Routledge
Taylor & Francis Group

Journal of Adventure Education and Outdoor Learning

ISSN: 1472-9679 (Print) 1754-0402 (Online) Journal homepage: www.tandfonline.com/journals/raol20

Making outdoor learning accessible and inclusive for children with special educational needs and disabilities (SEND): a case study

Ella Godwin, Lorna Jarvis, Nicola Parkin, Wouter Poortinga, Kersty Hobson, Mark Stead, Jonathan Reeves, Morgan Marshall & Merideth Gattis

To cite this article: Ella Godwin, Lorna Jarvis, Nicola Parkin, Wouter Poortinga, Kersty Hobson, Mark Stead, Jonathan Reeves, Morgan Marshall & Merideth Gattis (19 Dec 2025): Making outdoor learning accessible and inclusive for children with special educational needs and disabilities (SEND): a case study, Journal of Adventure Education and Outdoor Learning, DOI: 10.1080/14729679.2025.2601844

To link to this article: https://doi.org/10.1080/14729679.2025.2601844

Published online: 19 Dec 2025.

JOURNAL OF ADVENTURE EDUCATION AND OUTDOOR LEARNING
https://doi.org/10.1080/14729679.2025.2601844

Making outdoor learning accessible and inclusive for children with special educational needs and disabilities (SEND): a case study

Ella Godwin[a], Lorna Jarvis[a], Nicola Parkin[a], Wouter Poortinga[a,b], Kersty Hobson[c], Mark Stead[d], Jonathan Reeves[d], Morgan Marshall[d] and Merideth Gattis[a]

[a]School of Psychology, Cardiff University, Cardiff, UK; [b]Welsh School of Architecture, Cardiff University, Cardiff, UK; [c]School of Geography and Planning, Cardiff University, Cardiff, UK; [d]WWT, Slimbridge, UK

ABSTRACT

Outdoor learning enhances children's academic performance, social communication, and well-being. Accessible and inclusive opportunities for outdoor learning are essential for children with Special Educational Needs and Disabilities (SEND) to experience these benefits. This case study applied the Universal Design for Learning (UDL) framework to evaluate the accessibility and inclusivity of outdoor learning programmes. The study involved qualitative interviews with expert outdoor learning staff at three WWT wetland centres in the UK. Reflexive thematic analysis identified four themes: resources and adaptations, communication with schools, staff approach to inclusion, and balancing needs. The findings highlight factors that shape the accessibility and inclusivity of outdoor learning provision for children with SEND. The study demonstrates how UDL can inform inclusive and proactive approaches to outdoor education, offering a model for organisations seeking to enhance the accessibility of their outdoor learning programmes. We conclude with recommendations for practitioners to support belonging for all children.

ARTICLE HISTORY
Received 2 April 2025
Accepted 4 December 2025

KEYWORDS
Accessibility; outdoor learning; special educational needs and disabilities (SEND); inclusion

Introduction

Outdoor learning in natural environments has been shown to benefit children's learning, health and wellbeing, and social skills (Becker et al., 2017; Dillon & Lovell, 2022; Gill, 2014; Miller et al., 2021; Mygind et al., 2021). Research has highlighted that children with special educational needs and disabilities (SEND) can particularly benefit from learning in natural environments (Guardino et al., 2019; Szczytko et al., 2018). However, caregivers have reported key barriers to accessing outdoor spaces for children with disabilities (Gattis,

CONTACT Merideth Gattis GattisM@cardiff.ac.uk School of Psychology, Cardiff University, Park Place, Cardiff CF10 3AT, UK

This research was supported by a research internship award from the Cardiff University School of Psychology to Ella Godwin, funding from WWT to Ella Godwin and Lorna Jarvis, and PhD studentship funding from Cardiff University School of Psychology to Nicola Parkin.

2025; Horton, 2017). Universal Design for Learning (UDL), developed by David Rose, Anne Meyer and their colleagues at the Center for Applied Special Technology (CAST), provides a framework for making accessible and inclusive learning environments and can be readily applied to nature-based learning (Meyer et al., 2014; Rose, 2000).

The current article explores the accessibility of outdoor learning programmes for children with SEND in a conservation organisation in the UK, identifying the adaptations that have been made to accommodate their needs, the perceived value of those adaptations, and areas for improvement. Below we review the literature as a foundation for our study. We first review the benefits of nature for typically developing children and children with SEND, emphasising the importance of accessible and inclusive outdoor learning environments. We then describe the UDL framework and explain how it can guide adaptations that mitigate the barriers faced by children with disabilities in accessing outdoor learning. Finally, we introduce our case study from a conservation organisation that provides outdoor education programmes. The aim of our study was to provide novel insights into accessibility at outdoor-learning-focused organisations and to highlight key strategies to foster more inclusive and accessible outdoor learning programmes.

Benefits of nature for typically developing children

Outdoor learning positively influences children's academic performance and motivation, contributing to higher achievements in subjects such as reading, science and mathematics (Dillon & Lovell, 2022; Eick, 2012). For example, Ernst and Stanek (2006) reported that fifth-grade students taking part in a year-long, nature-based, out-of-school science programme scored significantly higher in writing and reading at the end of the year compared to those in a control group. Furthermore, students involved in the nature-based programme also developed a greater interest in learning and school activities. Similarly, Bølling et al. (2018) reported that participation in outdoor learning enhanced students' intrinsic motivation, which in turn improved academic achievement and attendance. Guardino et al. (2019) found that both teachers and students reported heightened well-being, interest and enjoyment in outdoor compared to indoor classrooms. These studies collectively highlight the benefits of outdoor education for children's academic development.

The positive effects of outdoor learning environments extend beyond children's academic achievements, significantly enhancing their health, wellbeing and socioemotional development. Systematic reviews have highlighted that time spent outdoors can have positive effects on physical activity, fitness levels and sedentary behaviour (Gray et al., 2015). Finn and colleagues (Finn et al., 2018) found that an outdoor education programme resulted in a threefold increase in steps per hour from baseline to post-test, a significant decrease in sedentary time and improved science test scores, highlighting outdoor education as an innovative way of promoting physical activity and science learning concurrently. Bølling et al. (2019) reported that children regularly exposed to outdoor education showed greater improvements in prosocial behaviour and experienced fewer peer problems and hyperactivity-inattention issues compared to children with infrequent opportunities for outdoor education. These positive effects were particularly notable among students from low socioeconomic backgrounds and when sessions were longer and more concentrated. Similarly, Chawla et al. (2014) found that exposure to outdoor

environments during school hours reduced stress, increased wellbeing and improved social health in students. These studies demonstrate the positive influence that outdoor learning and nature programmes can have on children's health, wellbeing and socio-emotional development.

