.

Therefore, a key piece of learning from the collaboration is that for high quality research to be achieved efficiently, it needs to be planned into future projects from the very earliest stages. Integrating research data collection into programme design and infrastructure would ensure consistency of aims across delivery and evaluation, and maximise research quality. For example, there was potential for the Generation Wild website to be used as a data collection platform, as children and teachers already had uniquely identifiable accounts linking to their schools. This could have reduced logistical challenges and research costs, but it was not realised during the first three year phase of delivery.

A further issue is how to evaluate the impact of educational initiatives without placing too much additional burden on teachers and exacerbating existing concerns about teacher

workload. The report on the government funded Natural Connections Demonstration Project (Waite et al, 2016) found that evaluation was "perceived as an additional burden" by teachers and schools; that gathering data required "considerable effort" (2016: 28); and that low survey return rates was a significant methodological limitation of this evaluation. McKaskill et al (2023) highlight the difficulties experienced in getting a response from schools to evaluation requests, and the eventual impact of offering higher value incentives to raise response rates. They also suggest it is essential that programme and evaluation objectives are carefully aligned, from the earliest stages of design and development, to keep evaluation activities proportionate and minimally burdensome for teachers. In the delivery and evaluation of Generation Wild, there was some duplication of effort between Cardiff's research studies and WWT's own internal monitoring and evaluation processes. With earlier involvement of research teams in programme design, it would have been feasible to combine these two purposes into a single survey and reduce demands on participating teachers.

McKaskill et al (2023) found initial response rates from teachers were extremely low in their research, but mention that offering higher value incentives was effective in raising response rates. This was observed during Study 1 of this thesis, as originally no incentives were offered, and teachers did not come forward to participate. Once WWT agreed to provide tickets as incentives, as well as providing a small budget for other research expenses, this situation was improved. However, funding bids need to budget a sufficient sum to cover the whole range of research costs, including: travel, equipment, website costs, participant incentives, conference fees and other impact activities. This is not an entirely novel suggestion but remains difficult to realise in practice, with many funders reluctant to cover research and evaluation costs. In the delivery report on the Natural Connections demonstration project, Waite concluded that, "The allocation of a significant proportion of the budget to evaluation and the development of an evaluation framework at the start of the project were fundamental in the success of delivering and evaluating the demonstration project" (Waite et al, 2016:28). Harvey & Holland (2024) suggest 10% of overall project costs is a realistic figure for high quality evaluation and dissemination of findings.

9.5 Directions for future research

This section articulates several possible strands of future research, extending the work described in this thesis. These include using the SCOOL scale for further research assessing the impact of environmental education initiatives, including improved designs and longer term follow up; longitudinal research with trainee teachers; linking teacher and child data within a single study; adaptation and translation of the scale. These ideas are discussed below.

This research has shown the importance of examining the role of teachers in delivering, and creating from, impact from school-mediated environmental education programmes. The SCOOL scale could be used as an outcome measure in future research on the impact of other school-mediated environmental education initiatives on teachers. The partial psychometric validation conducted as part of Study 3 demonstrated the scale's internal consistency, test-retest reliability and convergent validity with related measures, making it suitable as part of a robust evaluation. A clear direction for future work emerging from the discussion of the limitations in section 9.4 was the need to use a randomised control trial design when evaluating interventions. The use of this 'gold standard' research design would raise the bar for evaluation, enabling causal inferences to be drawn. Despite the difficulties of using a RCT design in the context of real-world programme delivery, this remains a desirable research goal (McKaskill et al, 2023).

The lack of research on longer term outcomes of outdoor learning, for both students and teachers, has been highlighted as a limitation in recent reviews (Dillon and Lovell, 2022; Mann et al, 2022). Study 4 found a measurable impact of Generation Wild on teachers after 6 weeks, but a longitudinal design with further follow-up after months, or even years, could assess whether there is a sustained impact on teacher behaviour. Thus, a particular question of interest is whether these are effects are sustained over longer time periods. If teachers continue to spend more time teaching outdoors in subsequent school years, with classes who have not themselves taken part in Generation Wild, then a single intervention programme may potentially have a much wider impact, indirectly reaching greater numbers of children.

A further topic for longitudinal research is the impact of experience, observations and training in outdoor teaching during initial teacher training. As the SCOOL scale was developed and tested for use with trainee teachers as well as fully qualified teachers, this application would be straightforward. Previous research has found evidence that appropriate outdoor training can increase trainee teachers' self-efficacy for outdoor education (Hovey et al, 2019), and their perceived competence and willingness to teach outdoors (Barrable and Lakin, 2020). Greer et al (2023) also highlight the importance of initial teacher education incorporating relevant training on the use of school grounds for outdoor teaching. Barrable and colleagues (2022) identified three themes describing how experiences during the period of initial teacher training affected students' confidence and motivation for outdoor teaching. Mastery experiences, which allowed a student to practice under support or supervision, were particularly valued. However, vicarious experiences, such as observing a mentor teach, reading and watching videos, were also considered to be helpful. A lack of their own previous experience as a learner was a reason behind low confidence for outdoor learning. The trainee and early career teachers who participated in cognitive testing in study 2ii conveyed a similar sense, that it could be difficult even to consider teaching outdoors if this were not something you had seen or experienced.

A further interesting research direction would be to simultaneously collect data from teachers and the children they teach within a single study design. This would permit testing of the hypothesis that teachers' scores on the SCOOL measure will predict child outcomes. This was originally included within the proposed design for study 4 but was not achievable within the time and budgetary limitations of this research, as described in section 9.3. A nested data structure that links data from children and their teachers to school level demographic data would enable the use of multi-level modelling to tease apart the impact of Teacher and School level enablers.

The finding of differences between England and devolved nations support collecting data from a larger and well stratified sample of teachers to compare SCOOL scores and outdoor learning rates across the four UK nations. There is also great potential for using the SCOOL measure beyond the UK, to enable meaningful international comparisons into how teachers'

perceived capability for outdoor learning varies across very different education systems. This would require adaptation, translation and revalidation of the SCOOL measure, could increase understanding of how systemic constraints affect outdoor learning on a wider scale, including the countries of the Global South.

In addition to these directions for future work with the SCOOL scale, the findings of this thesis support further research with more diverse (and well described) participant samples, to better understand differences between groups. Although the schools where teachers in Study 1 and Study 4 taught all met the eligibility criteria for Generation Wild, the schools were not homogeneous in terms of economic deprivation, local greenspace or pupil ethnicity. Data collected in Study 4 showed considerable variation between schools on these measures. Care should be taken about linking schools serving diverse communities under the common umbrella of 'disadvantage'. It is likely that to maximise efficacy within particular communities, projects may need adaptation to meet local needs. Realistically, this may be beyond the scope of a national programme such as Generation Wild, which adopts a one-size-fits-all approach out of necessity, as an economy of scale. However, within WWT, staff do the best they can to meet diverse needs (Godwin et al, in press).

Study 1 gave particular insights into how cultural beliefs and lived experiences of racism may interact to multiply barriers to nature for families belonging to some minoritised ethnic groups. Although only a minority of teachers spoke about race during their interviews, when they did speak on the topic, they often spoke at length, and in ways that were rich and powerful. It is acknowledged that most of the data came from White British teachers, and this does not seem sufficient to fully understand the lived experiences of minoritized ethnic groups (Bates and Ng, 2021; Smith et al, 2017). However, what teachers said about the effects of racism and inequalities between ethnic groups was important. The fear of racist behaviour led to Asian families in some areas avoiding public spaces such as parks, or areas where they felt underrepresented. This has also been reported as a barrier to accessing greenspace by Edwards et al (2022) and Slater (2022) and should be considered in programme designs. Teachers also reported particular issues affecting girls in Islamic communities, because of religious requirements for modest dress from a young age. Hamza et al (2024) report similar findings in their qualitative research on experiences of natural

greenspace amongst South Asian Muslim people in Britain. Understanding how barriers may multiply at points of intersection between gender, culture, ethnicity and financial deprivation should be a specific focus for future research with a more diverse team of researchers. The findings of this work could then be applied to help communities overcome these barriers.

It is essential for any environmental education programme to incorporate diverse perspectives and practices if it is to succeed in helping economically disadvantaged and minoritised children to develop a relationship with nature. Narratives and policies that assume universal human connection with nature may not reflect actual experiences or desires. Rather than assuming uniform benefits or innate affinity, research and policy must focus on diversity, inclusion, and context-specific barriers.

9.6   The applications of this research for policy and practice

A starting point of this research was the need to produce an effective evaluation of Generation Wild. However, the novel contributions of this thesis go much further and include: a new theoretical framework for understanding challenges and enablers to outdoor learning, and the development of a novel quantitative measure of teacher capability for outdoor learning. In addition to academic contributions (see above), this research has clear relevance to practitioners in the environmental education sector. One key output has been producing evidence-based recommendations for policy and practice. Dissemination of these findings to relevant organisations has been a priority over the last two years, in order that they can be applied in the design and delivery of future environmental education programmes to increase efficacy. The remainder of this section describes how research findings have already had impact within WWT; the potential for application to future initiatives; and evidence to advocate for changes to the English education system.

9.6.1 Applications of research findings to Generation Wild delivery

The findings of Study 1 had direct implications for both the delivery of Generation Wild and the wider programme evaluation. The themes described in chapter 4 shaped the overall approach taken throughout the research collaboration, aiming for findings to be representative of the population targeted by Generation Wild. An example of this was designing consent and recruitment methods to support more inclusive participation in child studies (not reported in this thesis). The themes and supporting extracts have also been widely shared with WWT staff, and have had reported impact through raising awareness of disadvantaged children's lives and the difficulties experienced by school staff (Stead and Marshall, 2025).

There were also more specific points relating to the delivery of Generation Wild, which were shared with WWT staff, as it was clear they could improve the efficacy of the programme. Two specific examples of early research findings leading to small but effective changes to programme delivery are described below. Chapter 3 contains further reflections on how the nature of the research collaboration, with researchers integrated into the delivery organisation, facilitated action learning and rapid change.

One issue emerging from the interviews was that booking practices for wetland visits should be changed to allow bookings up to a year ahead, as many schools plan topics for the entire school year at the end of the previous summer term. In section 5.3.4, extracts from teacher interviews described how time spent on Generation Wild was limited if it did not coincide with a relevant curriculum topic, as part of the National Education Policies as barriers theme. This change to booking procedures was implemented successfully, with schools encouraged to book up to a year ahead, allowing teachers to time participation to coincide with relevant topics if they wished. The Nature Friendly Schools evaluation later came to similar conclusions, suggesting that school-mediated programmes need to allow sufficient time for recruitment, planning and involvement of senior leaders (Passy & Cutting, 2023).

A second learning point from the interviews was around communications with class teachers. Initially, teacher engagement with the Generation Wild website was limited, with

only a minority setting up child logins. However, interviews with teachers made it clear that important messaging about these tasks was not making it to teachers, with communications ending up with school administrators. Some teachers were not even aware that the website existed, despite the website having been envisaged by WWT as a key tool for engagement. As WWT became aware of the emerging findings of Study 1, their communications strategy was revised from summer 2022 onwards, to ensure relevant communications were sent direct to each class teacher. The content and timings of teacher communications were also revised to make it clear what was expected from teachers before, during and after the wetland trip. This approach led to increasing numbers of teachers setting up pupil logins on the website. Over the first three years of delivery, the average number of activities competed per pupil rose from 1.9 to 4.7, and the number of children completing 10 activities increased from 8% in year 1 to 24% in year 3 (Stead & Marshall, 2025). Again, this was echoed in Passy and Cutting's recommendation for clear channels of communication between schools and external providers (2023).

9.6.2   Recommendations for the design of future programmes

In addition to the impact these findings have had on the delivery of Generation Wild, it is hoped that they will also shape the design of future programmes in the wider environmental education sector. The preliminary findings of this research have already been disseminated to representatives of other UK nature and environmental charities, including RSPB, National Trust, Ernest Cook Trust, Learning Through Landscapes, and the Wildlife Trusts (Stead and Marshall, 2025). They have also shaped the author's input to the Institute of Outdoor Learning's Strategic Thinking Workshop (November 2024), which will contribute to the organisational strategy for 2025-2030.

This research has highlighted the need for delivery organisations to work with teachers when developing future environmental education programmes, to enable better understanding of the constraints under which teachers are working. WWT has instigated a working group where interested teachers meet with WWT learning staff; this is part of their plans to continue developing their learning programme to be more effective and accessible for all schools. A co-production approach could facilitate more effective project design to

increase teachers' capability for outdoor learning. It can also highlight aspects of new programmes which might be hampered by constraints at School and System levels, as WWT's Head of Learning Mark Stead shared:

> *The original design [of Generation Wild] included a teacher training element… but in our early consultations with teachers and headteachers it became clear that the majority of teachers were unlikely to be released from the classroom for any training that wasn't directly addressing one of the core subjects.*

Therefore, it was decided that the final version of the programme (as described in chapter 1) should centre on children completing simple and achievable activity ideas. The majority of these did not require any particular type of environment, equipment or specialist knowledge. Both Study 1 and Study 4 showed that teachers found this bank of activities useful and inspiring, giving them fresh ideas and reducing the need for planning for outdoor learning.

This research has shown that even when individual teachers were highly motivated to deliver outdoor learning, opportunities can be constrained by wider organisational and systemic issues. It is therefore vital to look beyond the individual teacher, and consider how programmes might address those wider contextual issues impacting teachers' opportunity and motivation for teaching outdoors.

The findings of Study 1 provide some understanding of the specific ecological context experienced by teachers working in primary schools in disadvantaged communities. There are particular barriers described which could be addressed in the design of future programmes. Poor weather was perceived to be a greater barrier in schools where children lacked suitable outdoor clothing. This could be addressed through providing outdoor clothing and footwear in schools. Teachers in some schools thought family support for outdoor learning was low, within specific communities. Section 9.5 has already advocated for further research to understand complex cultural barriers such as working with particular ethnic and religious communities to overcome these issues.

One aspect of Generation Wild that teachers universally appreciated was the opportunity for children to visit a wetland site free of charge. Many teachers felt this was a transformative opportunity for children who had never spent time in such a large natural space. However, for some this also served to highlight what was absent from their local environment. Many teachers, particularly those in London and the cities of North-West England, expressed that it was harder to provide opportunities to connect with nature in their local environment due to poor access to safe local greenspace. For schools in neighbourhoods where the quality of greenspace quality is particularly poor, more intensive interventions may be needed to make significant impact. It is worth noting that this had been part of the original conception for the Generation Wild project, but as Mark Stead commented:

> *It is always a trade-off. We are constantly torn between maximising numbers reached (which funders tend to prefer) and maximising depth of impact (which I tend to prefer). If we go right back to my first concept, it was for a six week programme of activities on-site but this just wasn't feasible.*

These difficult compromises are inherent in the current climate of charitable funding, and whilst this research provides some evidence to support what is needed, pragmatic decisions have to be made.

