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Green Exercise

Linking nature, health and well-being

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Chapter 6

Learning on the move

Green exercise for children and young people

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Introduction

Physical activity is a key component of green education in nature ranging from mild to moderate or vigorous kinds of exercise. Acknowledging the role that formal and informal green education can play in enabling and encouraging physical activity is also important. These approaches can help to reduce sedentary behaviours and have positive impacts on obesity, type 2 diabetes, and mental resilience (Department of Health, 2011b). Here we outline the concept of green education and explore connections with physical activity. We identify how this links to broader health and wellbeing and consider how green education fits into current education policy, and provide examples from the United Kingdom illustrating current approaches to practice and research with primary school age children (4–11 years) and young excluded people (14–25 years). We argue that green education can play an important role in improving children and young people's physical activity levels and has a strong impact on their broader wellbeing.

What is green education?

Our definition of green education (also called outdoor learning, learning outside the classroom, outdoor education, and learning in natural environments (LINE)) extends beyond learning about the natural environment and developing positive environmental attitudes. We understand it as a situated natural and cultural context for learning any subject or skill, which brings greater opportunities for people to trial different ways of being and learning than when indoors (Waite, 2013; Waite and Pratt, 2015). It is not only about children's school learning outside the classroom but includes informal learning opportunities for all ages. 'Green education seems to be a more holistic concept [than environmental or sustainable education] and can include learning about either a) nature or b) other subjects; but the key element is being outside' (Bragg et al., 2013). Recent research by Lin et al. (2014) suggests that the opportunities of being outside are unlikely to be sufficient and that orientation through education, for example, is a more significant predictor of future use of greenspaces than solely accessibility.

Kellert (2012) suggests that starting early helps to develop a positive desire to be in nature. Internationally, many early years' policies recognise the outdoor environment as important for children's development (Maynard and Waters, 2014). Green education is recognised as also providing significant personal, social and health outcomes (Lovell and Roe, 2009; Dillon and Dickie, 2012). It can also increase engagement and attainment in curricular subjects (Ofsted, 2008). This diversity of potential benefits is, however, shaped by the current educational context, particularly in nations that are pursuing a performativity agenda of standards (NEETF, 2000; Waite and Pleasants, 2012). Green education is consequently often harnessed to mainstream educational ends. This presents some challenges (Rea and Waite, 2012) for co-opting the wider benefits of this learning to the service of formal education that arguably has narrower aspirations and vision of what constitutes education for children and young people (Berliner, 2011). However, mainstreaming can offer a route to accessing the myriad benefits from learning in natural environments to a wider cohort (Bauman et al., 2012). For the majority of children in affluent countries, school represents a common denominator in their lives. Schooling can, therefore, address issues across different communities and socioeconomic groups, providing a 'universal' access that many other methods of intervention directed at childhood experience would struggle to achieve.

Although we focus particularly on the benefits for physical wellbeing, one of the strengths of outdoor learning is that it can address a number of aims simultaneously (Dillon and Dickie, 2012). As we shall see below, it may be both prudent and politic to foreground these multiple potential outcomes in order to encourage the use of natural environments for the achievement of physical health outcomes.

Research is beginning to unpick subtleties in what the contribution of different outdoor spaces might be, so that concepts such as 'green education' and 'the great outdoors' are being defined more precisely. Studies are distinguishing and subdividing into, for example: blue aquatic environments (White et al., 2010); wilderness experiences (Cordell et al., 2005); familiar local natural environments (Beames and Ross, 2010); different cultural, geographical and historical milieu (Stewart, 2008; Warthow and Brown, 2011; Waite, 2013); managed parks and landscapes (Ward Thompson et al., 2012); school grounds (Malone and Tranter, 2003; Waite, 2013), woodland and forests (O'Brien, 2009); and therapeutic and school gardens (Sempik and Aldridge, 2006; Passy et al., 2010).

This more nuanced approach has resulted in greater variety and specificity of research studies, rapidly increasing the depth and breadth of the evidence base related to specific educational interventions in particular natural contexts. However, many of these studies are small scale and unpublished, and fail to build effectively on each other.

Elements that need to be considered in green education research and practice include the following questions:

- Purpose – what? why?
- Place – where?

- Pedagogy – how?
- People – who?

