



THE UNIVERSITY *of* EDINBURGH

Edinburgh Research Explorer

Culture, context and critical thinking

Scottish secondary school teachers' and pupils' experiences of outdoor learning

Citation for published version:

Christie, B, Beames, S & Higgins, P 2016, 'Culture, context and critical thinking: Scottish secondary school teachers' and pupils' experiences of outdoor learning', *British Educational Research Journal*, vol. 42, no. 3, pp. 417- 437. <https://doi.org/10.1002/berj.3213>

Digital Object Identifier (DOI):

[10.1002/berj.3213](https://doi.org/10.1002/berj.3213)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Peer reviewed version

Published In:

British Educational Research Journal

Publisher Rights Statement:

This is the peer reviewed version of the following article: Christie, B., Beames, S. and Higgins, P. (2016), Context, culture and critical thinking: Scottish secondary school teachers' and pupils' experiences of outdoor learning. *Br Educ Res J*, 42: 417–437. doi:10.1002/berj.3213, which has been published in final form at <http://onlinelibrary.wiley.com/doi/10.1002/berj.3213/abstract>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving.

General rights

Copyright for the publications made accessible via the Edinburgh Research Explorer is retained by the author(s) and / or other copyright owners and it is a condition of accessing these publications that users recognise and abide by the legal requirements associated with these rights.

Take down policy

The University of Edinburgh has made every reasonable effort to ensure that Edinburgh Research Explorer content complies with UK legislation. If you believe that the public display of this file breaches copyright please contact openaccess@ed.ac.uk providing details, and we will remove access to the work immediately and investigate your claim.



Context, culture and critical thinking: Scottish secondary school teachers' and pupils' experiences of outdoor learning

Limited research exists that considers the usefulness of outdoor learning as a legitimate pedagogical approach for the delivery of a mainstream secondary school curriculum. To address this shortcoming, we investigated the ways in which mathematics and geography teachers and students from three secondary schools in Scotland responded to the *Outdoor Journeys* programme, which is a school-based teaching approach that enables pupils to learn about the people and place in which they live. Data collection included participant observation, short questionnaires, and interviews with approximately 150 students (11-14 years old) and 10 teachers. In most cases, pupils enjoyed the opportunity to guide their own learning experientially and beyond the familiar classroom context. Teachers acknowledged that such an approach presented an opportunity to develop pupils' critical thinking skills and that these skills can, in some cases, be overlooked in early secondary education. Following these findings, we discuss the pedagogical implications arising from the inclusion of critical thinking as a key outcome of outdoor learning, and as part of the *Outdoor Journeys* programme, within a secondary school context. We continue by adding our voice to the nascent literature addressing outdoor learning approaches which seeks to gain traction within the broader social ecology of established school cultures.

Keywords: outdoor learning; critical thinking; secondary education

Word count: 203

In recent years ‘outdoor learning’ received much attention from government, policy makers and teacher education institutions in Scotland (Learning and Teaching Scotland¹ (LTS), 2007, 2010), and in the wider UK (Department for Education and Skills, 2006). This interest has resulted in the publication of guidance documentation (e.g., Curriculum for Excellence through Outdoor Learning, (LTS), 2010), blogs for professionals (e.g., I’m a teacher: get me outside of here), pages on specialist websites (e.g., Education Scotland’s GLOW), an increase in Continuing Professional Development providers, and growth in initial teacher training in outdoor learning.

Additionally, a surge of recent national educational policy and research advocates that teachers incorporate outdoor learning and education for sustainability in their practice (see Higgins & Lavery, 2013; Higgins & Nicol, 2013; Mannion, Fenwick & Lynch, 2013; Nicol, 2013; Britton, 2014; Christie, Beames, Higgins, Nicol & Ross, 2014, Mannion, Mattu, & Wilson, 2015). For example, the report of the Ministerial Advisory Group on ‘Learning for Sustainability’ (Lfs) has led the Scottish Government to adopt a national programme to implement its recommendations across Scotland (see Scottish Government, 2012a). The report’s aspiration is that ‘learning relating to sustainable development, global citizenship and outdoor learning is experienced in a transformative way by every learner in every school across Scotland’ (Scottish Government, 2012a, p. 11). The General Teaching Council Scotland (GTCS), which is the independent professional body promoting and regulating the teaching profession in Scotland, strongly supports this development. This is evidenced by their recently Revised Standards for Registration² that requires all teachers in Scotland to incorporate ‘learning for sustainability’ into their practice

¹ Learning and Teaching Scotland is the Scottish Government’s education support agency. In 2010 structural changes were made and its name changed to ‘Education Scotland’ (see <http://www.educationscotland.gov.uk/>). All references to the documents published etc. are attributed to the name appropriate to the time.

² See <http://www.gtcs.org.uk/standards/revised-professional-standards.aspx> for further details.

(GTCS, 2013). The message from the Scottish Government and the GTCS is clear: outdoor learning, alongside global citizenship and education for sustainable development, should be embedded into the educational experiences of all Scottish children. Despite this policy activity, little attention has been paid to secondary education and the role of outdoor learning beyond pre-school and primary level within the Scottish context (Beames, Nicol & Ross, 2006; Christie *et al.*, 2014; Mannion, Mattu & Wilson, 2015). Indeed, across the UK and internationally, the peer-reviewed literature on outdoor learning in secondary schools is limited to a relatively small number of papers (for example see Power, Taylor, Rees & Jones, 2009; Taylor, Power & Rees, 2010; Fägerstam & Samuelsson, 2012, Fägerstam & Blom, 2013; Fägerstam, 2014).

The current educational framework in Scotland is Curriculum for Excellence (CfE). Introduced in 2004, it promotes a flexible, coherent and cross-curricular approach to teaching and learning for three to 18 year-olds (Scottish Government, 2004). It is delivered across the Broad General Educational Phase, from early years to secondary year 3 (S3 - mostly 13 and 14 year-olds) to the Senior Phase (S4 and beyond). The development of the ‘four capacities’ (‘successful learners’, ‘confident individuals’, ‘responsible citizens’ and ‘effective contributors’) is central to CfE (Scottish Government, 2004). While we acknowledge that secondary schools are governed by unique timetabling structures and constrained through little flexibility within and between subject boundaries, we also recognise that CfE’s Broad General Educational phase within secondary year 1 (S1 – mostly 11 and 12 year-olds) to S3 affords many opportunities to alleviate such constraining influences, such as the absence of a requirement to teach towards standardised national examinations, which pervade so many educational reform movements (see Robinson, 2011; Sahlberg,

2015). Therefore, fostering the incorporation of outdoor learning into conventional secondary school structures and curricular objectives is now as possible as it is timely. It should be noted that while we support extra-curricular programmes (such as the Duke of Edinburgh's Award), these are not within the scope of this paper. Indeed, our conception of outdoor learning is firmly based in the vision espoused by Beames, Higgins and Nicol (2011), whereby outdoor learning is regarded as pedagogy – a means to deliver the curriculum from across many disciplines in authentic contexts.