9.6.3 Implications for national education policy

An inescapable conclusion of these research findings is that there is a need for change at the outer level of the ecological model: the national education system. The findings of study 1 show that for teachers in England, the requirements of the Primary National Curriculum, the pressure of high stakes mandatory assessments, and concerns over a poor OFSTED judgement were all barriers to regular outdoor teaching. In comparison, teachers in Wales saw the new Curriculum for Wales as broadly supportive and enabling of outdoor learning. Studies 3 and 4 showed that SCOOL scores were consistently lowest on the Systemic factor, indicating this was the level at which the greatest barriers were perceived by teachers. Study 3 also showed that teachers in England perceive significantly greater systemic barriers to

outdoor learning than those in devolved nations. There is substantial evidence from this research to support changes to education policy in England, to increase funding and incentivise outdoor learning.

The findings of this thesis have provided evidence contributing to campaigns for changes to education, and also submitted as evidence to government consultations. These research findings were shared with The Nature Premium campaign (IOL, 2025). This calls for ringfenced school funding to enable schools to provide regular additional sessions for children to get out into nature. Findings were also shared with the Education and Learning Policy group of Wildlife and Countryside Link, providing evidence to support their policy briefing (WCL, 2024). This briefing calls for greater inclusion of nature within education through: improving access to nature in schools; preparing teachers through training; making nature a part of daily school life for all pupils. This research evidence was also submitted within the author's response to the call for evidence for the Francis review of Curriculum and Assessment (DfE, 2024c). At the time of writing this chapter, the review is still underway, with an interim report recently published (DfE, 2025), and a final report due in Autumn 2025. It remains to be seen whether this review brings about any substantial changes to the English curriculum or assessment system. These findings will also be submitted in a response to the consultation on OFSTED which is currently open at the time of writing, in Spring 2025 (OFSTED, 2025). It is anticipated that if policy were changed to mandate outdoor learning, then changes in initial teacher training courses would swiftly follow, addressing the need for training highlighted in the previous section.

At a local level, another key issue constraining outdoor learning opportunities in some schools is access to greenspace. In study 1, teachers described an extremely wide variation in the size and quality of school grounds, from schools where there was no greenspace at all, to those who had ample and varied grounds available. Tackling this issue will require a long-term commitment from governments to prioritise greener school grounds. Although it is unrealistic to suggest that existing school grounds could be enlarged, looking forwards, there should be a requirement for new schools to have adequate greenspace for outdoor learning. There could also be a wider government commitment to funding to improve the quality of the space available within existing grounds. The National Education Naturepark programme

(Department for Education, 2023) has a focus on improving the quality of school grounds, but it is limited in funding and scope relative to the scale of what is needed. In Scotland, the Climate Ready School Grounds project piloted developing school grounds to mitigate the effects of climate change and promote biodiversity whilst enabling high quality outdoor learning and play (Learning Through Landscapes, 2025).

Although public greenspaces such as parks may provide access to nature in some neighbourhoods, teachers were often wary of taking children away from school grounds. This was due to perceived risk, and the need for additional staffing, which was not always available. There may also be some value in programmes which negotiate school access to privately owned greenspaces within their local area, or fund transport to destinations further afield. However, for schools which lack access to local greenspace, offsite trips such as the wetland visit offered by Generation Wild may provide the best alternative in the short term.

9.7   Conclusion

This thesis has explored the role played by teachers in delivering outdoor learning in UK primary schools, with two of the studies focusing particularly on teachers working in schools in disadvantaged communities. This topic was previously under researched in the academic context and largely absent from the design of environmental education projects. The findings of this research have made a novel theoretical contribution through the proposal of an ecological model of outdoor learning, and the development and validation of the School Contexts of Outdoor Learning (SCOOL) scale. The findings also have strong practical applications, both for the design of future environmental education programmes and to support changes to educational policy.

The findings of the first study showed the power of targeting a nature connection programme at disadvantaged communities. Teachers described how they perceived children as benefitting from experiencing and engaging with nature. After a decade of missed opportunities for levelling up (HMG, 2022), the potential of nature to improve children's

health and wellbeing should now be a priority. Although schools are potentially well placed to deliver time in nature for all children through outdoor learning, it is clear that many teachers in England do not currently feel able to exercise agency for outdoor teaching due to systemic and structural constraints. Studies 3 and 4 found that current rates of outdoor learning remain low in UK primary schools with most teachers teaching outdoors less than once a week. However, Study 4 showed that taking part in WWT's Generation Wild programme had a positive impact on teachers. Six weeks after taking part, teachers reported longer outdoor teaching time, increased nature connection and better wellbeing. Significantly, scores on both the Teacher and the Systemic factor of the SCOOL measure increased, suggesting that after taking part in Generation Wild, teachers felt more able to overcome systemic constraints.

Future research should include using the SCOOL measure to evaluate other school-mediated nature connection initiatives, and use longitudinal designs to examine whether changes in teachers' attitudes and behaviour persist over longer time periods. When designing nature connection programmes, delivery organisations should be mindful of the importance of teachers in providing sustained and embedded outdoor learning. The ecological model of outdoor learning can be used as a tool to aid design, ensuring that programmes tackle challenges to outdoor learning at all levels.

Finally, this research provides evidence to support changes to the English education system, to make outdoor learning a part of every child's education. The current situation is that school grounds remain paradoxical spaces: whilst they hold unique potential to democratise children's access to nature, structural inequalities often prevent this potential from being realised (Shoari et al, 2021). The uneven distribution of green grounds, along with financial and curricular constraints means that schools may currently be entrenching limited access to nature rather than levelling the playing field (Howlett & Turner, 2023). Addressing these challenges requires not only equitably funded investment in greening school grounds, but also re-imagining outdoor learning as a culturally responsive, and inclusive practice (Kelly et al, 2022; Sors, 2025; Sors & Whitfield, 2025).

References

Adams, G., & Carnine, D. (2003). Direct instruction. *Handbook of learning disabilities*, 403-416.

Anderson et al (2021) INclusivity in the OUTdoors. *Full report from the Rising Our Game webinar series*. University of Cumbria.
https://insight.cumbria.ac.uk/id/eprint/6302/1/EDI%20-%20INclusivity%20in%20the%20OUTdoors%20FULL%20REPORT%20V1%20sml.pdf

Andrade H, Alcoforado MJ, Oliveira S. Perception of temperature and wind by users of public outdoor spaces: relationships with weather parameters and personal characteristics. Int J Biometeorol. 2011 Sep;55(5):665-80. doi: 10.1007/s00484-010-0379-0. Epub 2010 Oct 30. PMID: 21053024.

Ardoin, N. M., Bowers, A. W., & Gaillard, E. (2020). Environmental education outcomes for conservation: A systematic review. *Biological conservation*, *241*, 108224.

Arola, T., Aulake, M., Ott, A., Lindholm, M., Kouvonen, P., Virtanen, P. et al. (2023). The impacts of nature connectedness on children's well-being: Systematic literature review. *Journal of Environmental Psychology*, *85*(101913), 1–14. doi:10.1016/j.jenvp.2022.101913

Aron, A., Aron, E. N., & Smollan, D. (1992). Inclusion of other in the self scale and the structure of interpersonal closeness. Journal of Personality and Social Psychology, 63(4), 596-612.

Aronsson, J. , S. Waite , and M. Clark . 2015. "Measuring the Impact of Outdoor Learning on the Physical Activity of School Age Children: The Use of Accelerometry." *Education and Health* 33: 57–62.

Aubrey, K. & Riley, A. (2019) Understanding and Using Educational Theories. 2nd edition. Sage.

Bandura, A. (1977) Social Learning Theory. New York: Prentice Hall.

Bandura, A., & National Inst of Mental Health. (1986). *Social foundations of thought and action: A social cognitive theory.* Prentice-Hall, Inc.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* W H Freeman/Times Books/ Henry Holt & Co.

Bandura, A. (2006). Guide for Constructing Self-Efficacy Scales (Revised). Self-efficacy beliefs of adolescents. 5. 307–337.

Barfod, K. S. (2018). Maintaining mastery but feeling professionally isolated: Experienced teachers' perceptions of teaching outside the classroom. *Journal of Adventure Education and Outdoor Learning*, 18(3), 201–213.

Barfod, K. & Bentsen, P. (2018) Don't ask how outdoor education can be integrated into the school curriculum; ask how the school curriculum can be taught outside the classroom. *Curric Perspect*. 38(2):151–156. doi:10.1007/s41297-018-0055-9.

Barfod, K. S., & Daugbjerg, P. (2018). Potentials in Udeskole: Inquiry-Based Teaching Outside the Classroom. *Frontiers in Education*, *3*. https://doi.org/10.3389/feduc.2018.00034

Barnes, C., Harvey, C., Holland, F., & Wall, S. (2021). Development and testing of the nature Connectedness parental self-efficacy (NCPSE) scale. *Urban Forestry & Urban Greening*, *65*, 127343.

Barrable, A. (2019a). Refocusing environmental education in the early years: a brief introduction to a pedagogy for connection. *Educ. Sci.* 9:61. doi: 10.3390/educsci9010061

Barrable, A. (2019b). The case for nature connectedness as a distinct goal of early childhood education. *Int. J. Early Child. Environ. Educ.*6, 59–70.

Barrable, A., Touloumakos, A., & Lapere, L. (2022) Exploring student teachers' motivations and sources of confidence: the case of outdoor learning, *European Journal of Teacher Education*, 45:3, 356-372, DOI: 10.1080/02619768.2020.1827386

Barrable, A. & Lakin, L. (2020) Nature relatedness in student teachers, perceived competence and willingness to teach outdoors: an empirical study, *Journal of Adventure Education and Outdoor Learning*, 20:3, 189-201, DOI: 10.1080/14729679.2019.1609999

Barrable, A., Friedman, S., Tam, K. P., & Papadatou-Pastou, M. (2024). Nature connection and wellbeing in children and adolescents: A systematic review and meta-analysis. *Global Environmental Psychology*.

Bashan, D., Colléony, A., & Shwartz, A. (2021). Urban versus rural? the effects of residential status on species identification skills and connection to nature. People and Nature, 3(2), 347-358. https://doi.org/10.1002/pan3.10176

Bates, C., Bohnert, A.M., & Gerstein, D. (2018) Green schoolyard in low-income urban neighbourhoods: natural spaces for positive youth development outcomes. Front. Psychol., 9 805, 10.3389/fpsyg.2018.00805

Bates, Kimberly A. and Ng, Eddy. "Whiteness in Academia, Time to Listen, and Moving Beyond White Fragility." (2021) : 1-7.

Beames, S., & Polack, N. (2019). School inspection reports and the status of outdoor learning, residential experiences and adventurous activities in Scottish schools.

Beames, S., Higgins, P. & Nicol, R. (2012). *Learning outside the classroom: Theory and guidelines for practice*. Routledge.

Becker, C., Lauterbach, G., Spengler, S., Dettweiler, U., & Mess, F. (2017). Effects of regular classes in outdoor education settings: A systematic review on students' learning, social and health dimensions. *International Journal of Environmental Research and Public Health*, 14(5). https://doi.org/10.3390/ijerph14050485

Bell, S. L., Leyshon, C., Foley, R., & Kearns, R. A. (2019). The "healthy dose" of nature: A cautionary tale. *Geography Compass*, *13*(1), e12415.

Bell, S., Thompson, C. W., & Travlou, P. (2003). Contested views of freedom and control: Children, teenagers and urban fringe woodlands in Central Scotland. *Urban forestry & urban greening*, *2*(2), 87-100.

Berman, M. G., Jonides, J., & Kaplan, S. (2008). The Cognitive Benefits of Interacting With Nature. *Psychological Science*, *19*(12), 1207-1212. https://doi.org/10.1111/j.1467-9280.2008.02225.x

Biesta, G., Priestley, M., & Robinson, S. (2015). The role of beliefs in teacher agency. *Teachers and Teaching*, *21*(6), 624–640. https://doi.org/10.1080/13540602.2015.1044325

Bikomeye, J., Balza, J. & Beyer, K.M. (2021) The impact of schoolyard greening on children's physical activity and socioemotional health: a systematic review of experimental studies. Int. J. Environ. Res. Public Health, 18 (2) 535, 10.3390/ijerph18020535

Bilton, H., & Waters, J. (2017). Why Take Young Children Outside? A Critical Consideration of the Professed Aims for Outdoor Learning in the Early Years by Teachers from England and Wales. *Social Sciences*, *6*(1), 1. https://doi.org/10.3390/socsci6010001

Bingham, D.D., Daly-Smith, A., Hall, J. *et al.* Covid-19 lockdown: Ethnic differences in children's self-reported physical activity and the importance of leaving the home environment; a longitudinal and cross-sectional study from the Born in Bradford birth cohort study. *Int J Behav Nutr Phys Act* 18, 117 (2021).

https://doi-org.abc.cardiff.ac.uk/10.1186/s12966-021-01183-y

Bingham, D. D., Costa, S., Hinkley, T., Shire, K. A., Clemes, S. A., & Barber, S. E. (2016). Physical activity during the early years: A systematic review of correlates and determinants. American Journal of Preventive Medicine, 51, 384–402. https://doi.org/10.1016/j.amepre.2016.04.022

Birch, J., Rishbeth, C., & Payne, S. R. (2020). Nature doesn't judge you–how urban nature supports young people's mental health and wellbeing in a diverse UK city. *Health & Place*, *62*, 102296.

Blakesley, D., Rickinson, M., & Dillon, J. (2012). Benefits of engagement with the natural environment for children with autism - Review of the evidence. Report commissioned by Natural England. Natural England

Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best Practices for Developing and Validating Scales for Health, Social, and Behavioral Research: A Primer. Front Public Health. 2018 Jun 11;6:149. doi: 10.3389/fpubh.2018.00149. PMID: 29942800; PMCID: PMC6004510.

Bølling M, Otte CR, Elsborg P, Nielsen G, Bentsen P. The association between education outside the classroom and students' school motivation: results from a one-school-year quasi-experiment. *Int J Educ Res*. (2018) 89:22–35. doi: 10.1016/j.ijer.2018.03.004

Boyatzis, R.E. (1998) *Transforming qualitative information: Thematic analysis and code development.* Sage.

Boyd, F., White, M. P., Bell, S. L., & Burt, J. (2018). Who doesn't visit natural environments for recreation and why: A population representative analysis of spatial, individual and temporal factors among adults in England. *Landscape and urban planning*, *175*, 102-113.

British Psychological Society (2021) Code of Ethics and Conduct.

British Psychological Society (2022) From poverty to flourishing- Bringing Psychology into action on poverty.

Braun, S. E. (2021). *Teachers' Occupational Health and Well-being: Antecedents, Consequences, and Prospects for Change*. (Doctoral dissertation), ProQuest Dissertations Publishing, Pennsylvania State University, State College, PA, United States.