Waite (2014, 2015) suggests that 'minding these ps and qs' provides a structure whereby the situated characteristics of learning outdoors in natural environments can be made more visible. This can maximise their learning potential and provide an analytical framework. First, the teacher needs to consider what the educational purpose is in taking learning outside the classroom. If this is to engender discovery and creative learning in the children, then teachers may choose a place that will support that by locating the lesson within a novel context that is not weighted with prior expectations. Waite (2013) refers to this as a 'culturally light' place where new ways of being and thinking may be better supported than in a familiar context which is 'dense' with cultural norms. For example, a visit to local woodland may offer an exciting context for imaginative story construction, where teachers and children can play with different ideas and narratives. In such a case, the pedagogy employed is likely to be facilitative rather than directive and follow children's lines of interest. The people involved in learning may include peers since group work encourages children to explore different ideas rather than seek the answer that they think the teacher wants (Mercer et al., 1999).

In another lesson the focus may be on developing knowledge of geographical and cultural features of the landscape; here the place is likely to be visited repeatedly to build understanding of it and a relationship with it. For example, Beames and Ross (2010) have worked with schools in Scotland on 'Outdoor Journeys' that develop cultural familiarity with places to stimulate sustained project-based learning. This pedagogical approach may require expert knowledge of the area, possibly including other adults who can provide historical details about the culture that is embedded in the place. In Ireland the 'Heritage in Schools Expert scheme' encourages this by inviting people who are expert in heritage to support school learning.

If the teaching aim is to stimulate different sorts of physical activity, open beaches may encourage more cardiovascular activity through running, while places with uneven terrain such as wooded areas may encourage finer body control (Fjørtoft, 2004). Aronsson et al. (2014) found that lower levels of children's moderate to vigorous physical activity were associated with school grounds compared to woodland. People supporting this kind of learning may also find that modelling vigorous movement is an effective pedagogical strategy.

Thus contexts for green educational endeavour are becoming more refined and there is greater attention to the nature of pedagogy within these spaces and its alignment with educational or health and wellbeing purposes. Innovative strategies may be necessary to address growing concerns around health and wellbeing and to capitalise on increasing evidence of the benefits of green education for health.

Evidencing the links between green spaces and behaviour

The evidence suggests that the relationships and the kind of benefits linked to physical activity in natural environments varies by age, gender, ethnicity, socioeconomic status and degrees of social cohesion (Lachowycz et al., 2012; de Vries et al., 2013; Dinnie et al., 2013). This emphasises our argument that research and practice need to understand the responses of people, i.e. children and young people with different social and cultural characteristics, within the matrix of place, pedagogy and learning purpose. The evidence base covering the links between physical activity and greenspace for children and young people, particularly for those from more disadvantaged backgrounds, is relatively small. What research there is for children and young people shows: children are more likely to engage in moderate to vigorous levels of exercise when spending time with friends outdoors (Pearce et al., 2014); over half of moderate to vigorous activity in children occurs in urban greenspace and mostly at weekends (Lachowycz et al., 2012); and young people gain social and mental health benefits from recreation in particular urban green settings (Moore et al., 2014).

It is not just the presence of green (e.g. parks, woods) and blue (e.g. streams, lakes, ponds) outdoor spaces which is important to leveraging specific impacts. The planning and design of greenspaces is important and has been shown to change usage patterns and behaviours according to age and other socio-demographic factors (Ward Thompson et al., 2008 and 2013). People's engagement and use of the environment depends on the types and quality of the greenspace, how close it is to them, and issues such as ease of access and site infrastructure provision. It also depends on factors such as the availability of organised and informal activities introducing people to specific sites and different kinds of ecosystems and habitats (Lin et al., 2014). Education, training and learning activities in the outdoors can mediate all these functions (Children and Nature Network, 2012). For younger age groups this encompasses activities such as adventure play e.g. den building, pond dipping, tree climbing, and for young people activities such as group and individual sports, or environmental science experimentation, and importantly includes all curriculum learning that takes place outside the classroom. Such organised and informal learning can counter the 'cotton wool kids' trend (O'Connor and Brown, 2013), and encourage active exercise, general fitness as well as bone and muscle strengthening, improving gross and fine motor skills, and motor coordination: patterns of activity that are potentially carried forward throughout life.