Benefits of nature for children with SEND

Outdoor learning also offers valuable educational benefits for children with diverse emotional, cognitive and behavioural needs. The UK Special Education Needs and Disability (SEND) Code of Practice (2014) defines a child or young person as having SEND if they have a learning difficulty or disability that requires special educational provision. This may relate to a wide range of areas, including communication and interaction, cognition and learning, social, emotional and mental health, sensory or physical needs (Department for Education, 2015). Research with children with SEND suggests that outdoor education promotes a more inclusive learning environment compared to traditional indoor learning environments (Stavrianos & Pratt-Adams, 2022). Szczytko and colleagues (2018) found that students with SEND participating in an outdoor education programme showed decreased disruptive behaviours and enhanced attention spans while maintaining comparable academic performance in science relative to a control group. Observational data from Guardino and colleagues (2019) also indicated that students with disabilities were more focused on educational tasks when working outdoors. These findings highlight the potential of outdoor environments in supporting improved behaviour and focus among children with SEND.

The benefits of outdoor learning for children with Attention Deficit Hyperactivity Disorder (ADHD) have been widely recorded. Natalini and Savastano (2024) conducted a systematic review highlighting that outdoor education has a significant influence on the inclusivity of educational tasks, interactions with peers and exploring the natural environment. They suggested that the unique characteristics of natural environments offer a more inclusive educational approach for children with SEND and particularly those with ADHD by reducing and containing anxiety and enhancing social skills through experimental activities and teamwork. For example, correlational and experimental research has shown that time and activities in natural environments, compared to urban areas, can reduce ADHD symptoms like inattentiveness and have lasting positive effects (Faber Taylor & Kuo, 2009; Kuo & Taylor, 2004). Furthermore, a two-year garden-based intervention programme for children with disruptive behaviour disorder led to an increase in pass rates, positive attitude and behaviour as well as a decrease in dropout rates (Ruiz-Gallardo et al., 2013). Collectively, these studies demonstrate the potential for outdoor environments to alleviate disruptive behaviours and ADHD symptoms as well as promote positive social interactions and learning outcomes.

More recently, researchers have also identified benefits of outdoor learning for children with Autism Spectrum Condition (ASC) and the need for adaptations to ensure accessibility. Current evidence indicates that natural environments help children with ASC adapt to change, support their imaginative and creative play, foster relaxation and enhance social skills (Friedman et al., 2022; Galbraith & Lancaster, 2020; Li et al., 2019). Friedman and Morrison (2021) conducted a five-month case study on the effects of using an outdoor classroom on two special education teachers and five autistic children.

Through observations and semi-structured interviews, they found that autistic children experienced developmental gains such as increased verbal communication, reduced over-stimulation and improved focus on tasks, all contributing to progress towards their Individual Education Plan (IEP) goals. These benefits have been observed in various contexts and cultural settings. For instance, Li and colleagues (2019) explored the effects of nature on children with ASC living in Chinese cities by interviewing their caregivers. Parent reports highlighted that time outdoors provided motor-sensory, social and emotional benefits and had a calming effect on their children. However, concerns such as inappropriate behaviours, phobias, safety concerns and difficulties with the public were also identified. Based on these findings, Li et al. (2019) recommended adaptations when designing outdoor environments, such as creating private areas for emotion regulation and offering sensory stimuli, to reduce the barriers faced by children with ASC and their parents. These findings highlight the importance of making adaptations to ensure accessibility and inclusivity in outdoor learning environments for children with SEND, enhancing the potential of time spent in nature to support their unique developmental needs.

Whilst there is preliminary evidence on the benefits of nature for children with SEND and the need to make adaptations to ensure accessibility, there is a notable gap in high-quality evidence to guide learning programme providers. In particular, there is a need for empirical studies that go beyond documenting benefits to systematically assessing accessibility within established organisations and identify strategies that can be replicated in practice. The current study contributes to addressing this gap in research by evaluating the accessibility of a widely established outdoor learning organisation, highlighting current provisions, the challenges that the organisation encounters, and adaptations that have been implemented. This research highlights practical strategies for increasing accessibility and provides a model for how similar organisations might critically reflect on and improve their own practices. This paper therefore extends existing research by moving beyond documenting the potential benefits, to offering recommendations that can guide practitioners and inform future research in outdoor and inclusive education.

Making outdoor learning accessible and inclusive

Considering the significant benefits that outdoor learning can have for all children, including those with SEND, ensuring accessibility and inclusivity is essential. Whilst inclusion has multiple definitions within the literature, it can be understood as going beyond physical integration to ensure equal access, participation and support, with adaptations provided so that all children can meaningfully engage in learning (Long & Guo, 2023). Accessibility, by contrast, refers more specifically to the removal of physical, sensory and structural barriers that might prevent children from participating and proactively ensuring activities, environments and resources and useable by everyone (United Nations, 2006). Parents, caregivers, and teachers have described significant barriers to accessing outdoor spaces with children who have disabilities (Gattis, 2025; Hopper, 2017; Horton, 2017). Barriers to inclusive outdoor play have been identified in several studies. These include inaccessible ground cover and play equipment, parental concerns that prevent children

with disabilities from engaging with outdoor play, and a lack of diversity in ground level components, which can reduce children's interest (Fernelius & Christensen, 2017; Talay et al., 2010). Hopper (2017) also found that teachers encountered challenges when thinking about addressing issues of inclusion, variation, planning and assessment. Accessibility in outdoor environments therefore involves addressing obstacles such as uneven terrain, limited facilities or inaccessible information formats, and inclusion involves ensuring that all children can engage fully and meaningfully alongside their peers.

Universal Design (UD) originated as a concept in architecture and design, defined as the creation and implementation of products and services that are accessible and usable by all people across a wide range of functional capabilities (Meyer et al., 2014; Rose, 2000). Extending this concept, Universal Design for Learning (UDL) was developed by Rose, Meyer and CAST as a framework for learning and education. UDL identifies three key principles for educational provision to promote accessibility and inclusivity in learning: (1) multiple means of engagement, (2) multiple means of representation, and (3) multiple means of action and expression (Kelly et al., 2022; Rose, 2000; Warner & Dillenschneider, 2019). The principle of engagement states that curricula should be designed with built-in options to accommodate different levels of challenge and support, to ensure continuous learner engagement. In practice, this might involve incorporating outdoor sensory experiences such as tactile, auditory and visual elements, which can leverage diverse interests to maintain engagement (Pikus et al., 2024). The principle of representation states that information should be presented through various methods (e.g. readings, discussions, digital text) to cater to diverse student capabilities. For example, outdoor learning programmes could present information and instructions in different ways such as using visual and auditory aids to ensure every student can access and comprehend the material being taught. Finally, the principle of multiple means of action and expression provides opportunities for children to demonstrate their understanding in a range of ways, allowing practice with different levels of support. Children might express their learning through drawing, verbal explanations or photography of the outdoor area. The aim of the UDL framework is to anticipate and address barriers to learning, which can be physical, cognitive, cultural, social, and/or emotional through proactive design, in contrast to traditional models that reactively adapt to specific needs. By planning variation in the curriculum in advance, UDL ensures accessibility and inclusivity for all students, making learning effective and engaging for everyone (Kelly et al., 2022; Pikus et al., 2024).