Braun, V. & Clarke, V. (2006) Using thematic analysis in Psychology. *Qualitative Research in Psychology*, 3(2): 77-101.

Braun, V. & Clarke, V. (2013) *Successful qualitative research: a practical guide for beginners.* Sage.

Braun, V. & Clarke, V. (2021a) Can I use TA? Should I use TA? Should I not use TA? Comparing reflexive thematic analysis and other pattern-based qualitative analytic approaches. Counselling and Psychotherapy Research, 21(1): 37-47.

Braun, V. and Clarke, V. (2021b) Thematic Analysis: A Practical Guide. Sage, London.

Brigandi CB, Spillane NK, Rambo-Hernandez KE, Stone J. Teaching in the time of COVID-19 a biological systems theory approach. Front Media SA. 2022;7:964492.

Broch, T. B. (2022). Painting nature: Travelling within and through (racial) landscapes. In *Unfamiliar landscapes: Young people and diverse outdoor experiences* (pp. 259-282). Cham: Springer International Publishing.

Brockes (2024) I'm all for the concept of 'forest school' – just not the kind I pulled my kids out of | Emma Brockes | The Guardian

Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design.* Cambridge, MA: Harvard University Press.

Bronfenbrenner, U. (Ed.). (2005). *Making human beings human: Bioecological perspectives on human development.* Sage Publications Ltd.

Bruce, M.D., Ermasova, N. & Mattox, L. The Fiscal Disparity and Achievement Gap between Extremely Wealthy and Poor School Districts in Illinois. *Public Organiz Rev* **19**, 541–565 (2019). https://doi.org/10.1007/s11115-018-0417-7

Bukamal, H. (2022). Deconstructing insider–outsider researcher positionality. *British Journal of Special Education*, *49*(3), 327-349.

Burke, J.R. and Onwuegbuzie, A.J. (2004) Mixed methods research: A research paradigm whose time has come. Educational Researcher 33: 14–26.

Butler and Fisher (2023)
School workforce in England, Reporting year 2023 - Explore education statistics - GOV.UK

CABE Space (2010) Urban Green Nation: Building the Evidence Base. Accessed online 14th November 2023 at: urban-green-nation-summary1_0.pdf

Cameron-Faulkner, T. & Melville, J. & Gattis, M. (2018). Responding to Nature: Natural Environments Improve Parent-Child Communication. Journal of Environmental Psychology. 59. 10.1016/j.jenvp.2018.08.008.

Castles, A., Rastle, K., & Nation, K. (2018). Ending the Reading Wars: Reading Acquisition From Novice to Expert. *Psychological Science in the Public Interest*, *19*(1), 5-51. https://doi.org/10.1177/1529100618772271

Cattell, R. B. (1966). The Scree Plot Test for the Number of Factors. Multivariate Behavioral Research, 1, 140-161. http://dx.doi.org/10.1207/s15327906mbr0102_10

CCEA (2007) The "Big Picture" of the Curriculum at Key Stage 1 & 2. Accessed online 13th November 2024 at:

http://ccea.org.uk/sites/default/files/docs/curriculum/area_of_learning/ks1_2_bigpicture.pdf

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

Chawla L., Keena K., Pevec I., Stanley E. 2014. "Green Schoolyards as Havens from Stress and Resources for Resilience in Childhood and Adolescence." *Health and Place* 28:1–13.

Chawla, L. (2015) Benefits of Nature Contact for Children. Journal of Planning Literature, 30(4): 433-452. DOI: 10.1177/0885412215595441

Chawla, L. (2007). Childhood experiences associated with care for the natural world. *Children, Youth and Environments*, **17**(4), 144–170.

Chawla, L. (1999). Life Paths Into Effective Environmental Action. *The Journal of Environmental Education*, *31*(1), 15–26. https://doi.org/10.1080/00958969909598628

Child Poverty Action Group (2022) The cost of the school day in England: Pupils' perspectives. https://cpag.org.uk/sites/default/files/2023-08/The%20Cost%20of%20the%20School%20Day%20in%20England-%20Pupils%27%20Perspectives.pdf

Clarke, V., Braun, V., Terry, G. and Hayfield, N. (2019) Thematic analysis. In Liamputtong, P. (ed) *Handbook of research methods in health and social sciences* (p843-860.) Springer.

Cloke, P., & Jones, O. (2005). 'Unclaimed territory': childhood and disordered space (s). *Social & Cultural Geography*, *6*(3), 311-333.

Collado, S., Rosa, C. D., & Corraliza, J. A. (2020). The Effect of a Nature-Based Environmental Education Program on Children's Environmental Attitudes and Behaviors: A Randomized Experiment with Primary Schools. *Sustainability*, *12*(17), 6817. https://doi.org/10.3390/su12176817

Collier, B. (10 October 2019), 'Black absence in green spaces', *The Ecologist [online]* https://theecologist.org/2019/oct/10/black-absence-green-spaces

Cont,S., Rowley, A., Knowles, Z. & Bowe, C. (2023) The perceptions of trainee teachers towards Forest School, does connection to nature matter?, Journal of Adventure Education and Outdoor Learning, DOI: 10.1080/14729679.2023.2180764

Costello, A. B., & Osborne, J. (2005). Best Practices in Exploratory Factor Analysis: Four Recommendations for Getting the Most from Your Analysis. Practical Assessment Research & Evaluation, 10, 1-9.

Cree, J. (2009). Forest school and the learning outside the classroom manifesto. *Horizons, 46*, 22–25.

Creswell, John W. (2013) Qualitative Inquiry and Research Design: Choosing among Five Approaches, 3rd ed. Thousand Oaks: Sage.

Creswell, J. W. (2021) *A concise introduction to mixed methods research*. SAGE publications.

Cronin-de-Chavez, A., Islam, S. and McEachan, R. (2019) Not a level playing field: A qualitative study exploring structural, community and individual determinants of greenspace use amongst low-income multi-ethnic families. Health & Place, 56: 118-126. https://doi.org/10.1016/j.healthplace.2019.01.018.

Crotty, M. (1998). The foundations of social research: Meaning and perspective in the research process. Sage.

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods, 1*(1), 16–29. https://doi.org/10.1037/1082-989X.1.1.16

Czerniawski, G. (2023) Positionality and practitioner research: Schoolteachers' experiences of professional doctorates in education. https://www.bera.ac.uk/blog/positionality-and-practitioner-research-schoolteachers-experiences-of-professional-doctorates-in-education Accessed 02/05/24.

Dadvand, P., Nieuwenhuijsen, M. J., Esnaola, M., Forns, J., Basagaña, X., Alvarez-Pedrerol, M., Rivas, I., López-Vicente, M., De Castro Pascual, M., Su, J., Jerrett, M., Querol, X., & Sunyer, J. (2015). Green spaces and cognitive development in primary schoolchildren. *Proceedings of the National Academy of Sciences of the United States of America*, *112*(26), 7937–7942. https://doi.org/10.1073/pnas.1503402112

Dale, R. G., Powell, R. B., Stern, M. J., & Garst, B. A. (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

Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York, NY: Plenum.

DEFRA. (2018). *A green future: Our 25 year plan to improve the environment*. Crown Copyright. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

DEFRA (2023) Environmental Improvement Plan 2023: First revision of the 25 Year Environment Plan, Accessed online 7th February 2024 at https://www.gov.uk/government/publications/environmental-improvement-plan,

de Oliveira Silva, D.F.; Cobucci, R.N.; Lima, S.C.; de Andrade, F.B. Prevalence of anxiety, depression, and stress among teachers during the COVID-19 pandemic: A PRISMA-compliant systematic review. *Medicine* **2021**, *100*, e27684.

Department for Children, Schools and Families (2006) Learning Outside the Classroom Manifesto.

Department for Education (2013) The National Curriculum in England. Accessed online 23rd October 2024 at https://assets.publishing.service.gov.uk/media/5a7de93840f0b62305b7f8ee/PRIMARY_national_curriculum_-_English_220714.pdf

Department for Education (2018) Use and Perceptions of Curriculum Support Resources in Schools. Research report. Accessed online 19th January 2025 at Use and perceptions of curriculum support resources in schools

Department For Education (2019) Early Career Framework DFE-00015-2019 Accessed online 28th November 2024 at Early career framework - GOV.UK

Department For Education (2019b) Initial teacher training (ITT): core content framework - GOV.UKAccessed online 28th November 2024.

Department for Education (2021) Condition of School Buildings Survey. Available online at https://assets.publishing.service.gov.uk/media/60af7cbbe90e071b54214c82/Condition_of_School_Buildings_Survey_CDC1_-_key_findings_report.pdf

Department for Education (2022) School workforce in England https://explore-education-statistics.service.gov.uk/find-statistics/school-workforce-in-england (accessed 14/09/22)

Department for Education (2023) Sustainability and Climate Change: a strategy for the education and children's service systems. Sustainability and climate change: a strategy for the education and children's services systems - GOV.UK (assessed 16th February 2025)

Department for Education (2023b) National funding formula for schools and high needs - GOV.UK Accessed online 8th March 2025.

Department for Education (2023c) Pupil absence in schools in England, Academic year 2021/22 - Explore education statistics - GOV.UK Accessed online 31st August 2023

Department for Education (2024) Keeping Children Safe in Education 2024. Accessed online 8th March 2025 at Keeping children safe in education 2024.

 Department for Education (2024b) Pupil premium: overview - GOV.UK Accessed online 13th October 2024.

Department for Education (2024c) Curriculum and Assessment Review: Review Aims, Terms of Reference and Working Principles. Accessed online 5th October 2024 at Curriculum and assessment review - GOV.UK

Department for Education (2024d) Types of school: Academies - GOV.UK Accessed online 17th October 2024.

Department for Education (2024e) Schools, pupils and their characteristics, Academic year 2023/24 - Explore education statistics - GOV.UK Accessed online 7th November 2024.

Department for Education (2024f) Teacher absences, Data set from School workforce in England - Explore education statistics - GOV.UK Accessed online 19th December 2024.

Department for Education (2025) Curriculum and Assessment Review: an interim report. Accessed online 2nd April 2025 at: https://www.gov.uk/government/publications/curriculum-and-assessment-review-interim-report

Deschamps A, Scrutton R and Ayotte-Beaudet J-P (2022) School-based outdoor education and teacher subjective well-being: An exploratory study. *Front. Educ.* 7:961054. doi: 10.3389/feduc.2022.961054

DeVellis RF. (2017) *Scale Development: Theory and Application*. Los Angeles, CA: Sage; Publications

Dewey, J. (1931 / 1982). *The Development of American Pragmatism*. In H. S. Thayer (Ed.), Pragmatism, the Classic Writings. Indianapolis, USA: Hackett.

Dickinson, E. (2013). The misdiagnosis: Rethinking "nature-deficit disorder". *Environmental Communication: A Journal of Nature and Culture*, *7*(3), 315-335.

Dillon, J. & Lovell, R. 2022. Links between natural environments, learning and health: evidence briefing. Natural England Evidence Information Note. EIN063.

Dillon, J., & Dickie, I. (2012). Learning in the natural environment: Review of social and economic benefits and barriers. Natural England.

Dodd, H.F., Lester, K.J. Adventurous Play as a Mechanism for Reducing Risk for Childhood Anxiety: A Conceptual Model. *Clin Child Fam Psychol Rev* **24**, 164–181 (2021). https://doi.org/10.1007/s10567-020-00338-w

Dreer B. On the outcomes of teacher wellbeing: a systematic review of research. Front Psychol. 2023 Jul 27;14:1205179. doi: 10.3389/fpsyg.2023.1205179. PMID: 37575417; PMCID: PMC10421665.

Dyment, J.E. (2005) Green School Grounds as Sites for Outdoor Learning: Barriers and Opportunities. International Research in Geographical and Environmental Education, 14:1, 28-45, DOI: 10.1080/09500790508668328

Education Scotland (2019) What is Curriculum for Excellence? | About Curriculum for Excellence | Curriculum for Excellence | Education Scotland Accessed online 24th November 2024.

Edwards, R. C., Larson, B. M., & Burdsey, D. (2023). What limits Muslim communities' access to nature? Barriers and opportunities in the United Kingdom. Environment and Planning E: Nature and Space, 6(2), 880-900. https://doi.org/10.1177/25148486221116737

Edwards-Jones, A., Waite, S. & Passy, R, (2018) Falling into LINE: school strategies for overcoming challenges associated with learning in natural environments (LINE), Education 3-13, 46:1, 49-63, DOI: 10.1080/03004279.2016.1176066

Emirbayer, M., & Mische, A. (1998). What is agency? *American Journal of Sociology, 103*(4), 962–1023. https://doi.org/10.1086/231294

Evans GW, Otto S, Kaiser FG. (2018) Childhood origins of young adult environmental behavior. Psychological Science 29: 679– 687.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. Psychological Methods, 4, 272-299. doi:10.1037/1082–989X.4.3.272

Feilzer, M.Y. (2009). Doing Mixed Methods Research Pragmatically: Implications for the Rediscovery of Pragmatism as a Research Paradigm. *Journal of Mixed Methods Research*, *4*(1), 6-16. https://doi.org/10.1177/1558689809349691

Field Studies Council (2021) Nature Friendly Schools – Field Studies Council

Fiennes, C., Oliver, E., Dickson, K., Escobar, D., Romans, A., & Oliver, S. (2015). The existing evidence-base about the effectiveness of outdoor learning. Institute of Outdoor Learning

Forest School Association (2024) What is Forest School? | Forest School Association
Accessed online 23rd May 2024.

Frantz, C. M., and Mayer, F. S. (2014). The importance of connection to nature in assessing
environmental education programs. *Stud. Educ. Eval.* 41, 85–89. doi:
10.1016/j.stueduc.2013.10.001

Friedman, S., Imrie, S., Fink, E., Gedikoglu, M., & Hughes, C. (2021). Understanding changes
to children's connection to nature during the COVID-19 pandemic and implications for child
well-being. *People and Nature*, 4(1), 155–165.

Friends of the Earth (2020) Greenspace consolidated dataset for England. Accessed online
17th July 2023 at Green space consolidated data for England | Friends of the Earth

Fullan, M.G. (1993), "*Why teachers must become change agents*", Educational Leadership,
Vol. 50 No. 6, pp. 12-17

Fullan, M. 2006. "The Future of Educational Change: System Thinkers in Action." Journal of
Educational Change 7(3): 113-122.

George, P., Murray, K., & Christian, H. (2024). Young children's use of blue spaces and the
impact on their health, development and environmental awareness: A qualitative study from
parents' perspectives. *Health Promotion Journal of Australia*, *35*(1), 45-56.

Gilchrist (2023) https://naturalengland.blog.gov.uk/2023/05/16/children-nature-
programme-the-importance-of-integrating-time-spent-in-nature-at-school/ Accessed
29/03/2024.