This paper very deliberately presents a Scottish focus, as we are keen to explore the ways in which the Scottish educational framework supports the integration of the educational, environmental, cultural and heritage sectors to deliver some of the broader educational, community and environmental agendas highlighted by the Scottish Government. For example, Education Scotland (2013) recognises the benefits of a holistic approach to teaching and learning and states that the synergistic benefits afforded by introducing outdoor contexts 'provides a diversity of resources and spaces that are difficult to replicate in an indoor environment' (p. 6). Crucially, they acknowledge that 'the place in which people learn also helps them to make connections between their experiences and the world around them in a meaningful context' (p. 6). This approach reflects recent empirical and theoretical support for outdoor learning and learning for sustainability that is emerging from a wider, and growing, research community whose interests span health and wellbeing, urban and rural design, environmental and community development, and education for sustainable development (for example see Sustainable Development Commission,

2008³; Burns, 2011; Geyer, 2013; Pearce, 2013⁴; Ward Thompson, 2013⁵, Astell-Burt, Mitchell & Hartig, 2014).

Positioned within this context, the present inquiry set out to investigate the suitability of a local, curriculum-based outdoor learning programme within a secondary school context in order to address the lack of empirical research in that area. The established primary school programme called *Outdoor Journeys* (see www.outdoorjourneys.org.uk) was used as a vehicle to evaluate the processes and outcomes involved in developing this approach with teachers and students at the secondary school level. This paper summarises our evaluation and discusses two areas that emerged from the findings of our inductive inquiry. The first relates to the development of students' generic critical thinking skills and the second examines the broader social ecology that forms a certain cultural backdrop for the introduction of the learning outside the classroom in the secondary school context.

Background and rationale

In 2006, Higgins, Nicol and Ross conducted a study that gathered teachers' approaches and attitudes to engaging pupils with the natural heritage. Their study revealed a number of opportunities and barriers that prevented teachers from learning outside of the classroom within school-grounds and beyond. In 2012, the current authors received funding from the Esmée Fairbairn foundation to conduct a two-year

³ The Sustainable Development Commission closed in March 2011 (<http://www.sd-commission.org.uk/pages/links.html>). However, there are a number of organisations and networks who continue to work in this area, for example see Learning for Sustainability Scotland, Scotland's United Nations Regional Centre for Expertise on Education for Sustainable Development (<http://learningforsustainabilityscotland.org/>)

⁴ See Centre for Research on Environment Society and Health (<http://cresh.org.uk>) for further research focused on exploring how physical and social environments can influence population health, for better and for worse.

⁵ See OpenSpace (<http://www.openspace.eca.ac.uk/index.php>) for further research into inclusive access to outdoor environments.

project (2012-2014) which comprised two principal tasks. The first was to examine the frequency and nature of outdoor learning provision in Scottish schools, which would effectively be a contemporary review of Higgins *et al.*'s 2006 study. We paid specific attention to teachers' approaches to learning outdoors and gave consideration to the types of support teachers felt that they needed to develop their practice (Christie *et al.*, 2014). This study was necessary, as no such data had been gathered since Higgins *et al.*'s study in 2006, and, perhaps more importantly, little was known about the influence of Education Scotland's support and policy guidance upon outdoor learning provision.

We worked with primary and secondary schools in four areas: Angus, Edinburgh, West Dunbartonshire and a Highland sub-region (covering Inverness, Nairn, Badenoch and Strathspey). Initial and follow-up surveys were conducted through questionnaires sent to primary and secondary schools, where 90 returns were received from a total of 270 schools. There were five key findings: first, a positive secondary school response (41% return rate from the 44 schools sampled); second, an increased use of the school-grounds at primary school level between 2006 and 2011; third, a improvement in teachers' attitudes towards teaching outdoors over the same period; fourth, Curriculum for Excellence through Outdoor Learning (LTS, 2010) appeared to be having a positive influence on teaching practice; and fifth, teachers requested more training and support. See Christie *et al.* (2014) for more details of this initial investigation.

These findings provide a clear rationale for the second task: the present follow-on study. Perhaps most importantly, along with the relatively high response rate from secondary schools, the first task had gathered some empirical evidence suggesting that secondary schools are keen to develop outdoor learning, although one

in four reported being unable to do this without additional support (Christie *et al.*, 2014). The questionnaire from the first study also investigated the enabling and constraining factors that influenced teachers' decisions to work outdoors. The responses to this question were largely similar to the 2006 study, with one notable exception being that 'staff enthusiasm' ranked alongside 'pupil enjoyment' as the joint second highest enabling factor at secondary level. Again, this indicates that secondary teachers are keen to develop their outdoor learning practices.

The research context: broader social ecology and critical thinking

Two areas were revealed during the research process and their presence framed our emergent findings: the broader social ecology surrounding the outdoor learning experience, and the development of critical thinking skills.

We define the broader social ecology as the culture and the context surrounding the outdoor learning experience, both inside and outside of the classroom, which takes account of both teacher and pupil and the reciprocal process of teaching and learning. We are mindful of the work of Hoad, Deed and Lugg (2013), who point to an ongoing maturation within the field of outdoor education which features a shift in focus 'from learning for the mind and experience of the individual (through reflection, for example) to the relationships between the participant, activity and the learning context' (p. 38). The broader field of educational research has long acknowledged the influence of the cultural and social milieu and the development of the individual within that process. However, it is only relatively recently that the situational and socio-cultural perspectives of teaching and learning have become highlighted as a key to understanding the broader ecology surrounding a given outdoor learning experience (Taylor *et al.*, 2010; Mannion & Adey, 2011;

Brown, 2013; Hoad *et al.*,2013; Waite, 2013; Williams, 2013). Our research builds on this work and will examine such wider institutional and socio-cultural influences on pupil learning.