Current education policy

While factors at the level of practice need to be kept in mind, learning approaches and opportunities for the integration of outdoor activity are shaped and constrained by the wider educational policy context. In Scandinavian countries outdoor culture permeates society, and there is a greater willingness to embrace broader concepts of education as developing the whole person (*bildung*) (Bentsen

and Jensen, 2012). Consequently, outdoor learning is much better established in Scandinavian education policies (Bentsen, 2013). *Bildung* has more in common with English early years educational and care provision that encourages a whole child perspective, so in England outdoor learning is better integrated in the early years than at later stages of education (Waite, 2010). As Waite (2010) notes, the decline of children's opportunities to learn outdoors has been influenced by policies encouraging performativity and a narrowing of curriculum aims that high stakes testing regimes tend to produce (Berliner, 2011). In Denmark, the government has recently funded a large Continuing Professional Development programme to support the spread of *udeskole*, where children learn curricular subjects outside the classroom: the physical, cognitive and social benefits arising from this practice are being examined by a complementary research project (Mygind, 2013).

Existing research has shown the value of outdoor learning for cognitive attainment (National Environmental Education and Training Foundation, 2000; Dillon and Dickie, 2012) and the associated value of physical activity for academic attainment by helping to change attitudes and academic behaviours such as concentration and attention (CDC, 2010). The new curriculum in England, introduced from September 2014 (Department for Education, 2013), although somewhat prescriptive in content, has responded to this evidence, and makes reference to the importance of experiential learning in contexts other than the classroom. Furthermore, educational policies in Scotland, Wales and Ireland have advocated outdoor learning, reflecting a global popular movement that supports reconnection of children with nature (Louv, 2008; Moss, 2012; Council for Learning Outside the Classroom) alongside concern with sedentary lifestyles and childhood obesity (Marmor, 2010). Natural Connections is a recent example of a project funded by Natural England, Department for Environment and Rural Affairs (DEFRA) and English Heritage, that responds to this evidence base and the policy imperatives outlined in the English government's Natural Environment White Paper — The Natural Choice: Securing the Value of Nature (HM Government, 2011). The project seeks to embed learning in outdoor and natural contexts across the curriculum in primary and secondary phases.

In Britain in the past, children with special educational needs have benefitted from additional funding and the development of alternative curricula, and pedagogical approaches such as Forest Schools, that have used green education as an effective approach to engage these groups with learning. Less affected by high stakes testing, there was less pressure on teachers to achieve high academic scores, and greater freedom to experiment with these pupil groups. However, contemporary financial pressures mean that there are now other school priorities for budget allocation. Schools in areas of high multiple deprivation or with high numbers of children with special educational needs may struggle to reach the performance standards set, and may now be less willing to widen and enrich the curriculum offer at the risk of failing to meet targets for 'what counts'. In such circumstances it is the availability of funding and performative demands of policy, rather than the appropriateness of the green education approach, that often dictates pedagogy

and outcomes. However, schools with high levels of eligible students, and which recognise the benefits accruing from green education, may choose to use their pupil premium (additional funding given to publicly funded schools in England to raise the attainment of disadvantaged pupils) creatively to ensure that children who would not otherwise access nature have the opportunity to do so.

Citizenship and personal social and health education (PSHE) is another major strand of outdoor learning policy and practice. Since the early days of the outdoor education movement, outdoor and adventurous activity has been advocated as a means to developing this fundamental learning in young people (Neill, 2003); although acquisition and transferability of personal and social skills from the particular learning situation is contested by place-based scholars such as Brookes, (2007). Nevertheless, examples of this philosophy being carried forward are the many social action projects carried out in outdoor contexts, e.g. creating community gardens within the National Citizen Service, an English government initiative to build a bigger and stronger society (Naracen, 2013).

Cross government policy aimed at older children and young people aged 13–19 includes 'Positive for Youth'. The policy recognises that some young people (about 6 per cent) experience complex and multiple needs including NEET (Not in Employment, Education or Training) status, having low educational attainment and difficult behaviours such as misusing substances (Cabinet Office and Department for Education, 2010). The policy vision focuses on the development of supportive relationships, the encouragement of strong ambitions and the provision of good opportunities as crucial aspects for preparing young people for work and adult life. There is potential for green education to contribute to this policy agenda by providing some good opportunities that can help prepare young people for work.

Opportunities for green education in lifelong and lifewide learning

This section provides examples of learning projects incorporating physical activity in natural contexts. Using the 'ps and qs' scheme (Purpose, Place, Pedagogy, People) as our framework, we describe each of the examples and explain the impacts on levels of participants' physical activity. The 'Place' in each of the examples is woodland, and the 'People' cover two specific age groups, i.e. primary school children aged 4–11 years; and young people aged 14–25 years. The latter group includes vulnerable and disadvantaged learners.