Gilchrist, M., Passy, R., Waite, S., & Cook, R. (2017). Exploring schools' use of natural
spaces. *Risk, Protection, Provision and Policy*, 103–124.

Gill, T. (2007) No fear: Growing up in a risk averse society. London: Calouste Gulbenkian Foundation.

Giusti, M., Svane, U., Raymond, C. M., & Beery, T. H. (2018). A framework to assess where and how children connect to nature. *Frontiers in psychology*, *8*, 2283.

Glackin, M. (2018) 'Control must be maintained': exploring teachers' pedagogical practice outside the classroom. British Journal of Sociology of Education. 39. 10.1080/01425692.2017.1304204.

Glackin, M. (2016). Risky fun' or 'Authentic science'? How teachers' beliefs influence their practice during a professional development programme on outdoor learning. *International Journal of Science Education*, 38(3), 409–433

Glazzard, J and Rose, A (2019) *The Impact of Teacher Well-Being and Mental Health on Pupil Progress in Primary Schools.* Journal of Public Mental Health. ISSN 1746-5729
DOI: https://doi.org/10.1108/JPMH-02-2019-0023

Gosler, A. and Tilling, S. M. (2021). Knowledge of nature and the nature of knowledge: student natural history knowledge and the significance of birds. People and Nature, 4(1), 127-142. https://doi.org/10.1002/pan3.10265

Gough, B and Madill, A. (2012) Subjectivity in psychological research: from problem to prospect. Psychological Methods, 17(3): 374-384.

Gray, C., Gibbons, R., Larouche, R., Sandseter, E. B. H., Bienenstock, A., Brussoni, M., Chabot, G., Herrington, S., Janssen, I., Pickett, W., Power, M., Stanger, N., Sampson, M., & Tremblay, M. S. (2015). What Is the relationship between outdoor time and physical activity, sedentary behaviour, and Page 18 physical fitness in children? A systematic review. International Journal of Environmental Research and Public Health, 12, 6455–6474. https://doi.org/10.3390/ijerph120606455

Greer, K., Sheldrake, R., Rushton, E., Kitson, A., Hargreaves, E., & Walshe, N. (2023). *Teaching climate change and sustainability: A survey of teachers in England.* University College London. www.ucl.ac.uk/ioe/departments-and-centres/centres/ucl-centre-climate-change-and-sustainability-education

Guest, G., MacQueen, K. M. & Namey, E. E. (2012). Applied thematic analysis. Thousand Oaks, CA: Sage.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate data analysis* (7th ed.). Prentice-Hall.

Halcomb, E. (2018). Mixed methods research: the issues beyond combining methods. Journal of Advanced Nursing, 75(3), 499-501. https://doi.org/10.1111/jan.13877

Haleemunnissa S, Didel S, Swami MK, Singh K, Vyas V. Children and COVID19: Understanding impact on the growth trajectory of an evolving generation. Child Youth Serv Rev. 2021 Jan;120:105754. doi: 10.1016/j.childyouth.2020.105754. Epub 2020 Nov 28. PMID: 33281255; PMCID: PMC7695548.

Hamza, M., Stride, A., & Quarmby, T. (2024). Exploring the experience of natural green space among South Asian Muslim people in the UK. *Leisure Studies*, 1–16. https://doi.org/10.1080/02614367.2024.2316164

Harris, M.A. (2021): Growing among trees: a 12-month process evaluation of school based outdoor learning interventions, Journal of Adventure Education and Outdoor Learning, DOI: 10.1080/14729679.2021.2001758

Harvey, D. J., Montgomery, L. N., Harvey, H., Hall, F., Gange, A. C., & Watling, D. (2020). Psychological benefits of a biodiversity-focussed outdoor learning program for primary school children. *Journal of Environmental Psychology*, *67*, 101381.

Harvey, C. & Holland, F. (2024) Evaluating Nature-based interventions. Conference workshop. Derby, UK.

Hayfield, N. & Terry, G. (2020) Reflexive Thematic Analysis, chapter in Handbook of Qualitative Research in Education, 2nd edition. Edward Elgar.

Hertz, R. (ed.) (1997) *Reflexivity and Voice*. London: Sage.

HMG (2022) Levelling Up the United Kingdom". Department for Levelling Up, Housing and Communities. Accessed online 3rd February 2024 – via gov.uk.

Holt, L., & Murray, L. (2021). Children and Covid 19 in the UK. *Children's Geographies*, *20*(4), 487–494. https://doi.org/10.1080/14733285.2021.1921699

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30*(2), 179–185. https://doi.org/10.1007/BF02289447

Horton, J., & Kraftl, P. (2018). Rats, assorted shit and 'racist groundwater': Towards extra-sectional understandings of childhoods and social-material processes. *Environment and Planning D: Society and Space*, *36*(5), 926-948.

Hovey, K., Niland, D., & Foley, J. T. (2020). The Impact of Participation in an Outdoor Education Program on Physical Education Teacher Education Student Self-Efficacy to Teach Outdoor Education. *Journal of Teaching in Physical Education*, *39*(1), 18-27.

Howlett K, & Turner EC. Greenness and biodiversity of open spaces in primary schools and their local surroundings in England. *Environmental Conservation*. 2023;50(4):230-240. doi:10.1017/S0376892923000255

Hu, L.-t., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. https://doi.org/10.1080/10705519909540118

Hughes, J., Rogerson, M., Barton, J., & Bragg, R. (2019). Age and connection to nature: when is engagement critical?. *Frontiers in Ecology and the Environment, 17(5),* 265-269.

Humphrey, C. (2007) 'Insider–outsider: activating the hyphen', *Action Research*, 5 (1), 11–26.

Hunt, A., Stewart, D., Burt, J. & Dillon, J. 2016. Monitor of Engagement with the Natural Environment: a pilot to develop an indicator of visits to the natural environment by children - Results from years 1 and 2 (March 2013 to February 2015). Natural England Commissioned Reports, Number208.

Hursen, C., & Islek, D. (2017). The effect of a school-based outdoor education program on Visual Arts teachers' success and self-efficacy beliefs. *South African Journal of Education, 37*, 1-17.

IFF Research. (2023). People and Nature Survey Analysis. NECR500. Natural England.

Ingold, T. (2000). *The perception of the environment: Essays on livelihood, dwelling and skill.* Routledge.

Institute for Outdoor Learning (2025) Accessed online 8th March 2025 at <u>Nature Premium</u>

Institute for Outdoor Learning (IOL). (2022). *What is outdoor learning?* Available at: <u>https://www.outdoor-learning.org/Good-Practice/Research-Resources/About-Outdoor-Learning</u>

Institute of Outdoor Learning (2021) Describing Outdoor Learning. *Horizon* 94 (21)

Islam, M. Z., Johnston, J., & Sly, P. D. (2020). Green space and early childhood development: A systematic review. *Reviews on Environmental Health*, 35(2), 189–200. <u>https://doi.org/10.1515/reveh-2019-0046</u>

Islam, S., Joseph, O., Chaudry, A. *et al.* "We are not hard to reach, but we may find it hard to trust" …. Involving and engaging 'seldom listened to' community voices in clinical translational health research: a social innovation approach. *Res Involv Engagem* 7, 46 (2021). https://doi.org/10.1186/s40900-021-00292-z

Ives, C. D., Giusti, M., Fischer, J., Abson, D. J., Klaniecki, K., Dorninger, C., ... & Von Wehrden, H. (2017b). Human–nature connection: a multidisciplinary review. *Current Opinion in Environmental Sustainability*, *26*, 106-113.

Ives, C. D., Abson, D. J., Von Wehrden, H., Dorninger, C., Klaniecki, K., & Fischer, J. (2018). Reconnecting with nature for sustainability. *Sustainability science*, *13*, 1389-1397.

Iyer, P., Papaioannou, K., Bartasevicius, V. and Gill, V. (2021). Designing an impact evaluation of Nature Friendly Schools: Learning report.

Jacobson, D., & Mustafa, N. (2019). Social Identity Map: A Reflexivity Tool for Practicing Explicit Positionality in Critical Qualitative Research. *International Journal Of Qualitative Methods*, 18

Jackson DL, Gillaspy JA, Purc-Stephenson R. Reporting practices in confirmatory factor analysis: an overview and some recommendations. Psychol Methods. 2009 Mar;14(1):6-23. doi: 10.1037/a0014694. PMID: 19271845.

James, W. (1904 / 2007). *What is Pragmatism: A New Name for Some Old Ways of Thinking*. Minnesota, USA: Filiquarian Publishing, LLC.

Jamieson, M.K., Govaart, G.H. and Pownall, M. (2023) Reflexivity in quantitative research: A Rationale and beginner's guide. Social and Personality Psychology Compass, 17(4):

Jensen, J. K., Alkan Olsson, J., von Post, M., & Isaksson, C. (2024). Reconnecting children to nature: The efficacy of a wildlife intervention depends on local nature and socio-economic context, but not on urbanisation. *People and Nature*, 00, 1-14. https://doi.org/10.1002/pan3.10702

Kals, E., Schumacher, D., & Montada, L. (1999). Emotional affinity toward nature as a motivational basis to protect nature. *Environment and Behavior, 31*(2), 178–202.

Kaplan, R., & Kaplan, S. (1989). The experience of nature: A psychological perspective. Cambridge: Cambridge University Press.

Kaplan S. (1995). The restorative benefits of nature: Toward an integrative framework. *Journal of Environmental Psychology*, 15, 169–182. 1995)

Katsarou, E., Chatzipanagiotou, P., & Sougari, A.-M. (2023). A Systematic Review on Teachers' Well-Being in the COVID-19 Era. *Education Sciences*, *13*(9), 927. https://doi.org/10.3390/educsci13090927

Kaushik V, Walsh CA. Pragmatism as a Research Paradigm and Its Implications for Social Work Research. *Social Sciences*. 2019; 8(9):255. https://doi.org/10.3390/socsci8090255

Kay, L. (2023). 'I feel like the Wicked Witch': Identifying tensions between school readiness policy and teacher beliefs, knowledge and practice in Early Childhood Education. *British Educational Research Journal*, *50*(2), 632-652. https://doi.org/10.1002/berj.3937

Kelly, O., Buckley, K., Lieberman, L. J., & Arndt, K. (2022). Universal Design for Learning-A framework for inclusion in Outdoor Learning. *Journal of outdoor and environmental education*, *25*(1), 75-89.

Kim, L. and Asbury, K. 2020. Like a rug had been pulled from under you: The impact of COVID-19 on teachers in England during the first six weeks of the UK lockdown. *British Journal of Educational Psychology* 90: 1062-1083. https://doi.org/10.1111/bjep.12381

Kim, L.; Oxley, L. and Asbury, K. 2022. My brain feels like a browser with 100 tabs open: A longitudinal study of teachers' mental health and well-being during the COVID-19 pandemic. *British Journal of Educational Psychology* 92(1):299-318. doi: 10.1111/bjep.12450.

King, N. and Brooks, J.M. (2017) *Template analysis for business and management students.* Sage.

King, K., & Church, A. (2013). 'We don't enjoy nature like that': Youth identity and lifestyle in the countryside. *Journal of Rural Studies, 31*, 67–76.

Kleespies, M., Braun, T., Wenzel, V. & Dierkes, P. (2021). Measuring Connection to Nature—A Illustrated Extension of the Inclusion of Nature in Self Scale. Sustainability. 13. 1761. 10.3390/su13041761.

Knez, I., Thorsson, S., Eliasson, I. *et al.* Psychological mechanisms in outdoor place and weather assessment: towards a conceptual model. *Int J Biometeorol* **53**, 101–111 (2009). https://doi.org/10.1007/s00484-008-0194-z

Lankenau, G. R. (2018). Fostering connectedness to nature in higher education. *Environmental Education Research*, *24*(2), 230-244.

Learning Through Landscapes (2023) https://ltl.org.uk/about-us/ Accessed 7th May 2024.

Learning Through Landscapes (2025) Climate Ready School Grounds - Learning through Landscapes Accessed 17th February 2025.

Leather, M. (2018). A critique of Forest School: Something lost in translation. Journal of Outdoor and Environmental Education, 21, 5–18.

Lincoln, Y. S., & Guba, E. G. (2000). Paradigmatic controversies, contradictions, and emerging confluences. In N. K. Denzin, & Y. S. Lincoln (Eds.), The handbook of qualitative research (2nd ed., pp. 1065-1122), Thousand Oaks, CA: Sage Publications.

Lomax T, Butler J, Cipriani A, Singh I. Effect of nature on the mental health and well-being of children and adolescents: meta-review. *The British Journal of Psychiatry*. 2024;225(3):401-409. doi:10.1192/bjp.2024.109

Louv, R. (2005). *Last Child in the Woods: Saving Our Children From Nature-Deficit Disorder*. Chapel Hill, NC: Algonquin Books of Chapel Hill.

Lovell, R., O'Brien, L., & Owen, R. (2010). Review of the research evidence in relation to the role of trees and woods in formal education and learning. Forest Research

MacQuarrie, S. (2018) Everyday teaching and outdoor learning: developing an integrated approach to support school-based provision, Education 3-13, 46:3, 345-361, DOI: 10.1080/03004279.2016.1263968

Male, T. (2022). The rise and rise of academy trusts: continuing changes to the state-funded school system in England. *School Leadership & Management*, *42*(4), 313–333. https://doi.org/10.1080/13632434.2022.2095996

Mann, J., Gray, T., Truong, S., Brymer, E., Passy, R., Ho, S., ... & Cowper, R. (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.

Mannion, G., Fenwick, A., Nugent, C. & I'Anson, J. 2011. Teaching in nature. Scottish Natural Heritage Commissioned Report No. 476. Available at: www.snh.org.uk/pdfs/publications/commissioned_reports/476.pdf.

Mannion, G., Mattu, L. & Wilson, M. 2015. Teaching, learning, and play in the outdoors: a survey of school and pre-school provision in Scotland. Scottish Natural Heritage Commissioned

Report No. 779. <u>SNH Commissioned Report 779: Teaching, learning, and play in the outdoors: a survey of school and pre-school provision in Scotland</u>

Mannion, G., Ramjan, C., McNicol, S., Sowerby, M. and Lambert, P. (2023) *Teaching, Learning and Play in the Outdoors: a survey of provision in 2022.* NatureScot Research Report 1313.

Marchant, E., Todd, C., Cooksey, R., Dredge, S., Jones, H., Reynolds, D., & Brophy, S. (2019). Curriculum-based outdoor learning for children aged 9-11: A qualitative analysis of pupils' and teachers' views. *PloS One*, 14(5), e0212242.