The culture within a school is influenced to various degrees by an ecology that encompasses everything from individual pupil idiosyncrasies, to collegial relations between teaching staff, to regional norms of behaviour and belief. At the school and local authority level, this cultural ‘climate’ can determine how successful and sustainable the introduction of a given initiative, such as Outdoor Journeys, may be. Taylor *et al.* (2010) consider this issue in relation to local authorities and their relationship with outdoor education providers. Others, such as Spillane, Halverson and Diamond (2004), have focused on the role of leadership within this context and suggest that ‘situational elements are constitutive of human practice, and thus highlight how difficult it is to separate the capacity for action from the context of the action’ (p. 21). Further, as Wallace and Priestly (2011) suggest, it may be the case that teachers who implement new approaches ‘may not construct the same philosophical understanding of the reform philosophy as the creators of the model’ (p. 361). To address this possible pitfall, consideration needs to be given to appropriately engaging teachers within the process of shaping meaningful and innovative pedagogical practice; space must be provided to cultivate the ecological conditions needed to embed and sustain ‘new’ approaches. An inevitable tension exists between the teachers’ individual agency, in the form of their investment of the pedagogical approach being introduced, and the dominant (and possibly resistant) sub-cultures within the staffroom, department and the wider school context.

Thorburn and Allison (2013) directly address the advent of Curriculum for Excellence, as it relates to outdoor learning. Drawing on the challenges of

educational change described by Fullan (2006), they note that ‘clear and comprehensive implementation strategies between stakeholders rarely existed’, that support from local authorities was variable, and perhaps most worryingly, that ‘the extent to which new outdoor learning opportunities might be more a matter of chance’ (p. 436). Wallace and Priestly (2011) also discuss the socio-cultural perspective of professional development and change from a Scottish perspective, and others, such as McIntosh, Predy, Upreti, Hume, Turri and Mathews (2014) explore how the newly implemented educational policies are sustained within various school cultures.

Additionally, there is a wider concern that young people lack critical thinking skills and that schools are partly responsible for this, as they focus excessively on didactic methods at the expense of developing cognitive abilities that will enable pupils to more readily question and evaluate arguments, and critique information (Zhang, 1999; Egege & Kutieleh, 2004; Moseley *et al.*, 2005). Stapleton (2011), who has considered the development of critical thinking in young people from an East Asian perspective, notes that this ‘concern about deficient critical thinking skills is not confined to any one country or region, but appears to span education systems around the world’ (p. 16). While there appears to be a reasonable consensus regarding the lack of critical thinking skills development within formal schooling, there is less agreement surrounding a comprehensive definition of critical thinking and the steps needed to broach this deficiency (Stapleton, p. 17). We acknowledge the lack of definitional clarity and acknowledge the complexity of the task involved in addressing this. Therefore, we position our understanding of critical thinking as influenced by Diane Halpern and her work on thought and knowledge, and the relationship between those two constructs. Halpern (2014) defines critical thinking as, ‘the use of those

cognitive skills or strategies that increase the probability of a desirable outcome. It is used to describe thinking that is purposeful, reasoned and goal directed' (p. 17). Halpern (2014) contends that critical thinking is not a 'byproduct of standard instruction in a content area' or a good education (p. 17). Rather, she asserts that critical thinking instruction 'needs to focus openly and self-consciously on the improvement of thinking and the learning experience needs to include multiple examples across domains in order to maximize transfer' (2014, p. 17). Transfer, in this case, refers to the application of critical thinking skills across a range of contexts. Halpern's explanation reflects our own understandings of critical thinking skills, and lends further support for their incorporation into a 'pedagogy for our time', where young people are growing up in an age of 'hyper-modernity' (Virilio, 2000); characterised by uncertainty, 'liquidity' (Bauman, 2007) and 'mobility' (Elliot & Urry, 2010). In order to cope with these fluid social arrangements, we argue that one of the most important aims of education should be to equip young people with the skills needed to assimilate, evaluate, interrogate and critically engage with a range of information that may be complex and contradictory (see Tauritz, in press). We are further guided by Trickey and Topping's (2004) statement that 'increasing interest in the promotion of critical and creative thinking stems from discourse about the changing nature of the skills needed in contemporary society' (p. 365).

This positive regard for secondary school learning outside the classroom appears to signal a trend away from the resistance or indifference reported in earlier studies. For example, Christie's (2004) extensive evaluation of one Scottish local authority's residential outdoor learning initiative at secondary school level found mixed reactions to outdoor learning from staff and head teachers. Following that

study, in 2006, Higgins *et al.* encountered a similar situation, noting that secondary schools were ‘still hard to reach’, due in part to the rigidity of their discipline and timetabling structures which provided fewer curricular opportunities for outdoor learning than primary schools (p. 18). O’Donnell, Morris, and Wilson’s (2006) research reveals similar results; they state that while most primary school students (within their sample in England and Wales) were offered ‘Education outside of the Classroom’⁶ experiences, secondary provision was ‘more mixed and there were differences between subject areas’ (p. 11). This has resonance with other UK-focused research by Power *et al.* (2009) and Taylor *et al.* (2010).

The limited peer review research that specifically considers outdoor learning within the secondary school context has yielded several initial themes: students who learn outdoors have a significantly greater memory of complex content (Fägerstam & Blom 2013); the authentic learning environment outside the classroom (and the concrete interactions it affords) positively influences learning (Fägerstam & Blom, 2013); and outdoor tasks elicit higher engagement from students who are shy and those who are not high achievers in the classroom (Fägerstam, 2014).

Outdoor learning in secondary schools in Scotland

The recent ‘shift’ towards accepting outdoor learning into Scottish secondary school teaching may be partly due to the introduction of the Broad General Educational Phase, which is a central feature of CfE that stretches from age 3 to S3 (approximately age 14). Indeed, when examined at the S1-S3 stage, it offers teachers increased flexibility—both within and between subject boundaries—and affords greater scope to apply their professional skills, knowledge and creativity to deliver varied, rich and

⁶ O’Donnell et al (2006: i) state that “Education Outside the Classroom (EOtC) has been defined, in its broadest sense, as any structured learning experience that takes place outside a classroom environment, during the school day, after school or during the holidays (DfES 2005)”.

rewarding educational experiences (Scottish Government, 2012b). Crucially, in terms of logistics and timetabling, Education Scotland advises that ‘learners should be at the centre of curriculum planning rather than ‘fitted into’ curriculum structures’ (p. 1). Therefore, the circumstances and opportunities for learning outside of the classroom within secondary education in Scotland, especially within the S1-S3 stage where there is less exam pressure, are favourable.