Pikus and colleagues (2024) demonstrated how educators can apply the UDL framework to integrate natural materials and outdoor learning spaces into the curriculum, effectively supporting children's academic, social and physical development. While Pikus et al.'s (2024) study described how the UDL framework can be applied to school contexts, the current study extends the use of this framework to evaluate and enhance conservation education programmes conducted in fully outdoor settings. Our study aims to apply this approach by using a conservation organisation's learning programmes as a case study, demonstrating how the UDL framework can be effectively implemented in larger organisations and outdoor conservation education initiatives.

Our study

Our study aimed to evaluate the accessibility for children with SEND of outdoor learning programmes at a conservation organisation, using the principles of UDL. WWT, a charity for wetlands and wildlife, has 10 wetland centres across the UK, which are visited annually by approximately 50,000 schoolchildren, to learn and engage with the natural environment (Stead, 2023). WWT is one of the leading providers of outdoor learning in the UK, offering a range of learning programmes to children of all ages. Recently, they have developed an innovative education programme called Generation Wild which aims to connect children from disadvantaged communities with nature through a range of activities. These activities aim to connect the students with nature through five pathways: senses, compassion, emotion, beauty and meaning (Lumber et al., 2017; Stead, 2022). This programme addresses the reduced opportunities that disadvantaged children often have to engage with nature (Waite et al., 2021), with the aim of inspiring the next generation to build lasting connections with the natural world. Given that higher levels of deprivation are associated with higher numbers of children with SEND (Lupton et al., 2010), it is especially important for these sites and educational programmes to be accessible to children with SEND. The distinctive value of selecting WWT as a case study lies in its unique position as both a national conservation charity and a leading provider of outdoor learning; its scale, reputation and reach mean that the accessibility practices developed within this context have the potential to shape provision across wider environmental and educational sectors.

The current study aimed to evaluate the accessibility of outdoor learning programmes for children with SEND within a conservation charity. Specifically, the study sought to identify the adaptations currently in place to support accessibility, assess the perceived value of these adaptations and highlight areas where further improvements are needed. A further aim was to create recommendations to enhance and standardise inclusive practice across all sites of the charity.

Methods

Design

We employed a qualitative case study design, conducting semi-structured interviews with members of the learning team who oversee the educational programmes at the centres. Reflexive thematic analysis (Braun & Clarke, 2019) was selected to allow for an in-depth exploration of participants' perspectives and experiences. The analysis was underpinned by a critical realist perspective, which assumes that an external reality exists independently of human perception, but that participants' narratives represent subjective interpretations of reality (Bhaskar, 1975). The interview data were treated as accounts that illuminate both the practices in place and the meanings participants ascribe to them, with interpretation shaped by the researchers' reflexive engagement with the data. The UDL framework was employed as a conceptual lens to guide the interpretation of findings, with its three core principles (i.e. providing multiple means of engagement, representation, and expression) used to examine how accessibility was understood and enacted within the organisation.

Participants

We interviewed four outdoor learning staff from three different WWT centres. This included three learning managers and one member of the learning team. Two of the interviewees were men and two were women. Purposive expert sampling was utilised to ensure that participants were selected based on their specific expertise and familiarity with their respective sites. Recruitment was conducted via email in advance of in-person interviews. The study received ethical approval from the School of Psychology Ethics Committee at Cardiff University (EC2106156360), and all interviewees provided informed consent. Given the small sample size, additional precautions were taken to ensure to maintain participants' anonymity. Individual centres are not identified, and identifying details have been removed from quotations.

Interview protocol

An Interview Guide was developed to structure the interviews with members of the learning team, comprising several sections with informal prompts (Kallio et al., 2016). The guide was utilised to structure the interviews and gather information on the accessibility of WWT centres for children with SEND. The interview began with general questions about the accessibility of specific WWT centres and the adaptations made to increase accessibility. The second section focused on the accessibility of the Generation Wild programme for children with SEND, covering sensory, language, physical and social, emotional and mental health needs. The next section explored the processes in place for adapting sessions to make them more accessible and the information gathered from schools. The final section collected insights into the staff's thoughts and goals regarding SEND accessibility at WWT centres.

Procedure

Face-to-face interviews were conducted at three different wetland sites. At each site, the learning manager was interviewed, and at one site an additional staff member from the learning team joined the interview to provide additional insights. The interviews were conducted using the same format to ensure consistency across all sessions. Before starting each interview, participants were reminded of the interview topic and informed about the overarching aim of the study, which was to gather their views and knowledge on accessibility at their respective wetland sites. Participants were also informed that the interview would be recorded and subsequently transcribed for analysis. Semi-structured interviews were conducted to allow for the further exploration of issues as they naturally emerged during discussions in the interview. This approach facilitated a comprehensive understanding of participants' perspectives. Three interviews were conducted, lasting 28, 16, and 64 minutes. The first two involved one participant each, while the third included two participants. At the end of the interview, participants were debriefed and thanked for their participation and valuable contributions to the study.

Data analysis

Braun and Clarke's (2019) reflexive thematic analysis was utilised for the interview data. The six stages of thematic analysis were followed: (1) familiarisation with the data, (2) generating initial codes, (3) searching for themes, (4), reviewing themes, (5) defining and naming themes, (6) producing the report (Braun & Clarke, 2006). The recordings were transcribed by the second author and subsequently checked by the first author, enabling familiarisation with the data which is the first step of thematic analysis (Braun & Clarke, 2006). Inductive coding then attached meaningful labels to the transcribed data in a descriptive manner. Following the creation of the initial codes, the codes were organised into themes and sub-themes, being redefined throughout the analytical process. Rigour was addressed through transparency in decision-making, iterative cycles of coding and theme development, and the use of illustrative data extracts to demonstrate coherence between the analysis and participants' accounts. Canva (n.d.), version 1.84.0 was used throughout the analytical process as an organisational and visual tool. Data analysis was summarised and presented with a thematic map and illustrative quotes. In these quotes, [. . .] indicated the removal of irrelevant parts, while (text) denoted supplemental text added for clarity.

Reflexivity was maintained through ongoing discussions between the authors, acknowledging our individual perspectives and potential biases in creating themes and sub-themes. We acknowledge that our perspectives, professional backgrounds, and assumptions formed part of the analytic process, consistent with reflexive thematic analysis (Braun & Clarke, 2021). Our research team comprised individuals with diverse backgrounds and lived experiences that shaped our interpretations. Two undergraduate researchers contributed to data collection, coding and analysis: one with experience working with children with additional needs and in mental health, and a particular interest in accessibility; the other with a strong interest in outdoor education. The wider team included researchers with broad interest and expertise in environmental education and sustainability, alongside a professor and researcher specialising in developmental psychology. One member of the team was a former teacher and identified as neurodivergent, providing valuable experiential insight into accessibility and inclusion in educational contexts. These positions and experiences influenced how we engaged with the data and co-constructed meaning throughout the analytic process.