Markevych, I., Schoierer, J., Hartig, T., Chudnovsky, A., Hystad, P., Dzhambov, A. M., de Vries S, Triguero-Mas M, Brauer M, Nieuwenhuijsen MJ, Lupp G, Richardson EA, Astell-Burt T, Dimitrova D, Feng X, Sadeh M, Standl M, Heinrich J, & Fuertes, E. (2017). Exploring pathways linking greenspace to health: Theoretical and methodological guidance. Environmental research, 158, 301-317. https://doi.org/10.1016/j.envres.2017.06.028

Marsh, H. W., Hau, K. T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis-testing approaches to setting cutoff values for fit indexes and dangers in overgeneralizing Hu and Bentler's (1999) findings. *Structural Equation Modeling*, *11*, 320–341.

Marsh, K., & Blackwell, I. (2023). 'COVID couldn't catch him there': can outdoor learning benefit primary school-aged children after a global health crisis?. *Education 3-13*, 1-14. https://doi.org/10.1080/03004279.2023.2182162

Martin, L., White, M. P., Hunt, A., Richardson, M., Pahl, S., & Burt, J. (2020). Nature contact, nature connectedness and associations with health, wellbeing and pro-environmental behaviours. *Journal of environmental psychology*, *68*, 101389.

Mayer, F. S., & Frantz, C. M. (2004). The connectedness to nature scale: A measure of individuals' feeling in community with nature. *Journal of environmental psychology*, *24*(4), 503-515.

Mazrekaj, D., & De Witte, K. (2024). The Impact of School Closures on Learning and Mental Health of Children: Lessons From the COVID-19 Pandemic. Perspectives on Psychological Science, 19(4), 686-693. https://doi.org/10.1177/17456916231181108

McCormack (2024) NI's government has returned Stormont - what you need to know - BBC News

McKaskill, M., Bhatti, S., Bristow, T., Mahati, S., Papioannou, K., Philips, N., Uglow, M. & Haux, T. (2023) Nature Friendly Schools: Implementation, process, and outcome evaluation. Final report. National Centre for Social Research.

McLean, D. & Worth, J. (2025) Teacher Labour Market in England Annual Report. National Foundation for Educational Research.

McLeroy KR, Bibeau D, Steckler A et al. (1988) An ecological perspective on health promotion programs. *Health Educ Behav* 15, 351–377.

Meis-Harris, J., Borg, K., & Jorgensen, B. S. (2021). The construct validity of the multidimensional AIMES connection to nature scale: Measuring human relationships with nature. *Journal of environmental management, 280*, 111695. https://doi.org/10.1016/j.jenvman.2020.111695

Met Office UK regional climates - Met Office Accessed 8th March 2025.

Monitoring engagement of the natural environment children's report. (2019)
Retrieved September 16, 2022,
from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/828838/Monitor_of_Engagement_with_the_Natural_Environment__MENE__Childrens_Report_2018-2019_rev.pdf

Miller NC, Kumar S, Pearce KL, Baldock KL. The outcomes of nature-based learning for primary school aged children: a systematic review of quantitative research. *Environ Educ Res.* (2021) 27:1115–40. doi: 10.1080/13504622.2021.1921117

Milner, H. R. (2007). Race, culture, and researcher positionality: Working through dangers seen, unseen, and unforeseen. *Educational Researcher, 36*(7), 388–400. https://doi.org/10.3102/0013189X07309471

Mitchell, R. & Popham, F. (2008). Effect of exposure to natural environment on health inequalities: an observational population study. Lancet, 372 (2008), pp. 1655-1660

Mitchell, R., & Shaw, R. (2015). Health Impacts of the John Muir Award. University of Glasgow

Moser, N., Sahiti, F. & Gelbrich, G. Association between self-reported and objectively assessed physical functioning in the general population. *Sci Rep* **14**, 16236 (2024). https://doi.org/10.1038/s41598-024-64939-z

Moula, Z., Walshe, N., & Lee, E. (2023). "It was like I was not a person, it was like I was the nature": The impact of arts-in-nature experiences on the wellbeing of children living in areas of high deprivation. *Journal of Environmental Psychology*, *90*, 102072. https://doi.org/10.1016/j.jenvp.2023.102072

Mygind, E., Bølling, M., & Barfod, K.S. (2018). Primary teachers' experiences with weekly education outside the classroom during a year. *Education*, 3-13, 1–13

Mygind, L., Kjeldsted, E., Hartmeyer, R. D., Mygind, E., Bølling, M., & Bentsen, P. (2019). Immersive nature-experiences as health promotion interventions for healthy, vulnerable, and sick populations? A systematic review and appraisal of controlled studies. Frontiers in Psychology, 10.3389. https://doi.org/10.3389/fpsyg.2019.00943

Mygind, L., Kurtzhals, M., Nowell, C., Melby, P.S., Stevenson, M.P., Nieuwenhuijsen, M., Lum, J.A.G., Flensborg-Madsen T., Bentsen, B. & Enticott,P.G. (2021) Landscapes of becoming social: A systematic review of evidence for associations and pathways between interactions with nature and socioemotional development in children. Environment International, 146.106238, ISSN 0160-4120, https://doi.org/10.1016/j.envint.2020.106238.

Myhre, T.S. & Fiskum, T.A. (2021) Norwegian teenagers' experiences of developing second language fluency in an outdoor context, Journal of Adventure Education and Outdoor Learning, 21:3, 201-216, DOI: 10.1080/14729679.2020.1769695

Nagi, S., Kempe, S., Barriault, S., Masri, L., Dyyat, S., Muhl, C., ... & Racine, N. (2025). Into the wild: a mixed-methods pilot study of the mental health benefits of a nature summer camp for urban children with psychological needs. *BMC Public Health*, *25*(1), 1-12.

NASUWT (2024) Wellbeing Survey Briefing. Accessed online at https://www.nasuwt.org.uk/static/17ad7ef2-879e-40d4-96b3c014e605746a/Teachers-Wellbeing-Survey-Report-2024.pdf

Natural England (2020) The People and Nature Survey for England: Children's Survey. Accessed online 12th October 2022 at The People and Nature Survey for England: Children's survey (Experimental Statistics) - GOV.UK

Nisbet, E. K., & Zelenski, J. M. (2013). The NR-6: A new brief measure of nature relatedness. Frontiers in Psychology, 4.

Nisbet, E. K., Zelenski, J. M., & Murphy, S. A. (2009). The Nature Relatedness Scale: Linking individuals' connection with nature to environmental concern and behavior. *Environment and Behavior.* 41(5), 715-740

Oberle, E., Zeni, M., Munday, F. & Brussoni, M. (2021) Support Factors and Barriers for Outdoor Learning in Elementary Schools: A Systemic Perspective, American Journal of Health Education, 52:5, 251-265,DOI: 10.1080/19325037.2021.1955232

OFSTED (2025) Improving the way Ofsted inspects education: consultation document. Accessed online 30th March 2025 at: Improving the way Ofsted inspects education: consultation document - GOV.UK

ONS (2020) Access to garden spaces: England - Office for National Statistics Accessed online 15th May 2023.

ONS (2022) Personal well-being in the UK, quarterly - Office for National Statistics (ons.gov.uk)

ONS (2023) Personal well-being in the UK - Office for National Statistics (ons.gov.uk)

Otto, S., & Pensini, P. (2017). Nature-based environmental education of children: Environmental knowledge and connectedness to nature, together, are related to ecological behaviour. *Global environmental change*, *47*, 88-94.

Pantić, N. (2015). A model for study of teacher agency for social justice Teachers and Teaching Theory and Practice, 21 (6), 759-778.

Parker, G. (Nee R. (2015). Teachers' Autonomy. *Research in Education*, *93*(1), 19-33. https://doi.org/10.7227/RIE.0008 (Original work published 2015)

Parkin & Junker (2023) Measuring the impact of the Generation Wild project on children's nature connection and wellbeing. Oral presentation at the British Environmental Psychology conference. September 2023.

Passmore, H.-A., Martin, L., Richardson, M., White, M., Hunt, A., & Pahl, S. (2021). Parental/Guardians' connection to nature better predicts children's nature connectedness than visits or area-level characteristics. *Ecopsychology, 13*(2), 103–113. https://doi.org/10.1089/eco.2020.0033

Passy, R. and Cutting, R. 2023. The Children and Nature Programme 2019-2022. Learning Report. NECR488. Natural England.

Patchen, A.K., Rakow, D.A., Wells, N.M., Hillson, S. & Meredith, G.R. (2022) Barriers to children's outdoor time: teachers' and principals' experiences in elementary schools, Environmental Education Research, DOI: 10.1080/13504622.2022.2099530

Pawson, R. &Tilley, N. (1997) *Realist Evaluation.* Sage.

Priestley, M., Edwards, R., Priestley, A., & Miller, K. (2012). Teacher Agency in Curriculum Making: Agents of Change and Spaces for Manoeuvre. *Curriculum Inquiry*, *42*(2), 191–214. https://doi.org/10.1111/j.1467-873X.2012.00588.x

Priestley, M., Biesta, G.J.J. & Robinson, S. (2015). Teacher Agency: An Ecological Approach. London: Bloomsbury Academic.

Prince HE. Outdoor experiences and sustainability. *J Adv Educ Outdoor Learn.* (2017) 17:161–71. doi: 10.1080/14729679.2016.1244645

Prince, H.E. (2019) Changes in outdoor learning in primary schools in England, 1995 and 2017: lessons for good practice, Journal of Adventure Education and Outdoor Learning, 19:4, 329-342, DOI: 10.1080/14729679.2018.1548363

Prince, H.E. & Diggory, O. (2023) Recognition and reporting of outdoor learning in primary schools in England, Journal of Adventure Education and Outdoor Learning DOI: 10.1080/14729679.2023.2166544

Pritchard, A.; Richardson, M.; Sheffield, D.; McEwan, K. (2020) The relationship between nature connectedness and eudaimonic well-being: A meta-analysis. *J. Happiness Stud. 21*, 1145–1167.

Remmen, K. B., & Iversen, E. (2022). A scoping review of research on school-based outdoor education in the Nordic countries. *Journal of Adventure Education and Outdoor Learning*, *23*(4), 433–451. https://doi.org/10.1080/14729679.2022.2027796

Richardson, E. A., Pearce, J., Shortt, N. K., & Mitchell, R. (2017). The role of public and private natural space in children's social, emotional and behavioural development in Scotland: A longitudinal study. *Environmental Research*, *158*, 729–736.

Richardson, M., Hunt, A., Hinds, J., Bragg, R., Fido, D., Petronzi, D., Barbett, L., Clitherow, T., & White, M. (2019). A measure of nature connectedness for children and adults: Validation, performance, and insights. Sustainability, 11, 3250.

Rickinson, M., Dillon, J., Teamey, K., Morris, M., Choi, M. Y., Sanders, D., & Benefield, P. (2004). A review of research on outdoor learning. Field Studies Council

Rigolon A, Browning MHEM, McAnirlin O, Yoon HV. Green Space and Health Equity: A Systematic Review on the Potential of Green Space to Reduce Health Disparities. Int J Environ Res Public Health. 2021 Mar 4;18(5):2563. doi: 10.3390/ijerph18052563. PMID: 33806546; PMCID: PMC7967323.

Roffey S. Pupil wellbeing -Teacher wellbeing: Two sides of the same coin? Educ Child Psychol. 2012;

Rogers, S. (2010) Play and pedagogy: a conflict of interests? In Rethinking Play and Pedagogy in Early Childhood Education. 1st edition. Routledge.

Rosa, C. D., Larson, L. R., Collado, S., Cloutier, S., & Profice, C. C. (2023). Gender differences in connection to nature, outdoor preferences, and nature-based recreation among college students in Brazil and the United States. *Leisure Sciences*, *45*(2), 135-155.

RSPB   https://www.rspb.org.uk/whats-happening/big-garden-birdwatch/info

Rosa, E.M. & Tudge, J. (2013). "Urie Bronfenbrenner's Theory of Human Development: Its Evolution From Ecology to Bioecology: The Evolution of Urie Bronfenbrenner's Theory". *Journal of Family Theory & Review*. 5 (4): 243–258. doi:10.1111/jftr.12022

Rowley, A. (2023). *Natural curriculum summary report*. Natural England.

Rowley, A. & Cont, S. (2024) Empowering nature and climate literacy: the role of educators in a changing world. Accessed online 24th September 2024 at: Empowering nature and climate literacy: The role of educators in a changing world | BERA

Ruiz-Gallardo J-R, Verde A, Valdés A. Garden-based learning: an experience with "at risk" secondary education students. J Environ Educ. (2013) 44:252–70. doi: 10.1080/00958964.2013.786669 59.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Sarvan S, Muslu L. In the eyes of adolescents, is the pandemic an obstacle or a gain? A qualitative study based on the ecological theory. J Pediatr Nurs. 2022 Sep-Oct;66:15-22. doi: 10.1016/j.pedn.2022.05.012. Epub 2022 May 19. PMID: 35597131; PMCID: PMC9414683.

Schinka, J. A., Velicer, W. F., & Weiner, I. B. (2013). *Handbook of psychology: Research methods in psychology, Vol. 2*. John Wiley & Sons, Inc..

Schneller, M. B., Duncan, S., Schipperijn, J., Nielsen, G., Mygind, E., & Bentsen, P. (2017). Are children participating in a quasi-experimental education outside the classroom intervention more physically active? BMC Public Health, 17, 523. https://doi.org/10.1186/s12889-017-4430-5

Schultz, P. W. (2002). Inclusion with nature: The psychology of human-nature relations. In Schmuck, P., Schultz, W. P., & Milfont, T. L. (Ed.) Psychology of Sustainable Development. Boston: Kluwer Academic.

Schcolnik, M., Kol, S., & Abarbanel, J. (2006). Constructivism in Theory and in Practice. In *English Teaching Forum* (pp. 12-20). US Department of State, Bureau of Educational and Cultural Affairs, Office of English Language Programs

Schumann, S., & Sibthorp, J. (2014). The development and scaling of the teaching outdoor education self-efficacy scale. *Research in outdoor education*, *12*(1), 80-98.

Scott, G., Boyd, M. and Colquhoun, D., (2013). Changing spaces, changing relationships: The positive impact of learning out of doors. Australian Journal of Outdoor Education, 17(1), 47 - 53.

Scott, G. W., Boyd, M., Scott, L., & Colquhoun, D. (2014). Barriers To Biological Fieldwork: What Really Prevents Teaching Out of Doors? *Journal of Biological Education*, *49*(2), 165–178. https://doi.org/10.1080/00219266.2014.914556

Scottish Executive. (2006). A curriculum for excellence: Progress and proposals. Edinburgh, UK: Scottish Executive.

Sharma, N. & Tate, M. (2023) Annual governance survey. National Governance Association.