The reviewed literature reinforces the rationale for conducting this study by identifying the importance of considering the logistics and practicalities involved in developing outdoor contexts (in this case school-grounds) as legitimate extensions of the secondary classroom. In this case, we used the Outdoor Journeys programme as a straight-forward and established approach to outdoor learning, and examined how it could be incorporated into existing curricular structures, meet current Scottish educational objectives, and offer opportunities to develop critical thinking skills within the Broad General Educational Phase of early secondary school.

Outdoor Journeys

Outdoor Journeys is one effective way that the curriculum can be delivered through a combination of indoor and outdoor learning (Beames, Atencio, & Ross, 2009; Beames & Ross, 2010). This integrated approach was designed to encourage regular low-cost, meaningful cross-curricular outdoor learning within primary school.

Outdoor Journeys involves three phases - Questioning, Researching, and Sharing - that can be repeated over and over. First, Questioning, begins with the pupils going on a journey outside the classroom. The purpose of this initial nearby journey is to generate questions about the socio-cultural, physical and environmental nature of their school-grounds and local surroundings. Small notebooks and digital cameras are

useful for keeping a record of items to be researched. Second, Researching, involves pupils finding answers to their questions. They can use a variety of sources, such as the internet, books, historical documents, museum catalogues, and photographs. Quite often, pupils may need to go on another journey or meet with a local expert to answer their questions. Third, Sharing, involves pupils sharing the knowledge they have gained in a variety of creative ways. Examples include drama, dance, song, art poetry, podcasts, presentations and posters. They can share with their class, the whole school, or their community.

Outdoor Journeys is premised on critical outdoor education literature that argues for the need for a place-responsive, personally relevant, and increasingly autonomous learning experiences (Loynes, 2002; Baker, 2005; Beames, 2006). We use the term ‘place-responsive’ in response to recent literature that offers a deeper ontological and theoretical framework to better capture, illustrate and acknowledge the ongoing human-nature relationships that emerge and exist within a given place (Manion & Adey, 2011; Brown, 2012, 2013; Mannion, *et al.*, 2013). Mannion *et al.* (2013, p. 792) explain that the term offers ‘one way of considering how educators make explicit efforts to collaborate in assembling people, places and purposeful activities together, to produce viable and valuable environmental educational experiences’ (see Mannion, *et al.*, 2013 for a deeper consideration of this position).

Outdoor Journeys also offers an increasingly autonomous learning experience. In other words, it creates an opportunity for the learner to have more agency in his/her learning. With Outdoor Journeys, pupils choose the topic by creating questions and therefore drive the experience; the teacher will afford varying degrees of freedom and support, depending on the learners’ age and the complexity of their line of enquiry.

Research conducted by Beames & Ross (2010) has demonstrated that outdoor learning is possible without expert staff, specialist equipment and costly transport. However, since Outdoor Journeys was designed to facilitate outdoor learning in primary schools, its efficacy in secondary schools is unknown. The barriers identified in the Higgins *et al.* (2006) study, and echoed in the Christie *et al.*'s (2014) study, suggest that while secondary teachers were eager to consider methods of teaching outdoors, there was still apprehension and uncertainty around the logistical implementation of such an approach. We chose to implement Outdoor Journeys within a sample of secondary schools to determine the degree to which it could be readily accommodated within the constraints of the secondary school structure. There was also an element of convenience, as we know the Outdoor Journeys programme intimately, and could ensure that teachers were using it in the ways it was intended.

Methodology

Sample

Our inquiry involved working with 10 teachers and approximately 150⁷ students sampled from a range of ability classes within S1-S3 (11-14 year olds) within one geography department and two mathematics departments across three secondary schools in the local authority area of Perth and Kinross in Scotland. The rationale for subject selection reflected our view that geography represents a more familiar context for outdoor learning given its historical relationship with fieldtrips and fieldwork whereas mathematics provides a contrast by offering a more traditionally classroom based subject. The classes and pupils were conveniently sampled as logistical and practical issues such as time and scheduling governed our direction.

⁷ This number is an approximation as, due to absence, not all pupils were present at every stage of the research. Exact figures are provided for each specific data collection phase where possible.

Methods

Data collection spanned seven months, which included approximately eight weeks of school holidays. A mixed method approach comprising participant observation, short questionnaires, and group interviews, was adopted to address our two principal aims. First, we hoped to reveal both the pupils' and the teachers' perceptions of the programme and the process of learning in an outdoor context. Second, we planned to learn about the logistics and practices of implementing Outdoor Journeys in a secondary setting. We adopted three linked approaches to achieve this. First, we observed the full Questioning, Research and Sharing process and drew on these observations to better inform the nature of our questions during the group interviews with staff and students. Second, we were present during the delivery of the programme, in order to form deeper relationships with the staff and pupils and more effectively understand the broader social ecology of each school, in terms of its management, culture and learning environments. Third, we captured the students' thoughts immediately following the programme via a short questionnaire; this data was useful for the research study, as well as the school staff and the Local Authority development officers who were investing time in the research as part of the broader facilitation team. This Outdoor Journeys facilitation team comprised a researcher, an educational development officer, and an outdoor learning development officer. The data collection was coordinated and gathered solely by a researcher and one team member, who, at various points, worked alongside the teaching staff to assist with the initial delivery.

Participant Observation

At least one member of the facilitation team attended every Questioning and Sharing session and formed part of the participant observation process. This observational data was captured on either video or digital camera and amounted to the equivalent of six hours of footage. Not all of the eight 40-minute sessions were captured on video, therefore we estimate an approximate footage time based on the real-time length of the actual sessions.

Additionally, the lead researcher held a focus group interview with the facilitation team to gather each member's reflections on the overall Outdoor Journeys process. This form of peer review (see Merriam, 1998) proved to be most effective at distilling key elements of the data. Indeed, the process was central to the development of the broader cultural, relational and contextual themes, as the facilitation team had both a rich, collective overview and intimate insights into the nuances of each subject area, department, school and community setting.

Short questionnaire

The basic self-report questionnaire comprised 11 open and closed questions, which sought to gather pupils' thoughts on the Outdoor Journeys process, the learning that did or did not take place, the practical details surrounding the questions they developed, and reflections on their Sharing session. The wording of the questions differed depending on the mathematics- or geography-focus, however, the nature and content remained consistent across both subject areas. The questionnaire was intentionally short and quick to administer, as time was limited. In total, 142 questionnaires were distributed to pupils across all three secondary schools.