Results

Through reflexive thematic analysis of the interview data, 71 codes were created across four broad themes and 11 subthemes. The results offer insight into the efforts and challenges associated with enhancing inclusivity and accessibility in outdoor learning programmes at WWT sites. Figure 1 presents the themes in the form of a coding tree chart.

Theme 1 Resources and adaptations

The first theme, resources and adaptations, describes current adaptations to enhance accessibility for children with SEND and the areas staff identified as needing further development.

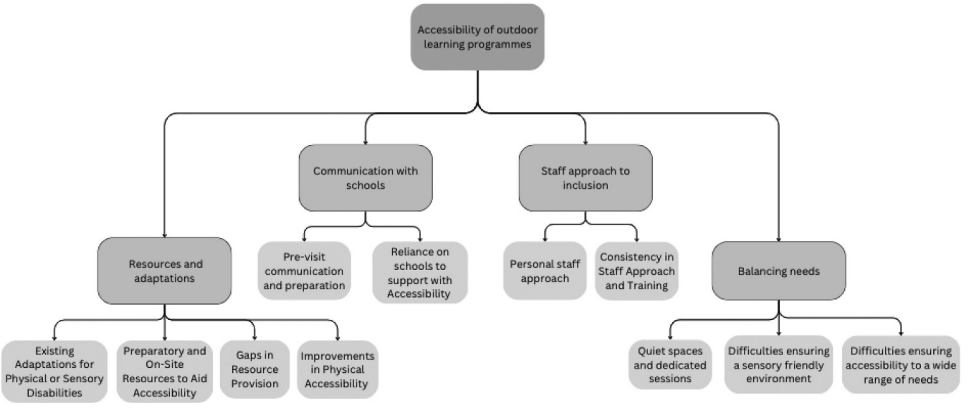

Figure 1. Coding tree for thematic analysis.

Sub-theme 1.1 Existing adaptations for physical or sensory disabilities

Each of the three centres had already made adaptations to aid accessibility for children with physical disabilities. The adaptations varied based on the specific needs encountered by the learning teams. All managers highlighted mobility adaptations for the Generation Wild learning programme, such as using routes with less walking for children with mobility requirements: '*We put them [the children] on the green route because there's less walking . . . That's often if there's anyone with mobility requirements*' (Learning Manager 2). Hearing loops for deaf or hard-hearing children had already been implemented at all centres. Tactile resources had also been used readily at one of the centres to accommodate the needs of blind children '*[we use] a lot more of like the feathers, so each person can have one. A lot more of our sort of model beaks . . . so they could feel more of something*.' (Learning Manager 3).

Sub-theme 1.2 Preparatory and on-site resources to aid accessibility

One of the centres had developed additional preparatory resources, including Social Stories (Gray, 1994), a pre-visit guide and an accessibility video to support children in preparing for their visit and facilitate a smoother transition to new environments and activities. Social Stories are short stories that describe social situations, routines and feelings that may arise to help children understand and navigate social interactions (Gray, 1994). These preparatory resources were sent to the class teacher before their visit, by one of the learning team members sending a

> link to the [accessibility] video, . . . a map so they can see the characters and stuff, . . . the social story, the pre-visit guide, the link to the video or the offer of a pre-visit so they can come on-site (Learning Manager 3).

In addition to these pre-visit resources, this centre also provided communication aids such as Picture Exchange Communication System (PECS) cards (Bondy & Frost, 1994) and translation cards as well as visual timetables, activity instruction cards and inspiration sheets to improve accessibility for children with SEND (see Figure 1). These different resources provide multiple methods of communication, both expressive through PECS cards and receptive through visual supports, overall increasing accessibility and inclusivity.

Sub-theme 1.3 Gaps in resource provision

Despite these positive examples, a significant area identified for improvement in two centres was the implementation and use of additional resources to support the learning and experience of children with SEND. As their Learning Manager reported in reference to resources available, '*I don't think as far as I'm aware, we've got anything right now that's set up specifically to cater towards . . . autism*.' (Learning Manager 1). Additionally, Learning Manager 2 explained that members of the learning team at their centre are currently '*working on using PECS for our sessions . . . both Generation Wild and standard. We want to make . . . social stories*.' (Learning Manager 2). These resources, which are already in use at one of the centres, will be valuable for supporting children who struggle with transitions and children who have additional verbal needs.

Discussions with one centre revealed that there was little in the way of support strategies for visiting children who were non-verbal. PECS cards were agreed to be a helpful solution, providing the child with relevant instructions for their activities during the visit (see Figure 2). Learning Team Member 1 suggested a method where each activity has its own PECS instruction resource and, depending on the activities the child is assigned, they can be given the relevant activity instructions.

> We will know when we go out what activities we're going to be [assigning to the child] . . . That even like having a pack of them that before we go out, we go right, I need a willow, I need a . . . (Learning Team Member 1).

This will allow the child to be included with the rest of the group and access the activity independently. This theme indicates the need for sharing resources, training and good practice within the organisation to support the needs of children with SEND.

Figure 2. One WWT centre provided communication aids such as Picture Exchange Communication System (PECS) cards to support children taking part in WWT's Generation Wild programme. The case study highlighted the value of implementing such communication aids across all centres.

Sub-theme 1.4 Improvements in physical accessibility

In terms of physical accessibility, Learning Manager 2 expressed a desire to improve facilities for visitors with disabilities, such as installing '*changing places' which are larger, more accessible toilets for disabled individuals with more severe needs*.' (Learning Manager 2). Another centre currently lacks these essential facilities as well. Adding a changing place would enable individuals with more significant disabilities to visit the wetland centres and ensure their health and safety whilst visiting the wetland centre.

Theme 2 Communication with schools

The second theme captures procedures for communicating with the schools regarding additional needs. It also highlights the challenges posed by relying on schools to provide information to WWT about the special educational needs of pupils.

Sub-theme 2.1 Pre-visit communication and preparation

All centres implement pre-visit communication with schools to understand the needs of the children and potential adaptations the learning team could make to improve accessibility. This was primarily done through booking forms, which require teachers to specify any additional needs in their class. One of the centres also conducts virtual meetings with teachers to better understand their class's needs and arrange suitable adaptations. The learning manager at this centre stressed the importance of this step in promoting accessibility, stating that they '*always make sure we chase like mad for . . . pre-visit briefings*' (Learning Manager 3). Another centre followed this strategy for special schools but not mainstream schools: '*If a special school comes in, it's always good to have a phone call with the teacher before the visit*' (Learning Manager 1). The purpose of these pre-visit briefings is to inform the Learning Team's approach to education sessions and prepare any additional resources: '*We go through all of the activities, and we agree with the teachers what they think will suit their pupils best. And then we sort of try and plan an order*' (Learning Manager 3).