Shepherd, J., Noble, E. & Parkin, J. (2022) Positionality and reflexivity for early career researchers and postgraduate researchers. https://www.bera.ac.uk/blog/positionality-and-reflexivity-for-early-career-researchers-and-postgraduate-researchers Accessed online 02/05/24

Sharples, J., Eaton, J., Boughelaf, J. (2024) Accessed online 8th March at A School's Guide to Implementation | EEF

Shoari, N., Ezzati, M., Doyle, Y.G. *et al.* Nowhere to Play: Available Open and Green Space in Greater London Schools. *J Urban Health* **98**, 375–384 (2021). https://doi.org/10.1007/s11524-021-00527-0

Shrestha, Topaz, et al. "The natural world around me; a qualitative exploration of young people's relationship to nature and how it relates to their wellbeing and feelings of pro-environmental behaviour." *Journal of Environmental Psychology* 103 (2025): 102556.

Shume, T. J., & Blatt, E. (2019). A sociocultural investigation of pre-service teachers' outdoor experiences and perceived obstacles to outdoor learning. *Environmental Education Research*, 25(9), 1–21. https://doi.org/10.1080/13504622.2019.1610862

Skinner, B.F. (1957) Verbal Behaviour. Upper Saddle River, NJ : Prentice Hall.

Skripkauskaite, S., Creswell, C., Shum, A., Pearcey, S., Lawrence, P., Dodd, H., & Waite, P. (2023). Changes in UK parental mental health symptoms over 10 months of the COVID-19 pandemic. *JCPP Advances*, *3*(2). https://doi.org/10.1002/jcv2.12139

Slater, H. (2022). Exploring minority ethnic communities' access to rural green spaces: The role of agency, identity, and community-based initiatives. *Journal of Rural Studies*, 92, 56–67. https://doi.org/10.1016/j.jrurstud.2022.03.007

Smith, T. A. and Pitt, H. 2022. 'But, would we be the odd family?': Encountering and producing unfamiliar bodies and landscapes. In: Smith, T. A., Pitt, H. and Dunkley, R. A. eds. Unfamiliar Landscapes: Young People and Diverse Outdoor Experiences. Palgrave Macmillan, Cham, pp. 283-308., (10.1007/978-3-030-94460-5_12)

Sors, L. (2025). Inclusive and Holistic Practice in Place-responsive Outdoor Learning. In the BERA Guide to Outdoor Learning: Place-responsive Pedagogy in Educational Research and Practice, Lucy Sors, Ruth Unsworth.

Sors, L. & Whitfield, L. (2025) Decolonising Outdoor Learning: Developing Connectedness Through Place-responsive Pedagogy Beyond the Early Years in England. In the BERA Guide to Outdoor Learning: Place-responsive Pedagogy in Educational Research and Practice, Lucy Sors, Ruth Unsworth.

Stead, M. (2022). Generation Wild: inspiring the next generation of nature lovers. Environmental Education, 129, 15-16. ISSN 0 309-8451.

Stead, M. (2023). Generation Wild: Connecting disadvantaged children with nature through storytelling and adventure. Primary Science, 179, 21-23. https://www.ase.org.uk/system/files/PS 179 p21-23 Stead.pdf

Stead, M. & Marshall, S. (2025) Generation Wild Phase 1 Evaluation Report.

Stern, M. J., Powell, R. B., & Hill, D. (2014). Environmental education program evaluation in the new millennium: What do we measure and what have we learned? *Environmental Education Research*, *20*(5), 581-611.

Stevens, J. P. (2002). *Applied multivariate statistics for the social sciences* (4th ed.). Erlbaum.

Stokols D. Translating social ecological theory into guidelines for community health promotion. Am J Health Promot. 1996 Mar-Apr;10(4):282-98. doi: 10.4278/0890-1171-10.4.282. PMID: 10159709.

Streiner D. L., Norman G. R., Cairney J. *Health Measurement Scales. A Practical Guide to Their Development and Use.* 4th. New York, NY, USA: Oxford University Press; 2014.

Tabachnick, B. G., & Fidell, L. S. (2019). Using Multivariate Statistics (7th ed.). Pearson.

Talebpour, L. M., Busk, P. L., Heimlich, J. E., & Ardoin, N. M. (2020). Children's connection to nature as fostered through residential environmental education programs: Key variables

explored through surveys and field journals. *Environmental Education Research*, *26*(1), 95-114.

Tam, K. P. (2013). Concepts and measures related to connection to nature: Similarities and differences. Journal of Environmental Psychology, 34, 64-78.

Teddlie, Charles, and Tashakkori, A. (2009) Foundations of Mixed Methods Research. Thousand Oaks: Sage Publications.

Terry, G., Hayfield, N., Clarke, V. & Braun, V. (2017) Thematic Analysis, chapter in The SAGE Handbook of Qualitative Research in Psychology. Ed. Willig & Stainton-Rogers. Sage

Thurstone, L.L. (1947). *Multiple factor analysis.* University of Chicago Press: Chicago.

Thurstone, L. L. (1954). An analytical method for simple structure. *Psychometrika, 19,* 173–182. https://doi.org/10.1007/BF02289182

Townsend N, Foster C. Developing and applying a socio-ecological model to the promotion of healthy eating in the school. *Public Health Nutrition*. 2013;16(6):1101-1108. doi:10.1017/S1368980011002655

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and teacher education*, *17*(7), 783-805.

Tschannen-Moran, M., Hoy, A. W., & Hoy, W. K. (1998). Teacher Efficacy: Its Meaning and Measure. Review of Educational Research, 68(2), 202-248. https://doi.org/10.3102/00346543068002202

Tudge, J., Mokrova, I. L., Hatfield, B. E., & Karnik, R. B. (2009). Uses and misuses of bronfenbrenner's bioecological theory of human development. Journal of Family Theory &Amp; Review, 1(4), 198-210. https://doi.org/10.1111/j.1756-2589.2009.00026.x

Ulrich RS, et al. Stress recovery during exposure to natural and urban environments. *J. Environ. Psychol.* 1991;11:201–230. doi: 10.1016/S0272-4944(05)80184-7.

Ulrich, R.S. Biophilia, biophobia, and natural landscapes. *Biophilia Hypothesis* 1993, *7*, 73–137.

Van Dijk-Wesselius, J. E., van Den Berg, A. E., Maas, J., & Hovinga, D. (2020). Green schoolyards as outdoor learning environments: Barriers and solutions as experienced by primary school teachers. *Frontiers in Psychology*, 10, 2919.

Vélez-Agosto, N. M., Soto-Crespo, J. G., Vizcarrondo-Oppenheimer, M., Vega-Molina, S., & García Coll, C. (2017). Bronfenbrenner's Bioecological Theory Revision: Moving Culture From the Macro Into the Micro. Perspectives on Psychological Science, 12(5), 900-910. https://doi.org/10.1177/1745691617704397

Vesely, S. & Klöckner, C. A. (2020). Social desirability in environmental psychology research: Three meta-analyses. *Frontiers in psychology*, *11*, 1395.

Vinall, C. (2022). Like a puppet on a string … exploring Headteachers' perceived demise of Local Governing Bodies within an English Multi-Academy Trust. Management in Education, 36(1), 25-33. https://doi.org/10.1177/08920206211051474

Vygotsky, L. S. (1986, 1934). Thought and language. Cambridge, MA: MIT Press.

Wachs, T. D. (2000). *Necessary but not sufficient: The respective roles of single and multiple influences on individual development.* American Psychological Association. https://doi.org/10.1037/10344-000

Waite, S. 2010. "Losing Our Way? Declining Outdoor Opportunities For Learning For Children Aged Between 2 and 11." *Journal of Adventure Education and Outdoor Learning* 10 (2): 111–126.

Waite, S., Passy, R., Bentsen, P., Mygind, E., Ho, S., D'Rosario, V., Stewart, A., & Gough, N. (2016). *Understanding educational and wellbeing implications of learning outside the classroom through cross-national collaboration*.

Waite, S., Husain, F., Scandone, B., Forsyth, E. & Piggott, H. (2021) 'It's not for people like (them)': structural and cultural barriers to children and young people engaging with nature outside schooling, Journal of Adventure Education and Outdoor Learning, DOI: 10.1080/14729679.2021.1935286

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

Walker, E., D. Bormpoudakis, and J. Tzanopoulos. 2021. "Assessing Challenges and Opportunities for Schools' Access to Nature in England." *Urban Forestry & Urban Greening* 61: 127097.

Walshe, N., Moula, Z., & Lee, E. (2022). Eco-Capabilities as a Pathway to Wellbeing and Sustainability. *Sustainability*, *14*(6), 3582. https://doi.org/10.3390/su14063582

Watkins, M. W. (2018). Exploratory Factor Analysis: A Guide to Best Practice. Journal of Black Psychology, 44(3), 219-246.

Wildlife and Countryside Link (2024) Policy overview: a new statutory requirement for access to and engagement with nature in education. Accessed online 30th March 2025 at: ELPG_policy_paper_summary_June 2024.pdf

Wells, N. M., & Evans, G. W. (2003). Nearby Nature. *Environment and Behavior*, *35*(3), 311-330. https://doi.org/10.1177/0013916503035003001

Welsh Government (2020a) *Curriculum for Wales: Developing a vision for curriculum design*. Accessed online 17th July 2023 at Developing a vision for curriculum design - Hwb

Welsh Government (2020b) *Curriculum for Wales: Curriculum design and the four purposes*. Accessed online 17th July 2023 at Developing a vision for curriculum design - Hwb

Welsh Government (2022) Curriculum for Wales. Accessed online 18th July 2023 at https://hwb.gov.wales/curriculum-for-wales

West, A. and Wolfe, D. (2019) 'Academies, autonomy, equality and democratic accountability: Reforming the fragmented publicly funded school system in England'. London Review of Education, 17 (1): 70–86. DOI https://doi.org/10.18546/LRE.17.1.06

Whatmore, S. (2002). Hybrid Geographies: Natures Cultures Spaces. London: Sage Publications.

Whitburn, J., Linklater, W., & Abrahamse, W. (2020). Meta-analysis of human connection to nature and proenvironmental behavior. Conservation Biology, 34, 180-193

White, M. P., Alcock, I., Grellier, J., Wheeler, B. W., Hartig, T., Warber, S. L., ... & Fleming, L. E. (2019). Spending at least 120 minutes a week in nature is associated with good health and wellbeing. *Scientific reports*, *9*(1), 1-11.

White RL, Eberstein K, Scott DM. (2018) Birds in the playground: Evaluating the effectiveness of an urban environmental education project in enhancing school children's awareness, knowledge and attitudes towards local wildlife. PLoS One. 13(3):e0193993. doi: 10.1371/journal.pone.0193993. PMID: 29509809; PMCID: PMC5839573.

Widaman, K. F. (2018). On common factor and principal component representations of data: Implications for theory and for confirmatory replications. *Structural Equation Modeling, 25*(6), 829–847. https://doi.org/10.1080/10705511.2018.1478730

Willig, C. (2013). Introducing qualitative research in psychology (3rd ed). Open University Press.

Wilson, E.O. (1984). Biophilia. Cambridge, MA: Harvard University Press.

World Health Organization (1986) *Ottawa Charter for Health Promotion*. Geneva: WHO.

Worth, J. and Van den Brande, J. (2020) Teacher autonomy: how does it relate to job satisfaction and retention? Slough: NFER.

WWF (2024) *Schools for Nature: Report on nature connection in UK schools*. WWF-UK. Accessed online 6th November 2025 at: Schools For Nature Report.

WWT (2017) The impact of school visits to WWT wetland centres on pupil attitudes to nature.

WWT (2019) Inspiring Generations: learning through exploration and discovery. Project report. Accessed online 8th May 2024 at https://www.wwt.org.uk/uploads/documents/2019-06-04/1559662710-wwt-inspiring-generations-project-report-full.pdf

WWT (2021) https://www.wwt.org.uk/our-work/projects/generation-wild/

Yao, W., Zhang, X., & Gong, Q. (2021). The effect of exposure to the natural environment on stress reduction: A meta-analysis. *Urban forestry & urban greening*, *57*, 126932.

Zaidi, N. and Pitt, H. 2022. Invisible boundaries to access and participation in public spaces : Navigating community diversity in Leicester, UK. Local Environment

Zelezny, L., Chua, P., & Aldrich, C. (2000). Elaborating on gender differences in environmentalism. *Journal of Social Issues, 56*(3), 443–457.

Appendices

Appendix 1: Semi structured interview guide for study 1

Question	Follow up/ prompt if necessary
Can you tell me a bit about yourself and your school?	Does school have an ethos of taking children out into nature?
How easy is to access green space in your school and your local area?	
How interested are you personally in nature and the environment?	Do you feel comfortable outdoors? Knowledgeable about nature and the environment? Does that matter?
Do you think children benefit from spending time in nature?	How? Wellbeing? Pro-environmental behaviours?
Do you think there can be barriers to teachers taking children out into natural environments?	Have you personally experienced barriers in your school? Or in previous schools?
Are some teachers more likely to take children outdoors?	Who? Why? What made your class's participation so successful?
Why did you book this Generation Wild visit?	Or did someone else book it?
How did your class respond to the GW visit?	
What were your own feelings about the GW project?	Would you recommend it to another school?
Are there any children you think have particularly benefited from this project?	Age? Gender? Cultural/ethnicity factors? Deprivation? SEND?
Are there any children you think will find it difficult to engage with this project?	

Which parts of the visit and follow up worked particularly well? Was there anything that didn't work so well, from your point of view?	261
How have you used the Generation Wild story and activities with your class so far?	If not, what were barriers?
Have the children in your class completed Generation Wild activities at home?	Internet access?
How many of the children in your class have become a Guardian of the Wild?	Transport?
How many of the children in your class have been on a return family visit with their free ticket?	Parental engagement? Materials not suitable for age group?
Has the experience of the COVID pandemic over the last two years been relevant to your participation in GW?[17]	
Are there any stories you'd like to share about your class and Generation Wild?	

Added as a question from participant 5 onwards due to participant focus on topic during early interviews

Appendix 2: Research journal extract

Visit observation

I observed two year 2 classes (age six and seven years) from the same school taking part in Generation Wild at Martin Mere. It was a fine but bitterly cold winter's day. Martin Mere had just reopened after being closed for several weeks due to Avian flu cases, and restrictions around site access meant that the nest and several activity posts had been moved to new locations. The learning manager had invited me to visit and asked for my feedback on these physical layout changes, and I had intended that to be the primary focus of this observation.

During the morning session, I chatted with the class teacher. She was enthusiastic about the trip, and spoke about how much the children were enjoying the experience and the activities. I asked her if she was planning to carry out more of the Generation Wild activities when they got back to school. She felt that would be almost impossible. "We don't have anywhere we can do this kind of thing at our school." I commiserated with her. Lack of accessible green space is frequently mentioned by teachers as a major obstacle to outdoor learning.

After lunch, I observed the second class during their Generation Wild session. I asked this class teacher the same question I'd asked her colleague earlier, "Do you think you'll carry on with the activities when you get back to school?"