Table 1 – Questionnaire response rates

School	Subject	Number of Classes involved	Number of questionnaires administered	Number of questionnaires returned
A	Geography	3	47	47
B	Mathematics	2	31	29
C	Mathematics	3	64	64
		TOTAL	142	140

The questionnaires were administered immediately after the Outdoor Journeys session. There may have been some ‘post-group euphoria’ bias (Ewert & Sibthorp, 2009, p. 382), whereby the pupils may have answered more favourably as they were still positively motivated and emotionally heightened by the programme, however, triangulation with the pupil interview data did not reveal inconsistencies. This affirmation gave us confidence that the carefully employed, mixed-methods approach had, to a large degree, addressed these biases (Creswell & Plano Clark, 2011).

Group Interviews

A random sample of pupils (n=22) taken from those who had been part of the Outdoor Journeys programme were divided into small groups of four or five by school, and then by class or year, and brought together for a group interview session. These twenty-minute sessions were held at each of the secondary schools within two weeks of the programme and each interview took place in a quiet classroom with no teachers present. They were audio-recorded and passages that were deemed germane to the investigation’s aims were transcribed. Additionally, nine of the ten teachers involved

in the research were interviewed. These interviews were conducted under comparative conditions and the transcriptions analysed using a similar process of open-coding (Miles & Huberman, 1994) and categorical aggregation (Stake, 1995). Data were interrogated without any predetermined themes, by two of the authors of this paper. Through a form of inductive analysis and peer-review, the data fell quite obviously into two broad categories: conceptual issues related to themes concerning context and culture which form a broader social ecology, and the development of students' critical thinking skills. Also, we noted that much data was generated surrounding the practicalities of delivering Outdoor Journeys within the heavily structured secondary school timetable. These logistical findings are not explicitly addressed in this paper but form part of a guidance document aimed at the development of outdoor learning in secondary schools⁸.

Findings

To structure the presentation of the findings we will first consider the pupils' responses to the questionnaire and group interviews through the lens of our own observations, before moving to examine the teachers' perspectives on the learning process and the logistics of implementation.

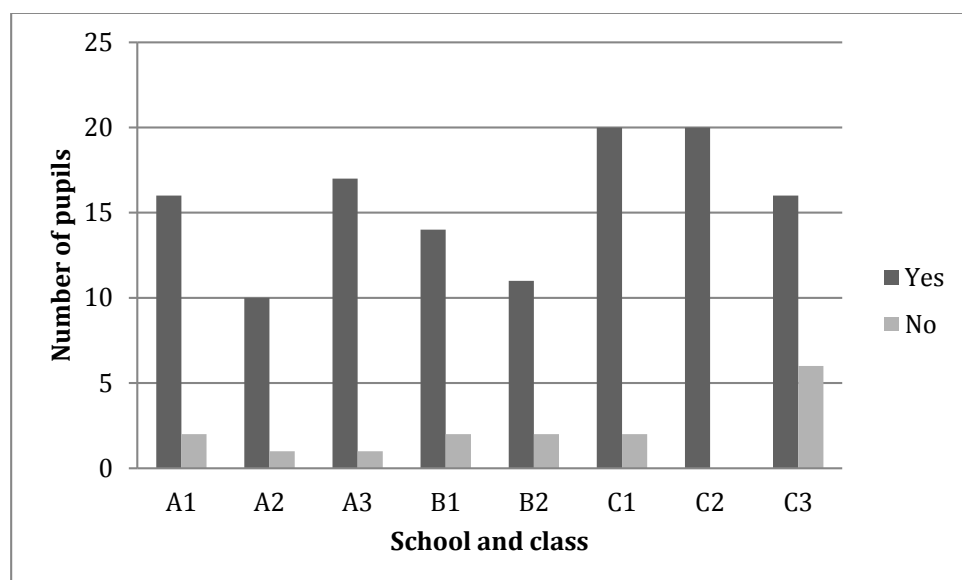
Pupil responses

The questionnaire began by asking pupils if they enjoyed the Outdoor Journey programme. This closed question revealed that the majority (89% or 124 pupils) enjoyed Outdoor Journeys, with only a small number (11% or 16 pupils) stating they did not. See Figure 1 for a breakdown of these figures by school and class. This

⁸ See www.outdoorjourneys.org.uk for a downloadable pdf of 'Outdoor Journeys in Secondary Schools'

analysis reveals that the pattern of responses were consistent across school, class and between subject areas too. School A focused on geography and Schools B and C focused on mathematics.

Figure 1. Did the pupils enjoy the Outdoor Journey programme?



To gain a deeper understanding of the nature of this ‘enjoyment’ pupils were asked, both within the questionnaire and through the group interviews, to talk or write about aspects of the programme that they did or did not enjoy. For example, when asked to reflect upon the process of generating their own questions there was a mainly positive response, as evidenced by comments referring to ‘new experiences’ (B1⁹), having ‘great fun’ (C1) and ‘enjoying being outside’ (A3). They also highlighted the independence gained by being able to generate their own questions. One pupil (from School B, class 1) described this as ‘feeling independent as the questions weren’t given to me... you could chose your own area [to study], you didn’t have to do what

⁹ We have labelled each school with a number to represent that class that we are referring to, for example A1, A2, A3. This labelling system is used to identify interview and questionnaire excerpts.

the teacher tells you to do'. Others reiterated this and highlighted how they enjoyed the 'freedom of choice' (B3) afforded by this process. However, a small minority of students felt that this process was daunting, rather than liberating, and shared feelings of being 'stuck' (C3), 'worried' (C2), and 'confused' (A3). Others moved through this range of feelings by describing the process as being 'hard at first, but once we got some [questions] it just flowed' (A2). This mix of responses could be attributed to the fact that these pupils had not worked in this way before and, whilst the majority relished the opportunity to gain some independence, others felt confused about how to develop a suitable question and find an answer. As one pupil summarised, 'it was a new experience, we'd never been outside for mathematics before' (B1).

The types of questions that the pupils came up with were varied and when asked whether they found it easy to research and answer them, the majority (55% or 76 pupils) felt that it was, some felt that it wasn't (41% or 56 pupils), and others were unsure (4% or 5 pupils). The difficulty encountered is not indicative of their enjoyment *per se*. Rather, it reflects the novelty of the approach and the lack of familiarity with critical thinking and questioning. This point is discussed in more detail in relation to the teachers' responses and later with regard to the wider discussion these findings generate.