Sub-theme 2.2 Reliance on schools to support with accessibility

All interviewees expressed concern surrounding the lack of communication from schools that can occur regarding the needs of their pupils, resulting in difficulties incorporating appropriate adaptations. A Learning Manager noted the vagueness of teachers' communication, '*we always tend to be told in terms of, if there is a member of the class that has ASD, sometimes a little bit unspecific*.' (Learning Manager 1). Learning Manager 2 expressed a more serious concern that some teachers do not provide information on pupils with SEND, '*with some, they don't tell us anything and we don't know what to expect*.' (Learning Manager 2). This difficulty was shared with Centre 3, '*You asked a question, and the teacher leaves section [on SEND needs in the class] blank. And then you can immediately spot said child or adult . . . that probably should have been flagged*.' (Learning Manager 3). Difficulties in communication and therefore appropriately supporting children with SEND highlight a need for a change in approach that is less reliant on the assistance of teachers and carers from the school.

Theme 3 Staff approach to inclusion

The third theme, staff approach to inclusion, captures the crucial role of the staff within the organisation in making outdoor learning accessible for children with SEND. It highlights how personalised approaches, and targeted training can significantly enhance inclusivity. A cohesive strategy across the organisation is essential to ensuring accessibility across all sites.

Sub-theme 3.1 Personal staff approach

The learning teams across the centres have adapted their approach to the presentation and facilitation of sessions to accommodate children with SEND. One team member emphasised this in relation to their personal approach and being mindful of noise levels in sessions, '*if someone's triggered by noise, just being aware not to be like, come on everyone, make loads of noise!*' (Learning Team Member 1). Another centre mentioned that there may be a reconsideration of the activities for children depending on their needs, '*Personally, if I had a group like that [with a high level of additional needs] I'd want them to do probably the very sort of hands-on stuff. The very tactile stuff . . . So I would get them . . . den building*.' (Learning Manager 2). In addition to adapting their personal approach and the chosen activities, one centre leverages their additional volunteer support to provide more individualised attention and assistance during sessions: '*If we've got a volunteer with us, we might get them to go with a particular group, because they might need a little bit more help*' (Learning Manager 1). These adaptations highlight the learning staff's flexible and responsive approach to facilitating inclusive learning experiences.

Sub-theme 3.2 Consistency in staff approach and training

Some centres highlighted the need for further knowledge and skills among staff and volunteers to improve SEND accessibility. Only one centre reported that their staff had participated in any SEND training. This included guided sight and Makaton training (Grove & Walker, 1990). According to a member of the learning team, this training was very successful for children with SEND. They explained, '*I've had a few classes as will say, "hello, good morning" in Makaton . . . And they've all just suddenly erupted into this, you know . . . signs*.' (Learning Team Member 1). This highlighted the success of specialised training in improving communication with SEND children and creating an inclusive environment.

Another centre identified that they require SEND training, not just for the Learning department but for the wider centre staff to ensure consistency in approach: '*I'm really keen for everybody to be more competent in sort of recognising particularly hidden disabilities, these meeting different requirements*' (Learning Manager 2). Learning Manager 2 informs that there are plans to achieve this pending, '*they are planning to do training in autism awareness and sighted guiding and hearing impairments all those sorts of things*.' (Learning Manager 2). Another centre also highlighted their want for more training in how to deal with different behaviours and situations regarding children with SEND: '*I think training in terms of how to deal with a child that might be, through no fault of their own, but disrupting the general flow class because of their needs and what to do in that situation*.' (Learning Manager 1). Staff training across the organisation would therefore promote inclusivity through a comprehensive and cohesive approach, ensuring everyone is competent in responding to a range of needs.

Theme 4 Balancing needs

The final theme, Balancing needs, captures the necessity for the organisation to balance diverse needs, acknowledging that there is no perfect solution for accessibility. It highlights the importance of being both reliable and flexible when accommodating different children and schools. Creating accessible environments requires flexible adaptations rather than a one-size-fits-all approach.

Sub-theme 4.1 Quiet spaces and dedicated sessions

Some centres offer a private space during a school's visit to help overstimulated children feel calmer: '*One thing that I often do, because if children need a space to calm down is, I'll open up . . . one of the rooms during like school holidays and stuff or find a quiet space*.' (Learning Manager 2). Similarly, one of the centres has facilities to provide a quiet space: '*If they want a quiet room for lunch.*' (Learning Manager 1). Additionally, one centre offers special pond dipping sessions for children with autism to promote inclusivity '*We started offering quiet and calm sessions on Saturday [however] the only real change is much lower capacity*.' (Learning Manager 2). These adaptations highlight the centre's growing commitment to creating an accessible environment for children with SEND.

Sub-theme 4.2 Difficulties in ensuring a sensory-friendly environment

Two of the centres reported problems eliminating sensory triggers due to the nature of the sites. An example of this is highlighted by Learning Manager 3 who flagged the difficulties supporting visits of children who fear birds: '*So we had a little lad, bless him, with autism that came absolutely hysterical because . . . the geese were waiting at the door*.' (Learning Manager 3). This can be a difficult problem to resolve as the organisation is a wetland conservation charity and birds cannot be removed from the grounds. Additionally, problems have arisen due to the inability to deactivate hand dryers during sessions. '*Ideally, I'd probably want to turn the hand dryer off during the quiet and calm sessions, but I don't know where the switch is*' (Learning Manager 1). The loud and sudden nature of the hand dryers can be triggering for certain children. However, hand washing is required after many of the activities at the centre which can be problematic when the automatic hand dryers cannot be deactivated.

Sub-theme 4.3 Difficulties ensuring inclusive accessibility to a wide range of needs

A barrier faced by one of the centres was ensuring sessions were adapted to be accessible to SEND children whilst also making sure those children feel they are still included with the rest of the class. Learning Manager 3 expresses that the cost of accessibility in education sessions can be children being separated from their peers, they explain, '*You don't want to separate them out . . . And make them feel awkward or special or whatever. But you also want them to join in*.' (Learning Manager 3). Additionally, inclusion for children with additional needs can be affected by adults from the visiting schools, '*They'll immediately jump in and tell you "nonverbal." They won't let that pupil experience the session*.' (Learning Manager 3), preventing the centre staff from including the child and making the session accessible to them.

Discussion

Our case study examined the accessibility and inclusivity of outdoor education for children with SEND at WWT. Reflexive thematic analysis identified four themes capturing the adaptations, ideas and improvements surrounding accessibility. Below we discuss our findings with reference to the UDL framework, identifying areas where outdoor education programmes have successfully incorporated its principles, highlighting opportunities for broader application and addressing the challenges that limit its full implementation.