Woodland Health for Youth (WHY): an evaluation of physical health benefits derived from learning outside the classroom in natural environments (LINE) for school-age children

In spring 2014 research was conducted evaluating the health benefits of green education, called Learning In Natural Environments (LINE). The Woodland Health for Youth (WHY) project was a partnership between Plymouth City

Council (Stepping Stones to Nature, 2012), Plymouth University (School of Nursing and Midwifery and the Institute of Education), Plymouth Community Healthcare, Good from Woods and one of the local schools taking part in the Natural Connections project and offering LINE to their pupils. The aim of the evaluation was to measure the physical health benefits of LINE and assess the contribution of WHY to reducing the incidence of childhood obesity, as well as promoting better partnership working between health and education services (Marnot, 2010). The study explored the potential for outdoor learning as a framework for 'whole school health promotion' (Langford et al., 2014), appointing a nurse researcher for this initiative at the school.

An interdisciplinary action research design appropriate for change management in a clinical practice setting was chosen, based on a recursive helix of planning, acting, observing and reflecting (Robinson, 2011). A reflective log was kept throughout the project, which included observations, discussions, thoughts and any ideas that evolved as the project progressed. These emergent reflections fed into the research cycle and informed the process.

Children undertook lessons across a range of curriculum subjects within their local woodland with the purpose of stimulating their engagement in learning. The pedagogy employed encouraged active experiential learning. Ten children in a Year 2 class participated in the research, selected through a 'first-come first-served' based consent process, reflecting mixed gender and attainment within the sample. Quantitative data on physical activity was collected using accelerometers attached to each child's wrist of choice to measure indoor and outdoor activity throughout the school day. Accelerometry is an established technique translating detection of movement into physical activity levels (Cooper et al., 2010; Kim et al., 2012). The children wore the monitors for the entire school day, but not when they went home. Comparison with the school timetable allowed data to be segregated into indoor and outdoor lessons and break times. In addition to the accelerometers, children's height and weight were measured and their body mass index (BMI) was calculated. The measurements were compared to measurements done by the school nursing service two years earlier, in Reception year, as part of the National Child Measurement Programme (National Child Measurement Programme, 2013).

Figure 6.1 shows the proportion of time spent in moderate to vigorous physical activity in each context. Statistical analysis of the physical activity levels obtained through accelerometers demonstrated that children were significantly more active during LINE sessions than during indoor lessons ($17.0\% \pm 6.7$ SD in LINE sessions, $6.2\% \pm 4.3$ in indoor lessons, $p=0.000$). They were particularly active when LINE was held in woodland ($19.0\% \pm 7.1$), rather than in the green school grounds ($13.7\% \pm 4.8$ in school ground LINE, $p=0.01$).

The woodland offers a larger and less familiar space to move around in, with ample opportunities to engage in a wide range of activities. Passy and Waite (2011) identify multiple benefits to woodland LINE including greater freedom, wilder and more natural space, child-led learning, negotiated boundaries, created activities and managed risk.

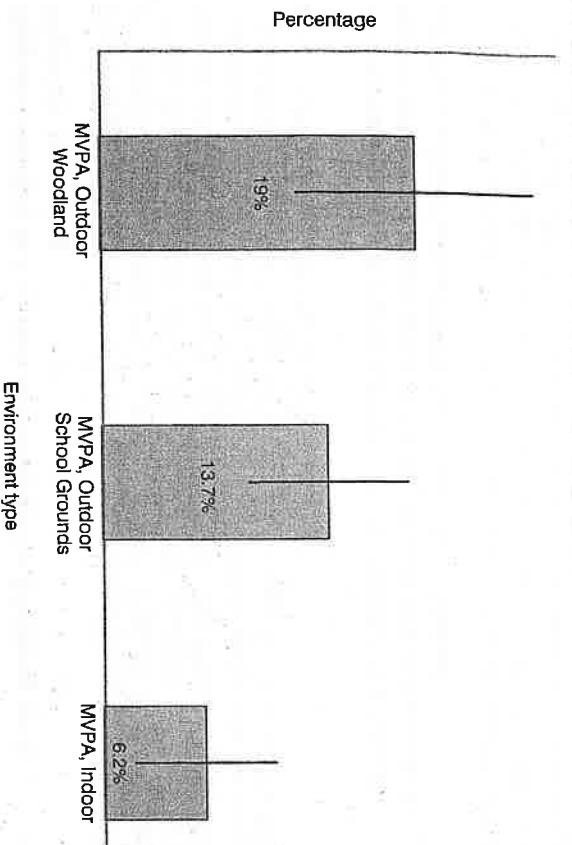


Figure 6.1 Levels of moderate to vigorous physical activity (MVPA) in different school environments (Aronsson et al, 2014)