"Oh, yes!" she exclaimed. "This is right up our street. My class love being outside, and our school is really lucky. We have a tiny patch of woodland in our grounds, which we use for outdoor learning, so we'll go out there and do some of the activities." I agreed that they were indeed lucky, and then mused all the way home about the contradictions in those two responses from teachers working in the same school environment.

My reflections afterwards (more questions than answers)

The vignette described above happened incidentally to the main purpose of my visit, but I keep coming back to it as informative, because of the reflective thinking it sparked.

What happened there? Two teachers, working with the same year group, in the same school, gave me contradictory answers about the possibilities offered by their local environment. For whatever reasons (experience, confidence, personal inclination), these two teachers held different views about the possibility of taking their class outdoors to complete nature activities.

So does their school have green space or no green space? I'm curious, so I've found the school's website and searched for more information; I've peered at the satellite image of the school and surrounding area on Google maps. The school grounds are (typically) majority hard surfaced playground and carparking, <u>but</u> there is also grassy playing field, an outdoor classroom, the small precious patch of woodland described by the second teacher, a pond, and a garden with a greenhouse and raised beds. There are three public parks within a seven-minute walking radius. They might not be wild, or full of rare species, but they are green spaces, with trees.

As an outside observer (and experienced and enthusiastic outdoor educator) it seems almost certain to me that there would be opportunities to carry out many of Generation Wild's suggested nature connection activities within school grounds, with more options available in the very local area, but one teacher had not thought so. I don't think she was being deliberately dishonest. Why would she bother? Rather, I assume she was telling me the truth as she experienced it.

Perhaps she did not equate nature with what was available in her school grounds or nearby? Separation of big wild distant nature vs small near everyday nature? Was she contrasting her school grounds with the extensive habitats and species of Martin Mere? Or she may have felt there were too many (unspoken, other) barriers to using those spaces? Systemic or school cultural factors? Does this mean that the availability of suitable outdoor learning

spaces as much a subjective phenomenon as it is an objective measurable fact? It's always easier to blame external factors for why you don't do something than to acknowledge the internal factors that are stopping you.

I realised there were subtle differences between how the two teachers had behaved during the activities. The afternoon teacher had modelled the activities herself, and prompted individuals or groups who were reluctant or struggling. She got down on the ground; she picked up sticks and leaves and stones; she joked with the children when her hands and shoes became muddy. And her own enthusiasm for nature made a big difference to the children's engagement. In contrast, while the morning teacher had been positive about the trip and what Martin Mere offered, she was less engaged (and perhaps felt personally uncomfortable) with the hands-on nature of the activities. She had been pleasant and professional, managing children's behaviour, asking and answering questions, and keen for her class to see (and name) birds. She wanted her class to learn from the visit, and she related what they were seeing to what they had learned in the classroom, but perhaps she had not truly bought in to the idea of hands-on outdoor experiential learning? Or with nature connection as opposed to teaching children about nature?

These individual differences between teachers are what I really want to dig down into through developing a quantitative scale measure. I hope to gain a more nuanced understanding of the specific challenges of a programme like Generation Wild, which depends on individual teachers to engage the children in their class in the longer term, beyond the initial day visit. Ultimately, the aim is to figure out what support teachers need, how to best target them, in order to make education initiatives more impactful. Could Generation Wild be tweaked to help them recognise what natural environments they do have locally, rather than what is not available?

Appendix 3: Pool of 58 items[18] as used in cognitive testing in study 2ii

Teacher factor

T1. I don't enjoy teaching outdoors.

T2. I enjoy teaching outdoors.

T3. I'm happy teaching outdoors whatever the weather.

T4. Bad weather puts me off teaching outdoors.

T5. Teaching outdoors is a high priority for me.

T6. I just don't see the point of taking my class outside.

T7. Outdoor learning feels like just another box I have to tick.

T8. I believe that outdoor learning is important for children's physical health.

T9. I believe that outdoor learning is important for children's mental health and wellbeing.

T10. Getting my class ready to go outside takes too long.

T11. I don't have enough time to plan and prepare outdoor lessons.

T12. I need ideas for outdoor lessons.

T13. I have the skills to teach outdoors.

T14. I don't know enough about local nature to teach children outdoors.

T15. I don't have enough experience to teach outdoors.

T16. I am not comfortable with the risks of taking children outdoors.

T17. I feel confident teaching outdoors.

T18. I am able to answer children's questions when teaching outdoors.

T19. I find teaching outdoors too unpredictable.

T20. It's difficult for me to manage children's behaviour outdoors.

T21. Children are more distracted when learning outdoors.

T22. Children are more focused when learning outdoors.

T23. Children's behaviour is better outdoors.

T24. It is difficult for pupils with SEND (Special Educational Needs and Disabilities) to access outdoor learning.

T25. Children are more engaged with learning outdoors.

---

[18] Italicised items are negatively valenced

School factor

S1. There is not enough green space for outdoor learning in our school grounds.

S2. There are accessible green spaces we can use within walking distance of our school.

S3. All children in my class have appropriate outdoor clothing and footwear.

S4. Our school has spare outdoor gear to lend to children.

S5. Parents complain if children get wet and muddy.

S6. Our school timetabling makes it difficult to take my class outside.

S7. Staffing in our school makes it difficult to take my class outside.

S8. There is pressure from parents to do more outdoor learning.

S9. Parents don't see the point of outdoor learning.

S10. I feel supported to teach outdoors by my headteacher.

S11. Our school leaders are strong advocates for outdoor learning.

S12. Our school leaders think that teaching outdoors is a waste of time.

S13. Our school leaders think that outdoor learning poses safety issues.

S14. Outdoor learning is a priority in our school.

S15. Outdoor learning is not valued in our school.

S16. There is pressure not to spend more time outdoors than other classes do.

S17. Our outdoor space is not safe for children to learn in.

S18. Our school has risk assessments in place to support outdoor learning.

S19. Every teacher is responsible for outdoor learning with their own class.

S20. Our school has a staff member who is a specialist in outdoor teaching.

Systemic factor

Sys1. The pressure to prepare children for standardised tests stops me teaching outdoors.

Sys2. Getting good results on standardised tests is more important than outdoor learning.

Sys3. School inspectors regard teaching outdoors as a waste of time.

Sys4. School inspectors see the value in outdoor learning.

Sys5. The fear of a poor school inspection judgement stops me teaching outdoors.

Sys6. I'm too busy trying to get through the curriculum to teach outdoors.

Sys7. There are plenty of curriculum links you can make when teaching outdoors.

Sys8. If outdoor learning were on the curriculum, it would be easier to justify doing more.

Sys9. The national curriculum in my country does not make outdoor learning a priority.

Sys10. Teaching outdoors becomes more difficult as children get older.

Sys11. There are plenty of curriculum topics that can be taught outdoors.

Sys12. It's difficult to assess progress during outdoor learning.

Sys13. It's difficult to evidence progress during outdoor learning.

Appendix 4: Instructions to Cognitive Interview Participants

We are developing a new survey measure about what teachers perceive to be the barriers to outdoor teaching and learning in UK primary schools. Your contribution will help us understand teachers' views, and ensure that questions used in the next phase of our research are appropriate, relevant and meaningful to the UK teaching workforce.

Please ask if you have any further questions at this stage.

You will see 58 statements that teachers have made about teaching outdoors. Please answer them thinking about your current /most recent job. Some of the statements are about you and some are about your school. Some of the statements may seem very similar- this is because we want to understand which wording works best.

I would like you to read each statement aloud and then think out loud as you answer the question. That might include saying what you think the question means, or saying if the meaning is not clear to you. It could also mean saying that you find the question difficult to answer and saying why that is.

There are no right or wrong answers, as the aim of this interview is to help us improve our questions.

Appendix 5: Reduced 29 item version of SCOOL scale used in study 2iii[19]

T2. I enjoy teaching outdoors.

T4. *Bad weather puts me off teaching outdoors.*

T5. Teaching outdoors is a high priority for me.

T10. *Getting my class ready to go outside takes too long.*

T11. *I don't have enough time to plan and prepare outdoor lessons.*

T13. I have the skills to teach outdoors.

T15. *I don't have enough experience to teach outdoors.*

T17. I feel confident teaching outdoors.

T20. *It's difficult to manage children's behaviour outdoors.*

T21. *Children are more distracted when learning outdoors.*

T25. Children are more engaged with learning outdoors.

S1/2. There are green spaces around our school that are easy to access for outdoor learning.

S3. All children in my class own appropriate outdoor clothing and footwear.

S4. Our school has spare outdoor gear to lend to children.

S5. *Parents complain if children get wet and muddy.*

S7. *Staffing in our school makes it difficult to take my class outside.*

S9. *Parents don't see the point of outdoor learning.*

S11. Our school leaders are strong advocates for outdoor learning.

S13. *Our school leaders think that outdoor learning poses safety issues.*

S14. Outdoor learning is a priority in our school.

S16. *There is pressure not to spend more time outdoors than other classes do.*

S17. *Our local green spaces are not safe for children to learn in.*

S20. Our school has a staff member who is trained in outdoor teaching.

Sys1. *The pressure to prepare children for standardised tests stops me teaching outdoors.*

Sys4. School inspectors see the value in outdoor learning.

Sys5. *The fear of a poor school inspection judgement stops me teaching outdoors.*

---

[19] Items in italics are negatively framed.

Sys6. I'm too busy trying to get through the curriculum to teach outdoors.

Sys10. Teaching outdoors becomes more difficult as children get older [and the pressures of standardised testing increase]

Sys13. It's possible to evidence progress during outdoor learning.

Appendix 6: Qualtrics survey Study 3

Introduction and Consent

Are you currently working as a teacher in the UK?

○ Yes

○ No

Unfortunately you are not eligible to take part in this study as we are looking for teachers working in the UK. Please click on the link to return this study on Prolific.

https://app.prolific.com/submissions/complete?cc=C98DOPZK

Outdoor teaching and learning

Study Information and Consent

What is this study about?

The aim of this study is to learn more about outdoor teaching and learning practices in UK schools. We want to know more about teachers' beliefs and experiences about teaching outdoors. You are invited to participate in this study as you have previously told Prolific that you are a teacher and live in the UK. If this is not the case, please return this study.

What does the study involve and how long will it take?

The study involves completing an online survey about you and your teaching role. We expect it to take about 12 minutes to complete the survey.

What happens to my information?

All of your information will be stored anonymously. No one will be able to identify you from the information that you share with us.

Who can I contact if I have a question or complaint?

This project has been reviewed and approved by the Cardiff University School of Psychology Research Ethics Committee. If you have any questions or concerns, you can contact psychethics@cardiff.ac.uk or the person who is leading the study,

Nicola Parkin   parkinNA@cardiff.ac.uk

Professor Merideth Gattis   gattism@cardiff.ac.uk

Please select an answer below to confirm that you have read the information about the study and that you agree to take part.

◯ I have read the study information and I agree to take part

◯ I do not agree to take part in this study

As you do not consent to take part in this study, please click on the link below to return to Prolific.

https://app.prolific.com/submissions/complete?cc=CYR7MUT0

Prolific ID

What is your unique Prolific ID?

[   ]

Qualtrics Survey Software

Demographics

We would like to know a little more about you and the school where you work, in order to ensure we recruit as wide a sample of UK teachers as possible.

Where is your school?

○ England

○ Wales

○ Scotland

○ Northern Ireland

How would you describe the location of your school?

○ Urban (city)

○ Suburban

○ Rural

How many pupils attend your school?

○ 1-99

○ 100-199

○ 200-399

○ 400-999

○ More than 1000

What is your age (in years)?

| 20 | 26 | 32 | 38 | 44 | 50 | 56 | 62 | 68 | 74 | 80 |

Select your age

What is your ethnic background?

○ White (English / Welsh / Scottish / Northern Irish / British)

273

○ White (Other)

○ Asian / Asian British

○ Black / African / Carribean / Black British

○ Mixed / multiple ethnic groups

○ Other ethnic group

○ Prefer not to say

Please select your gender:

○ male

○ female

○ other

○ prefer not to say

How long have you worked in teaching?

○ student teacher

○ Early Career Teacher (less than 2 years experience)

○ 2-5 years

○ 6-10 years

○ More than 10 years

What is your role?

○ Primary class teacher

○ Secondary subject teacher

○ Teaching assistant

○ Senior leader

○ Other

Which age groups do you teach? (Choose as many as apply.)

☐ Early Years (under 5 years)

☐ Infants/ lower primary (5 to 7 years)

☐ Juniors/ upper primary (7 to 11 years)

☐ Lower secondary (11 to 14 years)

☐ Upper secondary (14 to 16 years)

☐ Tertiary (16 to 18 years)

How often do you teach lessons outdoors?

○ Never

○ Very occasionally

○ Several times per term

○ Every week

○ Every day

Which curriculum subjects do you teach outdoors? (Choose as many as apply.)

☐ English/Literacy

☐ Maths/Numeracy

☐ Science

☐ Humanities

☐ Art/ Technology

☐ Physical Education

☐ Other

IOS (Aron et al., 1992)
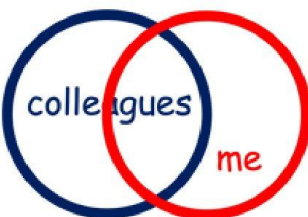
Choose the picture which best shows how close you feel to
the other people in your family

○

275

○

○

○

○
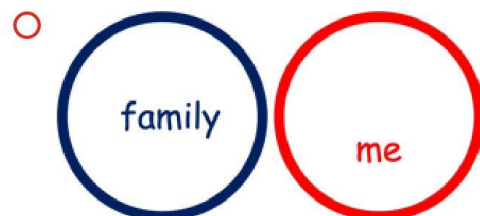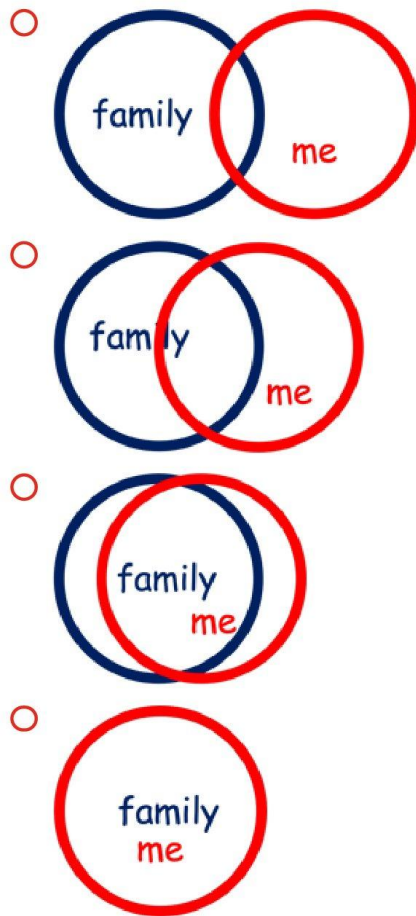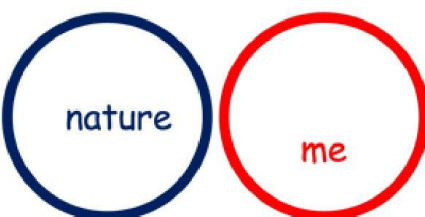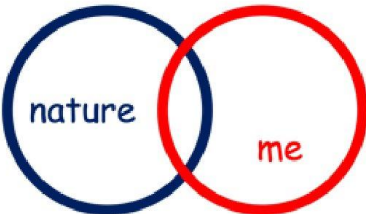
Choose the picture which best shows how close you feel to your colleagues in school.