Teacher responses

Nine of the ten teachers who took part in the programme were interviewed in small groups or as individuals, depending on availability. The interview schedule followed a similar pattern to that of the students, focusing on the delivery of the Outdoor Journeys programme, their perception of the pupils' experiences, their experience of the whole process, and their willingness to implement it in the future. The responses

were, in the main, supportive of Outdoor Journeys and outdoor learning, and they expressed interest in finding ways to incorporate this approach into their practice. Teachers at School B, however, felt that they would not continue to work in this way as it was not a common approach within the school, and because pupils and staff were not familiar with it.

The process of Outdoor Journeys, the method of questioning, researching and sharing, was discussed. A mathematics teacher (School B) felt that the interactive and shared nature of the whole experience encouraged pupils and teachers to talk about the subject under study. For example, there was a continual dialogue between the teachers and pupils as they worked together towards a final sharing session, where everyone participated and benefited from the range of information conveyed. Another mathematics teacher (School B) commented on the importance of subject focused conversation, stating ‘It is always a good idea — forcing them to use mathematical language in the classroom, so they have to think through it. So for me, the outside bit was good ... and the presentation was good as it forced them to think and it was good for them’.

We discussed the questioning process and noted the difficulty expressed by some pupils when generating questions, and considered whether this age-group possesses adequate skills to research those questions. Two of the three sample schools (within both geography and mathematics subjects) felt that Outdoor Journeys provided opportunities for the development of skills such as critical thinking — skills often more visible and encouraged within in a primary school setting. A mathematics teacher (School B) observed that ‘it’s interesting to think how many kids in primary school have their minds open to daft, silly questions, but they’ve got up here [secondary school] and we’ve maybe not trained them in that, or we’ve taken that out

of them'. Our data suggests that the Outdoor Journeys programme provides avenues for nurturing these critical thinking skills, specifically in relation to assimilating, evaluating, organising and interrogating information.

Robinson (2015) describes critical thinking as 'interpreting what's intended, understanding the context, fathoming hidden values and feelings, discerning motives, detecting bias and presenting concise conclusions in the most appropriate forms' (p. 137). Such skills are vital in the era in which we live, especially given the volume of information available to young people and the increasing need for them to be able to separate fact from opinion, sense from nonsense, and honesty from deception (Robinson, 2015; 137). Taken this way, Outdoor Journeys provides concrete opportunities for cultivating critical thinking, as it demands that pupils question, actively research and gather information before refining and sharing that process of criticality with one another.

This affordance of opportunities to exercise ways of thinking critically was revealed during the teacher interviews, where respondents identified this kind of integrated indoor / outdoor learning as a useful means for fostering such skills throughout the school, across subjects, and at various points in the school year. For example, a teacher from School C valued the three stage Outdoor Journeys process, as she felt 'it made them [the pupils] think and too often we do condition them to follow rules and they were having to think a bit wider', she went on to highlight to the benefit of developing these important 'life skills'. Another teacher noted how the sharing aspect forced the pupils to refine their thinking and take a critical approach as they 'had to show [their] rationale' for the courses of action that they decided to take.

The outdoor context acted as a stimulus to this whole process, as it demanded that pupils take a different perspective and develop a question drawn from first-hand

direct experience out-of-doors. Questions such as: ‘how many blades of grass can be found on the rugby pitch?’, ‘why do some rivers freeze over in winter and some do not?’, ‘what angle does a rugby ball travel when kicked over rugby posts?’, ‘why does snow melt on some parts of a house roof whilst others stay covered?’, were inspired by time spent out-of-doors: looking, experiencing, discussing and interacting with the surrounding landscape.

Interpersonal skills were also developed. For example, a teacher from School C suggested that the Outdoor Journeys process encouraged them to think more broadly and to take responsibility, ‘as they all had different problems to solve and they were all on different topics so that is quite good’ and that this ‘was preparing them better for life and preparing them better for their exams as well’. In this case, she was referring to the complexity of the range of tasks involved in the process, for example, time management, co-ordinating and delegating tasks between peers, and presentation skills.

Other teachers agreed with this notion of complexity stemming from one issue or question and highlighted that this type of activity lends itself to interdisciplinary work. For example, one teacher (school C) noted that the questions were broad and could be extended within and across other subject areas. Another, from the same school, felt that some of her mathematics questions were ‘more science based so they could be linked to other subjects and others could pick that up’. This led into a discussion around the broader social ecology of the school, the culture required for successful interdisciplinary work, and the support within the school to develop such initiatives.

In summary, the findings suggest that the Outdoor Journeys programme was well received by both teachers and pupils and, in general, offered opportunities for

future development both within and between subjects. Two emergent areas for further discussion were the broader social ecology of a school and the opportunities for the enhancement of critical thinking in the early secondary school stage.

Context, culture and critical thinking

Beyond the findings that focus directly on the implementation of Outdoor Journeys, three dominant categories emerged: culture, context and critical thinking

Culture

In relation to outdoor learning, and in terms of the findings from this programme, 'context' refers to more than the physical environment (Waite, 2013). We define it as a relationship between people (pupils, teachers, family and community) and the place (classroom, school-grounds, school building, locale). Further, within those contexts there is a bi-directional relationship that exists between the person(s) inhabiting that space and the influence that they exert onto that space. Indicators of this theme are specific to each local authority, school, subject area, and in some cases, each teacher and young person, and were evidenced through the observations of students interacting with one another, with teaching staff, and through the work that was carried out in the school-grounds. It then follows that when planning research or developing programmes, it is necessary to be mindful of the temporal, spatial and social contexts that influence its constituent parts.

In terms of the Outdoor Journeys programme, the contextual issues that arose surrounded the ways in which outdoor learning was perceived within the school, the value it was afforded by the Head Teacher and senior management team, and the teachers' knowledge of the school-grounds, the local place and the community in

which the school was situated. As we worked within mathematics across two schools, we could observe how one subject area was operating within two contrasting contexts. For example, one school (School C) fully supported the Outdoor Journeys programme, was keen to develop the approach, and incorporated aspects of it into their lessons plans beyond the research project. Further, they invited the researcher back to work with all staff, in order to help identify ways to embed outdoor learning across the school in an interdisciplinary manner. In this context the school-grounds have since been developed to include some 'raised-beds' for gardening, compost bins, and an outdoor classroom. At School C, there was a high value placed on outdoor learning and it was 'normal' for teachers to be teaching outdoors. This contrasts with the other mathematics school (School B), which had adopted a more passive approach to outdoor learning; while they willingly took part in the research programme, they did not feel that it was something that their school or subject area would adopt beyond the intervention. These differing contexts highlight the influence of the both teachers' knowledge of the outdoor space and also the context in which the teachers' are supported and expected to develop new, innovative approaches to delivering the national curriculum.