While national and local data demonstrate an increase in childhood obesity year-on-year (Public Health, Plymouth City Council, 2013), the results of this small-scale study contradict this trend; the majority of children had lowered their BMI since Reception year measurements. In Year 2, eight out of ten children had a healthy BMI at the time of measurement while two were classified as overweight; none of the children were underweight or obese. A recent systematic review by Langford et al. (2014) highlights the link between physical activity interventions and BMI reduction. Although childhood obesity is complex with many factors influencing children's BMI, the WHY project suggests that physical activity through LINE may be a contributing factor to reversing the negative trend generally seen in children's BMI levels. Furthermore, LINE may offer a more equitable and consistent way of increasing overall physical activity levels compared to targeted interventions or increases in break time, by avoiding stigmatisation of overweight children or compounding sedentary patterns in free play.

Observational data also indicates that children engage in a range of different activities during LINE, so developing a multitude of skills in addition to curricular learning, such as gross and fine motor skills, risk-taking behaviour and safe practice, creative skills, social skills and building confidence and self-efficacy. Additionally, children's body language mirrored the joy these activities and the outdoor environment provided. Spontaneous comments made by the children demonstrate that some of the children enjoy LINE and spending time in the woodlands, linking LINE to their social, emotional and physical sense of wellbeing:

'This is fun!' (girl looking for insects on a tree).

'I love nature' (boy in the woodland).

'I can feel the sun in my face and the fresh air' (girl in the woodland).

The WHY evaluation associated school-based initiatives and access to greenspace with increased physical activity levels; suggesting possible positive long-term health outcomes. To be effective, sustainable and equitable, LINE needs to become a regular feature of schooling, perhaps even enshrined in the national curriculum, in order to give all children, regardless of socioeconomic background, equal opportunity to access natural environments and to enjoy the multiple benefits that come with this.

Importantly green education such as LINE also provides a much wider range of benefits for children and young people. The concept of lifewide learning is outlined by Jackson (2014) as learning that takes place across the different roles and spaces people inhabit; at work, home, in education, in the hobbies and interests people pursue. This concept is illustrated in some of the examples below.

Physical activity through training and volunteering programmes for excluded 14–25 year olds

Hill Holt Wood (HHW) is a social enterprise that provides green education opportunities for pupils excluded from school. HHW works with Lincolnshire County Council as part of a programme called 'Solutions 4' involving young men excluded from mainstream education. A member of the HHW Board said 'it's impossible to underestimate the brutalising effects of where most of these kids live' (O'Brien, 2005a, b). One of the venues for 'Solutions 4' pupils is HHW, a small 14-hectare wood: they can choose to attend if they are interested in woodlands, conservation and outdoor working.

One study explored the activities of HHW (O'Brien, 2005a, b). Since then the wood has developed further to provide a wide range of opportunities for health, education and architectural design in woodlands (HHW undated). The pedagogical approach at HHW is to provide a strong ethos giving support and structure for the boys. The tasks are changed and adapted so that their attention span can be managed, and they can produce artefacts, such as wooden spoons, quickly. The focus is on progressing and providing learning opportunities that are appropriate for the boys when mainstream schooling has not worked. The young men participate in conservation, construction, tourism as well as undertake basic English, ICT (information and communication technologies) and Maths. They are also encouraged to include and bring their parents and carers to the wood at weekends and to plant their own tree 'so whatever happens... they can always come back to HHW; and because it's a community woodland, they always can' (HHW staff member). The physical elements of the approach can play an

important role in helping to calm the young men. One of the teaching staff talked about the boys and the woodland environment and said 'they were coming away from something, coming into something completely different, the fresh air was tiring them and the physicality of the work'.

Project Scotland (PS, 2014) is a volunteer placement programme for young people aged 16–30 years classified as NEET. They receive a subsistence allowance for undertaking a minimum of 30 hours of activity per week, for between three and twelve months. A Project Scotland programme was set up by Forestry Commission Scotland (FCS) in Galloway Forest for young men aged 16–25 years, drawn from areas with few employment opportunities to undertake practical conservation volunteering (O'Brien et al., 2010, 2011). Galloway Forest is a large wooded area in southern Scotland that includes moorland, hills and lochs. The aim of the programme was to give the young men an opportunity to learn new skills, gain confidence, work as part of a team and potentially move into further education or employment. A research project on conservation volunteering included the FCS programme, with data being gathered through interviews and questionnaires (O'Brien et al., 2011).