Universal Design for Learning (UDL) in outdoor education

The UDL framework aims to promote inclusive learning through three key principles for educational provision: multiple means of engagement, multiple means of representation and multiple means of action and expression (Kelly et al., 2022). The UDL framework is a new and developing approach that actively promotes inclusivity through its proactive design, making it well suited to outdoor learning programmes. The theme *Resources and Adaptations*, particularly the subtheme *Resources to Aid Accessibility*, aligns with the principle of multiple means of engagement by providing diverse ways to engage students with varied needs and preferences. Preparatory resources like Social Stories (Gray, 1994), accessibility videos, and visual timetables used at one centre can help children with SEND engage with the wetlands before and during their visits, helping to reduce anxiety and facilitate smoother transitions (National Autistic Society, n.d.). Providing visual timetables also provides structure to the day which can help enhance learning opportunities and minimise disruptive behaviours (Simonsen et al., 2008). Similarly, the theme *Balancing Needs*, specifically the subtheme, *Quiet Spaces and Dedicated Sessions*, also reflects multiple means of engagement by providing different ways for children to participate, for example catering to those who require a calmer environment due to sensory sensitivities. However, to fully align with UDL, these adaptations should be available to all visiting classes to ensure that all children, regardless of their unique requirements, can participate fully. Offering these options universally would enhance both accessibility and inclusivity. Our findings align with Li et al. (2019), whose report highlighted the importance of having private areas for emotion regulation and sensory stimuli to ensure children can engage and have space when feeling over-stimulated. Similarly, we propose that consistent implementation of the multiple means of engagement principle in outdoor learning programmes would ensure a more inclusive experience for all learners.

The UDL principle of multiple means of representation is evident across several themes. The theme *Resources and Adaptations* exemplifies this principle by offering multiple ways for children to access information. Visual aids and inspiration sheets explain activities, tactile resources like model beaks and feathers support blind children, and hearing loops assist those who are deaf or hard of hearing. Additionally, the creation of translation cards supports linguistic diversity, making information accessible to children who speak English as an additional language. Although less explicit, the theme *Staff Approach to Inclusion* also aligns with this principle, as staff members adapted activities and their presentation to accommodate the sensory and cognitive needs of different children. For instance, staff who had Makaton training used it to deliver certain activity instructions, thereby offering another mode of information representation (Grove &

Walker, 1990). However, the sub-theme *Gaps in Resource Provision* highlights that these resources and staff training were currently only available at one centre, emphasising the need to implement them across all centres to fully adhere to the multiple means of representation principle of the UDL framework (as shown in Figure 2). Ensuring that all centres adopt these strategies will enhance the accessibility and inclusivity of outdoor learning programmes for children with SEND.

Finally, the principle multiple means of action and expression from the UDL framework is an area that required improvement across the WWT centres. Whilst staff described some efforts to accommodate diverse learning needs, such as using tactile resources or more hand-on activities tailored to individual needs, these adaptations primarily focussed on sensory access rather than offering varied ways for students to express their understanding. Additionally, the limited availability of adapted resources and training, as highlighted in themes *Gaps in Resource Provision* and *Consistency in Staff Approach and Training*, further constrains the ability of staff to provide these varied expressive opportunities. To fully adopt the UDL framework, we recommended that WWT centres broaden the range of available resources and provide alternative tools for all children to express their understanding, such as through photography, art or creative projects, rather than relying solely on traditional question-and-answer methods (Kelly et al., 2022).

Another key component of the UDL framework is its advocacy for a proactive approach to accessibility, anticipating and addressing barriers to learning through pre-emptive planning, rather than adjusting as specific needs arise (Kelly et al., 2022). Our thematic analysis revealed the subtheme *Reliance on Schools to Support with Accessibility* within the broader *Communication with Schools* theme. This subtheme illustrates the lack of communication from schools regarding the additional needs of their pupils and results in WWT finding it challenging to incorporate appropriate adaptations. By integrating the UDL framework as an alternative and proactive approach, outdoor learning programmes could be designed in a way that inherently accommodate for all needs, reducing the dependency on schools to provide specific information and thereby enhancing overall accessibility. Long and Guo (2023) highlighted the need to move beyond inclusion towards adopting concepts of participation and belonging, emphasising environments where children with SEND not only access and take part in activities but also feel valued, connected and recognised as full members of their communities. Proactively considering and understanding the diverse needs and desires of all children within both environments and activities is therefore essential, as it anticipates barriers through multiple means of engagement, representation and action and expression, and in doing so promotes a sense of belonging for all children (Long & Guo, 2023).

A key challenge in implementing the UDL framework in outdoor learning programmes is ensuring comprehensive training and resources for all staff. The theme of *Staff Approach to Inclusion* highlights the inconsistency in personal approaches, which stems from a lack of standardised training and guidelines across the organisation where we conducted the case study. Whilst some staff members demonstrated flexibility and initiative in adapting sessions, such as using Makaton or modifying activities, these efforts were not uniform across all centres. The absence of cohesive training and resources results in varied levels of support, potentially leaving gaps in accessibility for children with diverse needs. To fully integrate the UDL framework, we recommend that organisations implement thorough training focused on inclusive practices, specifically using the social model of disability which emphasises the need to promote inclusion, participation and belonging (Long &

Guo, 2023). Consequently, this will help to ensure that staff can consistently apply the principles of multiple means of engagement, representation, and action and expression.

Strengths and limitations

To ensure feasibility, our project used a case study approach that focused on three sites within a single organisation. One strength of this approach is that it yielded an in-depth understanding of accessibility practices within WWT, a leading provider of outdoor learning in the UK, offering valuable insights that can inform similar organisations aiming to enhance their inclusivity efforts. However, the number of centres and staff that participated in the case study was small and may differ from the perspectives and practices of other individuals, other centres, or other organisations. The staff we interviewed had a strong positive regard for and proactive stance on improving accessibility for children with SEND, which may have influenced their responses. We also acknowledge a similar stance and potential bias in our interpretation of the data. To mitigate bias, the research team remained vigilant throughout the study, actively reflecting on their perspectives. Future research could include interviewing children with SEND and their teachers which may provide useful alternative perspectives and experiences of the accessibility measures within outdoor learning programmes.

Finally, a key strength of this study was its direct impact on improving accessibility across all WWT sites. As a result of this research, all WWT centres now have pre-visit resources available including visual guides, Social Stories (Gray, 1994) and sensory stories. In addition, all learning managers completed general SEND, neurodiversity and Makaton training (Grove & Walker, 1990). Recognising that accessibility is an ongoing process, WWT has committed to building on these efforts by embedding accessibility improvements into its three-year work plan including further specialist training in supporting children with SEND and the development of specific sessions designed to support those with additional needs. Whilst there is still progress to be made, this study marks a significant step forward in making outdoor learning more inclusive for children with SEND.