Culture

Culture, in this case, refers to the small, 'nested' concepts, which exist within a school's social ecology. At a micro-level, for example, tensions exist between and within certain subject areas. These arise at teacher and senior management levels, they can be driven by the accepted culture within a school, and can reflect young people's expectations about the delivery of a given subject area. For example, since geography has a tradition of fieldwork, pupils, teachers, and parents may be more comfortable

with outdoor learning being blended into its delivery, as compared to mathematics, where there may be less tradition of, openness to, and expectation of, learning outdoors.

The broad themes within our second category of theoretical and conceptual findings require deeper analysis. An understanding of a given situation is merely a snapshot of a combination of ideologies and behaviors of young people and the adults with whom they interact at that time, and this temporality heightens the complexity of human development and the difficulties involved in revealing the origins of change and growth (Ben-Zvi-Assaraf & Orion, 2010). Indeed, it is plain that the incorporation of one relatively simple approach to outdoor learning within three high schools constitutes only one educational instance in a series of countless instances across the life of the school, and each pupil will interact with, and interpret, that instance individually. When considering the enormity of this, we found solace in the work of Davis and Sumara (2006), whose extensive research on complexity theory and education led them to posit that teaching and learning will undoubtedly comprise ‘the interactions of many subcomponents or agents, whose actions are in turn enabled and constrained by similarly dynamic contexts’ (p. x). Waite (2013) has also shown how differences and similarities between individual, institutional, and local habituses serve to both restrict and foster learning in complex ways.

Whilst at this point we do not intend to delve deeply into complexity theory and use it as a principal theory for interpreting our findings, we do wish to highlight a principal feature of Davis and Sumara’s (2006) work on this topic, as it provides a useful starting point for our analysis: the process of teaching and learning is not explicable in reductionist terms. The circumstances under which educational change takes place are so fluid and complex that they ‘defy simplistic analyses and cause-

effect explanations' (Davis & Sumara, 2006, p. xi). As Spillane, Halverson and Diamond (2004) suggest, 'situation or context does not simply affect what school leaders do as some sort of independent or inter-dependent variable(s); it is constitutive of leadership practice' (p. 20-21). While we are not considering school leadership *per se*, the principle of a taking a holistic approach to understanding and development holds true in most school circumstances, as action is bound by context, and to change action we must first understand the context in which that activity takes place. In sum, advancing a pedagogical approach cannot take place without taking account of the culture, context and relational influences of the socio-cultural setting in which it is located.

Critical Thinking

The third area of findings from this investigation is the development of pupils' critical thinking ability. This finding was not foreseen and was raised principally by teachers who saw critical thinking as a crucial, yet neglected, part of a student's overall academic skill acquisition.

The development of critical thinking skills emerged as a strong theme throughout the data, since both the pupils and teachers identified the opportunity to deeply engage with a topic as a key strength of the Outdoor Journeys approach. For example, the pupils enjoyed choosing a question that interested them and the teachers were impressed with the pupils' engagement in the process of investigating, critiquing and selecting information to present to their peers. The teachers commented that this range of skills was not necessarily employed regularly during the first three years of secondary school and they identified Outdoor Journeys, and outdoor learning more generally, as an effective means to address this deficit.

Further, the pupils involved appreciated the opportunity to ‘think for themselves’ and to explore topics that interested them (Ben-Zvi-Assaraf & Orion, 2010). It is arguable, then, that integrated indoor/outdoor approaches to learning like Outdoor Journeys, may offer authentic opportunities to develop critical thinking skills that equip pupils with competencies demanded by a changing world (Kelly, 2009).

Marin and Halpern (2011) suggest that ‘real world experiences’ and opportunities to teach and learn in those settings, can enhance pupils’ thinking skills (p. 4). Others, like Garcia (2005), reinforce this position by stressing that critical thinking should exist ‘not only inside the classroom but also outside of it because a lack of critical thinking has important consequences that extend beyond the classroom’ (p. 34). She also suggests that critical thinking skills can be fostered by teachers using more open-ended questions, which can lead to associated skill development, such as ‘analysis, comparison, description, evaluation and problem solving’ (p. 37). There is much support for authentic, real-life, outside-the-classroom contexts as fruitful areas for learning (see for example, Fägerstam & Blom, 2013; Sternberg, 2001; Grunewald & Smith, 2008; Smith & Sobel, 2010; Beames *et al.*, 2011; Mannion & Adey, 2011; Wattoo & Brown, 2011), thus reinforcing the suggestion that such a contextualised approach increases the likelihood that problem-solving and critical thinking skills may be readily useful in other areas of a young person’s life.

It is not always clear how local knowledge and place-responsive knowing may attach to ‘maths’ knowledge (such synergies may not be revealed immediately) or within formal educational settings; and if they do surface, their origins may not be directly attributed to a particular outdoor experience, within a specific lesson, at that time. However, during the course of our research there were rich examples of the

influences of our limited outdoor learning intervention, such as the pupil who took time at the weekend to walk the distance between her old school building and her new school building wearing her mother's GPS watch. She did this, as she wanted to track the distance travelled and time taken to walk the route, as compared to the distance as measured on the local map. This process drew on local and mathematical knowledge, and was fuelled by her desire to investigate her question more completely. The teacher commented that this level of enthusiasm and commitment to a task was not usual for that pupil. This example, and others that we do not have space to share, demonstrate the potential for a more explicit weaving of contexts within and beyond school and the richness of local, place-responsive knowledge as a resource to reinforce this bridging.

If we accept that there is a need to develop critical thinking skills in young people and that authentic contexts (many of which exist outside the classroom) offer a fertile ground for the development of such skills, we can begin to see how integrated indoor / outdoor approaches to learning like Outdoor Journeys are increasingly vital for engaging young people in curricular content that matters to them. Additionally, it appears that Outdoor Journeys goes some way to providing an open-ended, pupil-led, enquiry-premised approach to learning, which could provide what constitutes the 'pedagogical ignition' for the development of pupils' critical thinking. This assertion gains support when we consider teachers' experiences of the Outdoor Journeys programme and their suggestion that it presents opportunities for pupils to develop these critical thinking skills and to engage with local socio-cultural, geo-physical and ecological phenomena.