Most of the young men were aged 16 and 17; some experienced behavioural and emotional difficulties as well as substance abuse. One young man said if it were not for Project Scotland: 'we'd all be sitting at home drinking Export [a brand of lager] and on the laptop'. Getting out of the house, being outdoors and doing something positive were all considered important by the young men (O'Brien et al., 2011). The activities they undertook included brushing, ditching, removing vegetation, they gained training in chainsaw and strimmer use, fencing and pesticide application. The work was often physically active; one young man noted 'you sleep better' when active. Activities including mountain biking, football and barbeques were also organised for the young men outside of the volunteering activity as part of celebrations providing further opportunities for the young men to be physically active.

Phoenix Futures (PF, undated) runs a 'recovery through nature' programme which aims to aid people's recovery through undertaking tasks in nature. 'As an organisation, what's important to us is not the actual activity itself or the task at hand, it's about taking part... we provide them with the skills to plan out a task, delegate tasks, take on responsibilities, delegate responsibilities, so it encourages them to take ownership of the whole programme' (PF representative). As part of a wider study, on Forestry Commission Scotland's engagement with communities, an interview was undertaken with a representative from PF (Lawrence et al., 2014). PF won a contract from FCS to deliver a skills programme for unemployed 16–25-year-olds in Glasgow. The work is undertaken on FCS-managed forest land or other publicly owned land. The young people are taught forestry skills which include chainsaw training, scrub cutting, pruning and landscaping. They are often socially excluded, isolated and using drugs and alcohol. The work the young people undertake involves a range of physical activity from mild to very active. The physical activity, physical experience, gaining improvements in gross

and fine motor skills and co-ordination of movement are important aspects of the training the young people receive (Hall, 2004).

Supported by Natural England's 'Access to Nature' programme, 'Into the Woods' was launched in September 2011. Based in Bristol it specialises in working with young adults and adults from vulnerable backgrounds. Discussions with project leaders as part of a short research project looking at mindfulness-based approaches to using the outdoors (Ambrose-Oji, 2013), explained that the purpose of the green education programme is to deliver positive physical and mental health benefits to participants with learning difficulties, disabilities or are mental health service users through physical activity in woodland settings. This group of people do not normally tend to access natural environments, either because they find these surroundings unfamiliar and frightening or because transport or physical access may be difficult. The pedagogic approach employed by the project is an adapted form of 'Forest School'. Participants are encouraged to explore the natural world through all of their senses, using environmental art, bush craft and developing traditional woodland working techniques.

For those young adults with capacity, traditional forestry and woodland skills training involves coppicing and hedge laying, but trainees are also introduced to activities such as fire lighting, tool care and health and safety management. For participants with particularly severe learning disabilities, the education and training is focused on developing self-confidence and key life skills through 'taking notice', developing awareness of the woodland environment and personal connections with it.

The project leaders reported an evaluation of the outcomes using indicators developed within the Silvanus Trust (undated) and Plymouth University 'Good from Woods' project showed that taking participants to new and challenging environments increased physical and emotional engagement with the environment, and encouraged new ways of exercising. It also broadens participant expectations of the kinds of physical activity they can take part in, as well as outdoor employment and volunteering opportunities they might apply for.

Discussion

We have outlined the importance of physical activity as a critical component of green education. This has an impact not only on children and young people's physical health but also on their mental resilience and wellbeing, self-esteem and social connections. The 'WHY' research project provides an innovative example of the education, environment and health sectors working together to research the levels of physical activity that can occur in green education compared to a traditional school day. This type of approach has potential for wider impact if adopted as part of whole school health promotion. The examples of 14–25 year olds all involve young people with major problems who are often facing exclusion and isolation. Green education is shown to be particularly effective for some of these young people due to the atmosphere of the environment

which can be calming, therapeutic and restorative, especially for those with anger management and behavioural problems. Much satisfaction can be gained by individuals connecting with nature and for some this can be a whole new experience. Changes in attitudes and behaviour occur and may be promoted through improved physical self-image and positive physical exercise. These behaviours can potentially last beyond the green education experience into adult life and lifewide learning (Pretty et al., 2009; Jackson, 2014).