○

○
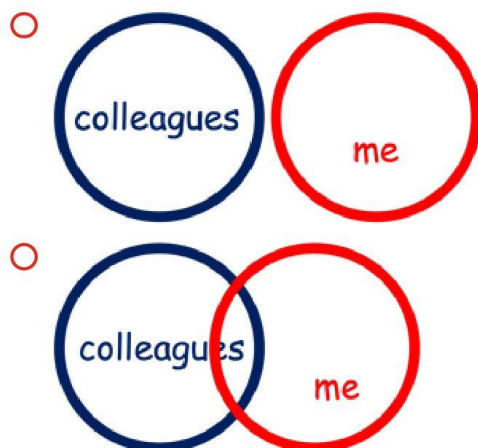
Inclusion of Nature in Self (Larson et al. 2019; Schultz, 2002)

Choose the picture which best shows how close you feel to nature.
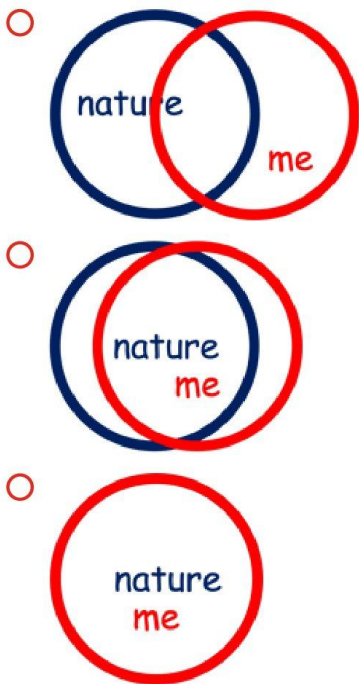
SCOOL measure

We would like to understand your beliefs and knowledge about teaching outdoors.

Please answer to what extent you agree or disagree with each statement.

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I'm too busy trying to get through the curriculum to teach outdoors.	○	○	○	○	○
Teaching outdoors is a high priority for me.	○	○	○	○	○
School inspectors see the value in outdoor learning.	○	○	○	○	○
I am not able to take my class outside as much as I'd like because children lack suitable clothing and footwear.	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Bad weather puts me off teaching outdoors.	O	O	O	O	O
I feel confident about delivering the curriculum outdoors.	O	O	O	O	O
Our school grounds are designed for outdoor learning.	O	O	O	O	O

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
School policies prevent me from teaching outside.	O	O	O	O	O
Teaching outdoors is an effective way to cover the curriculum.	O	O	O	O	O
I don't have enough time to plan and prepare outdoor lessons.	O	O	O	O	O
Outdoor learning is a priority in our school.	O	O	O	O	O
Our school leaders limit how much time I can spend outdoors with my class.	O	O	O	O	O
It is more difficult to manage children's behaviour during outdoor lessons.	O	O	O	O	O
I have the knowledge I need to teach outdoors.	O	O	O	O	O

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
There are outdoor spaces suitable for learning in or around our school.	O	O	O	O	O
I enjoy teaching outdoors.	O	O	O	O	O
Getting my class ready to go outside	O	O	O	O	O

279

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
takes too long to make it worthwhile.					
There is nothing stopping me from teaching outdoors.	○	○	○	○	○
Our school leaders are strong advocates for outdoor learning.	○	○	○	○	○
Children are more distracted when learning outdoors.	○	○	○	○	○
Staffing in our school makes it difficult to take my class outside.	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
The fear of a poor school inspection judgement stops me teaching outdoors.	○	○	○	○	○
Children are more engaged when learning outdoors.	○	○	○	○	○
I don't have enough experience to teach outdoors.	○	○	○	○	○
I understand how to assess progress during outdoor learning.	○	○	○	○	○
I have seen other teachers deliver successful outdoor lessons.	○	○	○	○	○
I have had training in teaching the curriculum outdoors.	○	○	○	○	○
Parents don't see the point of outdoor learning.	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
Teaching outdoors becomes more	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
difficult as children get older because of the pressures of standardised testing.					
In order to show that you are paying attention to these instructions, please select somewhat agree.	O	O	O	O	O
The pressure to prepare children for standardised tests stops me teaching outdoors.	O	O	O	O	O
Our school leaders think that outdoor learning poses safety issues.	O	O	O	O	O

NR-6 (Nisbet et al., 2013)

We would like to understand more about your personal relationship with nature.

To what extent do you agree or disagree with the following statements?

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I take notice of wildlife wherever I am.	O	O	O	O	O
I always think about how my actions affect the environment.	O	O	O	O	O
My connection to nature and the environment is part of my spirituality.	O	O	O	O	O
My ideal holiday spot would be a remote wilderness area.	O	O	O	O	O
	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
My relationship to nature is an important part of who I am.	◯	◯	◯	◯	◯
I feel very connected to all living things and the earth.	◯	◯	◯	◯	◯
It is important that you pay attention to instructions. Please select strongly disagree.	◯	◯	◯	◯	◯

Time in Nature (Meis-Harris et al., 2021)

In the last year, about how often have you spent time in nature?

◯ Never

◯ A few times a year

◯ At least once a month

◯ At least once a fortnight

◯ At least once a week

◯ A few times a week

◯ Every day

Experience of nature yesterday (White et al. 2017)

Yesterday, did you spend time in nature?

◯ Yes

◯ No

ONS Subjective Wellbeing (ONS, 2011; White et al., 2017)

The next few questions ask about your personal wellbeing.

Overall how satisfied are you with life nowadays?

0 - Not at all	1	2	3	4	5	6	7	8	9	10 - completely
○	○	○	○	○	○	○	○	○	○	○

Overall to what extent do you feel that the things you do in your life are worthwhile?

0 - Not at all	1	2	3	4	5	6	7	8	9	10 - completely
○	○	○	○	○	○	○	○	○	○	○

Overall how happy did you feel yesterday?

0 - Not at all	1	2	3	4	5	6	7	8	9	10 - completely
○	○	○	○	○	○	○	○	○	○	○

Overall how anxious did you feel yesterday?

0 - Not at all	1	2	3	4	5	6	7	8	9	10 - completely
○	○	○	○	○	○	○	○	○	○	○

Environmental concern (Schultz, 2001)

People around the world are generally concerned about environmental problems because of the consequences that result from harming nature. However, people differ in the consequences that concern them the most.

Please rate each of the following items.

I am concerned about environmental problems because of the consequences for:

	1 - Not important	2	3	4	5	6	7 - Supreme importance
My future	○	○	○	○	○	○	○
Me	○	○	○	○	○	○	○
Children	○	○	○	○	○	○	○
My lifestyle	○	○	○	○	○	○	○
	1 - Not important	2	3	4	5	6	7 - Supreme

	1 - Not important	2	3	4	5	6	7 - Supreme importance importance
Birds	O	O	O	O	O	O	O
Future generations	O	O	O	O	O	O	O
Animals	O	O	O	O	O	O	O
People in the community	O	O	O	O	O	O	O

	1 - Not important	2	3	4	5	6	7 - Supreme importance
My health	O	O	O	O	O	O	O
Plants	O	O	O	O	O	O	O
All people	O	O	O	O	O	O	O
Marine life	O	O	O	O	O	O	O

Teacher autonomy scale (Worth and van den Brande, 2020)

We would like to understand how autonomous you feel in your current job role.

Please choose the answer that describes how much influence do you have over each of these aspects of your teaching role.

	None at all	A little	A moderate amount	A lot	A great deal
How your classroom is physically laid out	O	O	O	O	O
What teaching methods or strategies you use	O	O	O	O	O
How you prepare your lesson/schemes of work	O	O	O	O	O
How you plan your lessons/schemes of work	O	O	O	O	O

	None at all	A little	A moderate amount	A lot	A great deal
How the use of time in your classroom is scheduled	O	O	O	O	O

	None at all	A little	A moderate amount	A lot	A great deal
What the standards and rules for behaviour in your classroom are	O	O	O	O	O
How often you provide feedback to your pupils	O	O	O	O	O
How you assess pupils' learning to inform your teaching	O	O	O	O	O

	None at all	A little	A moderate amount	A lot	A great deal
How you provide feedback to your pupils	O	O	O	O	O
The content of the curriculum	O	O	O	O	O
Your professional development goals	O	O	O	O	O
What data you collect on pupils attainment	O	O	O	O	O

Debrief

Thank you for taking part in our study.

We are interested in your beliefs about teaching outdoors and how it relates to your own experiences of nature and your wellbeing.

You can use the text box below if you wish to tell us your thoughts about these issues or about our study.

[ ]

Powered by Qualtrics

Appendix 7: Descriptive statistics for the items in the draft SCOOL scale (Study 3)

Item	Mean (SD)	Skewness	Kurtosis	Communality
1	2.76 (1.26)	.37	1.95	.569
2	3.03 (1.14)	-.18	2.34	.388
3	3.66 (1.20)	-.62	2.39	.393
4	2.66 (1.31)	.37	1.94	.605
5	2.37 (1.18)	.75	2.71	.480
6	3.29 (1.20)	-.41	2.14	.587
7	3.51 (1.05)	-.44	2.58	.550
8	3.11 (1.22)	-.22	1.90	.651
9	2.76 (1.22)	.28	1.93	.540
10	2.24 (1.38)	.76	2.23	.440
11	3.34 (1.38)	-.36	1.77	.627
12	3.13 (1.19)	.01	1.86	.230
13	2.68 (1.20)	.38	2.09	.437
14	3.14 (1.03)	-.13	2.36	.331
15	2.65 (1.31)	.30	1.95	.733
16	3.10 (1.23)	-.09	1.99	.447
17	2.30 (1.29)	.57	2.06	.727
18	3.24 (1.29)	-.16	1.93	.430
19	3.35 (1.27)	-.35	2.02	.577
20	2.63 (1.40)	.37	1.79	.651
21	3.74 (1.03)	-.56	2.76	.489
22	2.27 (1.15)	.95	3.14	.336
23	2.60 (1.25)	.31	2.02	.684
24	3.08 (1.17)	.01	1.93	.341
25	3.22 (1.18)	-.38	2.04	.609
26	3.36 (1.26)	-.26	1.88	.489
27	2.60 (1.20)	. 29	1.94	.516
28	2.78 (1.20)	.30	2.05	.560

29	3.44 (1.01)	-.38	2.82	.452
30	3.54 (1.28)	-.64	2.25	.420
31	2.73 (1.27)	.28	1.91	.462

Items removed from analysis as communality<.4

Appendix 8: Four factor solution from exploratory factor analysis

Explains 59% of the variance.

Factor 1- Individual teacher knowledge and competence

25 I have the knowledge I need to teach outdoors.

8 I feel confident about delivering the curriculum outdoors.

6 I understand how to evidence progress during outdoor learning.

26 *I don't have enough experience to teach outdoors.*

10 I have had training in teaching the curriculum outdoors.

Factor 2- School positive and negative

15 Our school leaders are strong advocates for outdoor learning.

20 Our school grounds are designed for outdoor learning.

11 There are outdoor spaces suitable for learning in or around our school.

17 Outdoor learning is a priority in our school.

19 *School policies prevent me from teaching outside.*

16 *Our school leaders think that outdoor learning poses safety issues.*

18 *Our school leaders limit how much time I can spend outdoors with my class.*

Factor 3- Systemic negatives

5 *Teaching outdoors becomes more difficult as children get older because of the pressures of standardised testing.*

1 *The pressure to prepare children for standardised tests stops me teaching outdoors.*

9 *I don't have enough time to plan and prepare outdoor lessons.*

4 *I'm too busy trying to get through the curriculum to teach outdoors.*

Factor 4- Beliefs about children's behaviour

28 *Children are more distracted when learning outdoors.*

27 *It's more difficult to manage children's behaviour during outdoor lessons.*

Appendix 9: Three factor solution from exploratory factor analysis

This gives a scale with 18 items, which explains 53% of the variance.

Factor 1: Individual knowledge and beliefs (explains 37% of variance)

25 I have the knowledge I need to teach outdoors.	.861
8 I feel confident about delivering the curriculum outdoors.	.828
6 I understand how to evidence progress during outdoor learning.	.777
26 *I don't have enough experience to teach outdoors.*	*.706*
23. Teaching outdoors is a high priority for me.	.542
10 I have had training in teaching the curriculum outdoors.	.532
21 I enjoy teaching outdoors.	.521
7 Teaching outdoors is an effective way to cover the curriculum.	.518

Factor 2: School environment (9%)

15 Our school leaders are strong advocates for outdoor learning.	.774
17 Outdoor learning is a priority in our school.	.709
20 Our school grounds are designed for outdoor learning.	.677
11 There are outdoor spaces suitable for learning in or around our school.	.620
19 *School policies prevent me from teaching outside.*	*.606*
16 *Our school leaders think that outdoor learning poses safety issues.*	*.559*

Factor 3: Systemic pressures (7%)

5 *Teaching outdoors becomes more difficult as children get older …*	*.732*
1 *The pressure … for standardised tests stops me teaching outdoors.*	*.706*
4 *I'm too busy trying to get through the curriculum to teach outdoors.*	*.577*
9 *I don't have enough time to plan and prepare outdoor lessons.*	*.561*

Appendix 10: Two factor solution from exploratory factor analysis

Model explains 46% of variance.

Factor 1- Individual

25 I have the knowledge I need to teach outdoors.

8 I feel confident about delivering the curriculum outdoors.

6 I understand how to evidence progress during outdoor learning.

26 *I don't have enough experience to teach outdoors.*

10 I have had training in teaching the curriculum outdoors.

23 Teaching outdoors is a high priority for me.

7 Teaching outdoors is an effective way to cover the curriculum.

21 I enjoy teaching outdoors.

Factor 2- External (combination of school and systemic)

19 *School policies prevent me from teaching outside.*

15 Our school leaders are strong advocates for outdoor learning.

16 *Our school leaders think that outdoor learning poses safety issues.*

18 *Our school leaders limit how much time I can spend outdoors with my class.*

20 Our school grounds are designed for outdoor learning.

17 Outdoor learning is a priority in our school.

31 There is nothing stopping me from teaching outdoors.

11 There are outdoor spaces suitable for learning in or around our school.

1 *The pressure to prepare children for standardised tests stops me teaching outdoors.*