Conclusions

Our case study highlighted the importance of ensuring accessibility and inclusivity for children with SEND in outdoor learning environments. While some WWT centres had implemented supportive adaptations like Social Stories (Gray, 1994), quiet spaces and adaptations to activity sessions, these efforts were not consistent across all sites. By applying the UDL framework, outdoor learning programmes can move beyond reactive adjustments and instead design activities and environments that anticipate and adapt for diverse needs from the outset.

Our findings point to four key recommendations for making outdoor learning accessible and inclusive for all. First, adopting a proactive approach by embedding UDL-informed programme design can ensure accessibility in all activities and reduce reliance on schools to provide information. Second, consistent organisation-wide training for staff and volunteers is required to ensure confidence and competence in supporting children with diverse needs. Third, sharing good practice and resources across sites, such as pre-visit guides, Social Stories (Gray, 1994) and communication aids, can promote equity of provision and reduce effort. Finally, establishing quiet spaces and flexible participation as standard practice can aid both inclusion and a sense of belonging for all children (Long & Guo, 2023).

Overall, our study demonstrates the value of UDL in outdoor learning within a national conservation charity, a context rarely examined in SEND research. It offers both theoretical insights and practical guidance, showing how UDL can inform inclusive practice in outdoor education. Our study highlights how outdoor education providers can move beyond basic inclusion towards fostering accessibility, participation, and belonging for all children.

Acknowledgments

The authors would like to thank WWT for being the site of this research and the WWT staff for their involvement.

Disclosure statement

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

Funding

The work was supported by the Cardiff University School of Psychology.

Notes on contributors

Ella Godwin completed her BSc in Psychology with Professional Placement at Cardiff University in 2024.

Lorna Jarvis is a BSc student in Psychology with Professional Placement at Cardiff University.

Nicola Parkin is a PhD student in Psychology at Cardiff University.

Wouter Poortinga is Professor of Environmental Psychology at the Welsh School of Architecture and the School of Psychology, Cardiff University.

Kersty Hobson is Professor of Human Geography in the School of Geography and Planning at Cardiff University.

Mark Stead is Head of Learning at WWT.

Jonathan Reeves is Principal Research Officer in the Ecosystem Health and Social Dimensions unit of the Conservation Evidence Department at WWT.

Morgan Marshall was the Generation Wild Programme Manager for WWT.

Merideth Gattis is Professor of Psychology at the Cardiff University Centre for Human Developmental Science and the School of Psychology, Cardiff University.

ORCID

Nicola Parkin http://orcid.org/0009-0001-1912-1035
Wouter Poortinga http://orcid.org/0000-0002-6926-8545
Kersty Hobson http://orcid.org/0000-0003-4200-9081
Jonathan Reeves http://orcid.org/0000-0003-4723-3015
Merideth Gattis http://orcid.org/0000-0002-8665-7577

References

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), 1–20. https://doi.org/10.3390/ijerph14050485

Bhaskar, R. (1975). Forms of realism. *Philosophica*, *15*. https://doi.org/10.21825/philosophica.82713

Bølling, M., Niclasen, J., Bentsen, P., & Nielsen, G. (2019). Association of education outside the classroom and pupils' psychosocial well-being: Results from a school year implementation. *Journal of School Health*, *89*(3), 210–218. https://doi.org/10.1111/josh.12730

Bølling, M., Otte, C. R., Elsborg, P., Nielsen, G., & Bentsen, P. (2018). The association between education outside the classroom and students' school motivation: Results from a one-school-year quasi-experiment. *International Journal of Educational Research*, *89*, 22–35. https://doi.org/10.1016/j.ijer.2018.03.004

Bondy, A. S., & Frost, L. A. (1994). The picture exchange communication system. *Focus on Autistic Behavior*, *9*(3), 1–19. https://doi.org/10.1177/108835769400900301

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, *11*(4), 589–597. https://doi.org/10.1080/2159676x.2019.1628806

Braun, V., & Clarke, V. (2021). 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. https://doi.org/10.1002/capr.12360

Canva. (n.d.). Canva: Visual suite for everyone. Retrieved June 21, 2024, from http://www.canva.com/en_gb/

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. https://doi.org/10.1016/j.healthplace.2014.03.001

Department for Education. (2015). special educational needs and disability code of practice: 0 to 25 years - Statutory guidance for organisations which work with and support children and young people who have special educational needs or disabilities. https://assets.publishing.service.gov.uk/media/5a7dcb85ed915d2ac884d995/SEND_Code_of_Practice_January_2015.pdf

Dillon, J., & Lovell, B. (2022). Links between natural environments, learning and health: Evidence briefing. *Natural England Evidence Information Note EIN063*.

Eick, C. J. (2012). Use of the outdoor classroom and nature-study to support science and literacy learning: A narrative case study of a third-grade classroom. *Journal of Science Teacher Education*, *23*(7), 789–803. https://doi.org/10.1007/s10972-011-9236-1

Ernst, J., & Stanek, D. (2006). The prairie science class: A model for re-visioning environmental education within the national wildlife refuge system. *Human Dimensions of Wildlife*, *11*(4), 255–265. https://doi.org/10.1080/10871200600803010

Faber Taylor, A., & Kuo, F. E. (2009). Children with attention deficits concentrate better after walk in the park. *Journal of Attention Disorders*, *12*(5), 402–409. https://doi.org/10.1177/1087054708323000

Fernelius, N. C. L., & Christensen, N. K. M. (2017). Systematic review of evidence-based practices for inclusive playground design. *Children Youth and Environments*, *27*(3), 78. https://doi.org/10.7721/chilyoutenvi.27.3.0078

Finn, K. E., Yan, Z., & McInnis, K. J. (2018). Promoting physical activity and science learning in an outdoor education program. *Journal of Physical Education Recreation & Dance*, *89*(1), 35–39. https://doi.org/10.1080/07303084.2017.1390506

Friedman, S., Gibson, J., Jones, C., & Hughes, C. (2022). 'A new adventure': A case study of autistic children at forest school. *Journal of Adventure Education and Outdoor Learning*, *24*(2), 1–17. https://doi.org/10.1080/14729679.2022.2115522

Friedman, S., & Morrison, S. A. (2021). "I just want to stay out there all day": A case study of two special educators and five autistic children learning outside at school. *Frontiers in Education*, *6*, 6. https://doi.org/10.3389/feduc.2021.668991

Galbraith, C., & Lancaster, J. (2020). Children with autism in wild nature: Exploring Australian parent perceptions using photovoice. *Journal of Outdoor and Environmental Education*, *23*(3), 293–307. https://doi.org/10.1007/s42322-020-00064-5

Gattis, M. (2025, April). *Are natural environments accessible and inclusive for people with special educational needs and disabilities?* SPARK Research Showcase on Disability, Cardiff University Conference presentation.