Green design and planning

There is potential for the environment and education sectors, with support and input from the health sector, to start working more closely together to encourage the design and creation of greenspace infrastructure in:

- i any new build school, nursery, college and university development
- ii existing education establishments which provide opportunities to retrofit green infrastructure/space.

Such approaches are starting in collaborations between the health and environment sectors such as the NHS (National Health Service) Forest in England and Wales and in the NHS Greenspace demonstration project in Scotland (O'Brien, 2014). Both of these programmes create greenspace in new or existing health care settings from hospitals to doctors' surgeries. In other examples, education establishments will be encouraged to utilise these and other nearby greenspaces for green education. Forestry Commission Scotland for example, provides information on public forest learning sites close to schools that can be used for programmes such as Forest School (FCS, 2009). Natural Connections has had significant impact promoting the educational use of schools' local natural environments, including beaches, their grounds and nearby parks and woodland.

Perhaps one of the most persuasive aspects about green education is research that shows that even outside of formal education, nature is a learning resource that promotes resilience in young people positively affecting their future life course. Merchant et al.'s (2013) study of young people in low-skilled jobs in the southwest of England unexpectedly found that many drew on nature as a positive factor in their lives. Other research examining social and economic aspirations of young people living in or near a national park (Merchant et al., 2013) demonstrated how strongly they valued the natural environment, and how significant it was to their life choices, influencing their future occupational training and extending the time they remained within their local community.

The Monitor Engagement with the Natural Environment (MENE) survey reports on visits with children to nature by adults from 2009–2012 (Natural England, 2012) in England. It found that 37 per cent of visits with children were within 1 mile of home with parks in a town or city being the most visited

nature spaces (Natural England, 2012). Motivations to visit nature for those with children were to entertain and play with them; 40 per cent of visits to nature with children involved play and 59 per cent walking. Children that canvas for time in natural environments may also be a force to green educate their parents.

The RSPB report *Every Child Outdoors* (2010) concluded that 'there is strong evidence to show that by the time children leave secondary school, their attitude to exercise is highly predictive of whether they will be physically active as adults. The strongest relationship is with the quality of exercise they have experienced, as opposed to the quantity of exercise. Nature is a major motivating factor for exercise'.

Encouraging these behaviours relies on greenspace design that provides children and young people with welcoming, nearby access and environments that stimulate their need to explore and safely challenges them (NICE, 2008). A focus on greenspace and formal learning approaches such as those outlined in this chapter, when combined with improvements to the quality, facilities and visual welcome of existing greenspace for children and young people, can consequently encourage greenspace access as part of everyday living and family life for lifewide learning. The challenge is for policy makers, planners and practitioners to recognise the value of greenspaces in this context, and find the means to protect, maintain and improve public and other accessible greenspace during a period of global and national economic austerity (Heritage Lottery Fund, 2014).

Wider benefits than physical activity

This chapter focused on the importance of green education in encouraging and enabling physical activity, but we emphasise that much wider benefits and opportunities are provided for children and young people. For example, the young men at Galloway Forest talked about sensory experiences that were an important part of the whole physical experience. They enjoyed seeing wildlife and wanted to take care of it, appreciated the views of nature, felt a sense of freedom 'yeah it's got me, got in my veins' (Young man, Project Scotland, Galloway), gained a sense of place and felt more at ease. Green education can be a particularly important approach for those who face specific issues, such as attention deficit hyperactivity disorder (Faber Taylor and Kuo, 2011), anger, behavioural and emotional difficulties and kinaesthetic learners who learn by doing (O'Brien and Murray, 2007). Understanding this wide range of benefits and their association with different natural contexts can enable green educators to target green education appropriately for different audiences and sectors.

Cross-sector partnerships

Partnership working is essential to the success of planning, design, governance and the delivery of green education whether formal or informal. Our examples show partnerships across the environment and education sectors, and, more infrequently, with the health sector. Some of the barriers to partnership working

that the projects overcame included differing objectives and requirements for reporting, siloed working and thinking, diverse professional cultures and a lack of a common language or understanding between sectors, inequality of input and the time needed to develop partnerships. It can be important to consider different types of partnership working. For example, strategic partnerships focus on high impact relationships involving integration into governance and decision-making processes. Policy delivery partnerships aim at a specific policy target; while operational partnerships focus on organising specific practical programmes and projects (Ambrose-Oji et al., 2010). There can also be partnerships concentrating on networking in which there is sharing of information, communication and contacts (Ambrose-Oji et al., 2010). To date, the majority of green education projects have been operational projects and programmes that are time limited. Without strategic networking, lessons are not necessarily being learnt across these projects and scaling them up remains difficult. This highlights the importance of the strategic partnerships explored within the Natural Connections project to raise the profile and impact of green education not only as an approach to learning but an effective policy approach to tackling the 'physical inactivity epidemic' (All Party Commission on Physical Inactivity, 2014).

With recent health and social care reforms in England decentralising responsibility for public health back to Local Authorities there are new opportunities to support schools in promoting healthy schools and pupils (Buck and Gregory, 2013). Green education approaches offer an effective approach to achieve this by incorporating more physical activity into the curriculum. Indeed, the link between pedagogy, people and place is strengthened with such devolution since Local Authorities are also responsible for significant areas of public parks and other open spaces, and often work in partnership with others from the environment sector such as the Forestry Commission in planning the use of other public land (Tighe et al., 2013). Agreements can also be reached with private sector landowners for green education to take place on their land (Murray and O'Brien, 2005).

Interventions encouraging green education

The examples provided in this chapter illustrate a range of different types of interventions that enable and encourage green education. Evidence suggests that interventions targeting the wider social environment of individuals can also be important (Morris et al., 2012; O'Brien and Morris, 2013). For example, families, community structures and social networks can play a significant role in bringing about sustained change. Interventions that involve participants in the design of the intervention can also ensure the needs of those targeted are met (Morris et al., 2012).

The limitations of project-delivered interventions is that they tend to be short term lasting two to four years. Progress made by project leaders can, therefore, be restricted. This can be exacerbated where project-based working sees project leaders leaving before the end of the intervention to secure continuing

employment in new posts. Accessing further funding to extend a successful intervention is also difficult. Funding bodies tend to prefer new projects to be 'innovative' and differing from previous ones, even if extending a funding scheme might extend reach, embed success and increase impact.

Research gaps

There has been research that has explored physical activity levels and the wider benefits of green education. However, this evidence base remains limited in crucial ways including many diverse and dispersed small-scale studies involving small numbers of participants with cross-sectional rather than longitudinal timescales that limit assessment of the complex relationships and interactions between physical, social and educational benefits over time. Evaluations of green education interventions are often restricted by a lack of baseline data or by the small scale of funds allocated as the majority of the funding often goes on delivery of the intervention. The WHY study suggests further research on physical activity on a larger scale and over a longer period, with appropriate use of accelerometers would be useful. But this needs to be coupled with exploration of the leadership role in promoting physical activity, enabling robust evidence to be gathered to inform partnership approaches to whole school health promotion. The general need remains for research with greater specificity of 'purpose, people, place, and pedagogy' in order to provide better understanding and assessment of the most effective approaches for specific groups of children and young people.

Conclusions

As Britain and other countries integrate a public health focus across policies of all kinds, it seems there has never been a better time to embed green education as a cross-sectoral approach to improving physical activity levels amongst children and young people. As this chapter demonstrates in formal learning, for example, this means moving from a focus in schools that is mainly on sports, towards integration of outdoor learning across the curricula. Better recognition of the evidence that outdoor spaces are not equal, that different habitats and natural settings afford different opportunities for physical exercise and facilitate different learning outcomes, should provide planners, designers and practitioners in the environmental, land management, public, private and civil society sectors with strategies for 'designing in' opportunities for physical and restorative activity. Our examples have demonstrated that woodlands provide a 'culturally light', and particularly flexible and valuable space for the physical and mental health benefits offered by green education.

We have shown how green education crosses the formal/informal education divide acting as an effective vehicle to support a lifelong/lifewide concept of learning and personal development. There is often complementarity between mainstreaming green education and supporting informal lifewide learning.

The 'pester power' of children may persuade parents and carers to visit natural settings young people have been exposed to as a setting for green education. This can bring play, learning and exercise into other parts of family life, promoting beneficial behaviours across the generations.

The chapter also demonstrates the potential of green education to deliver outcomes related to social justice and health inequalities. Many green education initiatives are targeted at disadvantaged members of society who often suffer with poorer life chances and poorer health status but may feel stigmatised by special treatment. The chapter has also shown the potential of mainstreaming green education approaches to ensure a more universal access to outdoor settings and the benefits derived from them to all school children.

Policy embedded support that maintains sight of 'purpose, people, place and pedagogy' (Waite, 2014) and a broad interpretation of green education as 'learning on the move', could secure the widest set of benefits from outdoor physical activity in the years to come.