Gill, N. T. (2014). The benefits of children's engagement with nature: A systematic literature review. *Children, Youth and Environments*, *24*(2), 10. https://doi.org/10.7721/chilyoutenvi.24.2.0010

Gray, C. (1994). Social stories and comic strip conversations: Unique methods for social cognitive learning. *Arlington, TX: Future Horizons*.

Gray, C., Gibbons, R., Larouche, R., Sandseter, E. B., 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 physical fitness in children? A systematic review. *International Journal of Environmental Research and Public Health*, *12*(6), 6455–6474. https://doi.org/10.3390/ijerph120606455

Grove, N., & Walker, M. (1990). The Makaton vocabulary: Using manual signs and graphic symbols to develop interpersonal communication. *Augmentative and Alternative Communication*, *6*(1), 15–28. https://doi.org/10.1080/07434619012331275284

Guardino, C., Hall, K. W., Largo-Wight, E., & Hubbuch, C. (2019). Teacher and student perceptions of an outdoor classroom. *Journal of Outdoor and Environmental Education*, *22*(2), 113–126. https://doi.org/10.1007/s42322-019-00033-7

Hopper, R. (2017). Special educational needs and disability and learning outside the classroom. In S. Waite (Ed.), *Children learning outside the classroom from birth to eleven* (2nd ed., pp. 118–130). SAGE Publications Ltd.

Horton, J. (2017). Disabilities, urban natures and children's outdoor play. *Social & Cultural Geography*, *18*(8), 1152–1174. https://doi.org/10.1080/14649365.2016.1245772

Kallio, H., Pietilä, A., Johnson, M., & Kangasniemi, M. (2016). Systematic methodological review: Developing a framework for a qualitative semi-structured interview guide. *Journal of Advanced Nursing*, *72*(12), 2954–2965. https://doi.org/10.1111/jan.13031

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. https://doi.org/10.1007/s42322-022-00096-z

Kuo, F. E., & Taylor, A. F. (2004). A potential natural treatment for attention-deficit/hyperactivity disorder: Evidence from a national study. *American Journal of Public Health*, *94*(9), 1580–1586. https://doi.org/10.2105/ajph.94.9.1580

Li, D., Larsen, L., Yang, Y., Wang, L., Zhai, Y., & Sullivan, W. C. (2019). Exposure to nature for children with autism spectrum disorder: Benefits, caveats, and barriers. *Health and Place*, *55*, 71–79. https://doi.org/10.1016/j.healthplace.2018.11.005

Long, T., & Guo, J. (2023). Moving beyond inclusion to belonging. *International Journal of Environmental Research and Public Health*, *20*(20), 6907. https://doi.org/10.3390/ijerph20206907

Lumber, R., Richardson, M., & Sheffield, D. (2017). Beyond knowing nature: Contact, emotion, compassion, meaning, and beauty are pathways to nature connection. *PLOS ONE*, *12*(5), e0177186. https://doi.org/10.1371/journal.pone.0177186

Lupton, R., Thrupp, M., & Brown, C. (2010). Special educational needs: A contextualised perspective. *British Journal of Educational Studies*, *58*(3), 267–284. https://doi.org/10.1080/00071005.2010.500607

Meyer, A., Rose, D. H., & Gordon, D. (2014). *Universal design for learning: Theory and practice*. CAST Professional Publishing. http://udltheorypractice.cast.org/

Miller, N. C., Kumar, S., Pearce, K. L., & Baldock, K. L. (2021). The outcomes of nature-based learning for primary school aged children: A systematic review of quantitative research. *Environmental Education Research*, *27*(8), 1115–1140. https://doi.org/10.1080/13504622.2021.1921117

Mygind, L., Kurtzhals, M., Nowell, C., Melby, P. S., Stevenson, M. P., Nieuwenhuijsen, M., Lum, J. A. G., Flensborg-Madsen, T., Bentsen, P., & 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. https://doi.org/10.1016/j.envint.2020.106238

Natalini, A., & Savastano, M. (2024). Outdoor education, processes of inclusion of children with ADHD and learning disabilities. *European Journal of Special Education Research*, *10*(3). https://doi.org/10.46827/ejse.v10i3.5385

National Autistic Society. (n.d.). Social stories and comic strip conversations. https://www.autism.org.uk/advice-and-guidance/topics/communication/communication-tools/social-stories-and-comic-strip-coversations

Pikus, A. E., Etchison, H. M., Gerde, H. K., & Bingham, G. E. (2024). Nature for all: Utilizing the universal design framework to incorporate nature-based learning within an early childhood inclusive classroom. *Teaching Exceptional Children*, *57*(5), 338–347. https://doi.org/10.1177/00400599241257438

Rose, D. (2000). Universal design for learning. *Journal of Special Education Technology*, *15*(2), 56–60. https://doi.org/10.1177/016264340001500208

Ruiz-Gallardo, J., Verde, A., & Valdés, A. (2013). Garden-based learning: An experience with "at risk" secondary education students. *Journal of Environmental Education*, *44*(4), 252–270. https://doi.org/10.1080/00958964.2013.786669

Simonsen, N. B., Fairbanks, N. S., Briesch, N. A., Myers, N. D., & Sugai, N. G. (2008). Evidence-based practices in classroom management: Considerations for research to practice. *Education and Treatment of Children*, *31*(1), 351–380. https://doi.org/10.1353/etc.0.0007

Stavrianos, A., & Pratt-Adams, S. (2022). Representations of the benefits of outdoor education for students with learning disabilities: A thematic analysis of newspapers. *Open Journal of Social Sciences*, *10*(6), 256–268. https://doi.org/10.4236/jss.2022.106020

Stead, M. (2022). Generation Wild: Inspiring the next generation of nature lovers. *Environmental Education*, *129*, 15–16.

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/PS179 p21-23 Stead.pdf

Szczytko, R., Carrier, S. J., & Stevenson, K. T. (2018). Impacts of outdoor environmental education on teacher reports of attention, behavior, and learning outcomes for students with emotional, cognitive, and behavioral disabilities. *Frontiers in Education*, *3*, 46. https://doi.org/10.3389/feduc.2018.00046

Talay, L., Akpinar, N., & Belkayali, N. (2010). Barriers to playground use for children with disabilities: A case from Ankara, Turkey. *African Journal of Agricultural Research*, *5*(9), 848–855. https://academicjournals.org/journal/AJAR/article-abstract/D34842028102

United Nations. (2006). *United nations convention on the rights of persons with disabilities*. https://www.un.org/disabilities/documents/convention/convention_accessible_pdf.pdf

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 & Outdoor Learning*, *23*(1), 54–73. https://doi.org/10.1080/14729679.2021.1935286

Warner, R. P., & Dillenschneider, C. (2019). Universal design of instruction and social justice education: Enhancing equity in outdoor adventure education. *Journal of Outdoor Recreation, Education, and Leadership*, *11*(4), 320–334. https://doi.org/10.18666/JOREL-2019-V11-I4-9543