Summary and implications for practice and continuing research

Outdoor Journeys can be seen as one effective way that the S1 to S3 mathematics and geography curricula can be delivered through a combination of indoor and outdoor learning. Our findings demonstrate how outdoor learning can be meaningfully incorporated within secondary school settings without altering existing timetables, incurring high transport costs, or requiring increased staff numbers.

Practically speaking, implementing a course of study like Outdoor Journeys is probably best done through a two-phased approach that starts in the school-grounds and then moves into the local community. This progressive approach reflects the concentric circles model of outdoor learning (originating from work by Higgins & Nicol, 2002) that places schools at the core and radiates to encompass local areas beyond the school-grounds, day excursions or field trips, and residential or longer overnight stays. Such a phased approach would suit most secondary school settings, as it allows teachers to use their immediate outdoor space within their timetabled allocation, which in most cases is between 40 and 50 minutes per lesson. Once teachers feel comfortable in this context, they could then consider moving out into their nearby surroundings beyond the school gate. This second step may require teachers to negotiate longer periods of time and form allegiances with colleagues in related subject areas, which could afford rich opportunities for interdisciplinary learning.

Our investigation has considered the effectiveness of outdoor learning within maths and geography. It is clear that there are many interdisciplinary possibilities for outdoor learning both within and between all subject areas, however, the delimitation of discipline is not the issue. Rather, we aspire to develop a broader, more holistic understanding of integrated indoor and outdoor learning in urban and rural contexts alike with a clear emphasis on quality educational experiences wherever that teaching

and learning may take place and whichever subject area influences the content (Beames *et al.*, 2011; Education Scotland, 2011a,b). This reflects much of the Finnish educational reform approach, which as Sahlberg (2015) explains requires ‘a shift from common curriculum-based teaching’ and a move towards a ‘curriculum that can be locally adjusted to meet the interests and requirements of local communities’(p.198).

Complexity thinking (e.g. Davis & Sumara, 2006) and ecological systems theory (e.g. Bronfenbrenner, 1979) almost demand to be considered as ways of more deeply understanding the nuanced relationships between pupils, parents, teachers, curriculum content, local landscape, activities, school culture, regional social norms, and national identity—to name but a few. Such grand theories remain attractive as they have the capacity to both confirm and accommodate our experience of the myriad tensions faced when trying to capture the multidimensional aspects of educational practice. Such theories, however, are much less capable of offering teachers empirically informed, practical guidelines for taking their classes outdoors and so we must continue to navigate this teaching and research nexus, especially where a paucity of empirical evidence persists, as in the secondary school context.

Acknowledgements

We would like to thank all secondary school pupils and staff involved in this research. We would also like to thank both reviewers for their constructive comments; their feedback has greatly improved our manuscript.

References

Astell-Burt, T., Mitchell, R., & Hartig, T. (2014) The association between green space and mental health varies across the lifecourse, *Journal of Epidemiology and Community Health*, 68(6).

- Baker, M. (2005) Landfullness in adventure-based programming: Promoting reconnection to the land, *Journal of Experiential Education*, 27(3), 267-276.
- Bauman, Z. (2007) *Liquid times: Living in an age of uncertainty* (Cambridge, Polity Press).
- Beames, S. (2006) Losing my religion: The struggle to find applicable theory, *Pathways: The Ontario Journal of Outdoor Education*, 19(1), 4-11.
- Beames, S. & Ross, H. (2010) Journeys outside the classroom, *Journal of Adventure Education & Outdoor Learning*, 10(2), 95-109.
- Beames, S., Atencio, M. & Ross, H. (2009) Taking excellence outdoors, *Scottish Educational Review*, 41(2), 32-45.
- Beames, S., Higgins, P. & Nicol, R. (2011) *Learning outside the classroom* (London, Routledge).
- Ben-Zvi-Assaraf, O. & Orion, N. (2010) Four case studies, six years later: Developing system thinking skills in junior high school and sustaining them over time, *Journal of Research in Science Teaching*, 47(1), 253-280.
- Britton, A. (2014) Education for global citizenship and sustainable development, In: M. Carol & M. McCulloch (Eds) *Understanding Teaching and Learning in Primary Education* (London, SAGE).
- Bronfenbrenner, U. (1979) *The ecology of human development: Experiments by nature and design* (Massachusetts, Harvard University Press).
- Brown, M. (2012) Student perspectives of a place-responsive outdoor education programme, *New Zealand Journal of Outdoor Education: Ko Tane Mahuta Pupuke*, 3, (1), 64-89.
- Brown, M. (2013) Teacher perspectives on place-responsive outdoor education, *SET: Research Information for Teachers*, (2).

- Burns, H. (2011) How supportive environments generate good health. In: S.J. Marr, S. Foster, C. Hendrie, E.C. Mackey, & D.B.A. Thompson (Eds.), *The changing nature of Scotland* (Edinburgh, TSO Scotland).
- Christie, B. (2004) Raising achievement in Scottish secondary schools? A study of outdoor experiential learning. Unpublished PhD thesis, University of Edinburgh, Edinburgh.
- Christie, B., Beames, S., Higgins, P., Nicol, R. & Ross, H. (2014) Outdoor Learning Provision in Scotland, *Scottish Educational Review*, 46(1), 48-64.
- Creswell, J. & Plano Clark, V. (2011) *Designing and conducting mixed methods research* (Thousand Oaks, CA, Sage).
- Davis, B. & Sumara, D. (2006) *Complexity and education: inquiries into learning, teaching and research* (Mahwah, NJ, Erlbaum).
- Department for Education and Skills. (2006) *Learning outside the classroom manifesto* (Nottingham, DfES).
- Education Scotland (2011a). *Outdoor learning practical guidance, ideas and support for teachers and practitioners in Scotland*. Available online at: <http://www.educationscotland.gov.uk/resources/o/outdoorlearningpracticalguidanceideasandsupportforteachersandpractitionersinscotland.asp> (accessed 5 October 2014)
- Education Scotland (2011b). *Building your curriculum: Outside & in*. Glasgow: Education Scotland.
- Education Scotland (2013) *Outdoor learning*. Available online at: www.educationscotland.gov.uk/learningteachingandassessment/approaches/outdoorlearning/index.asp (accessed 18 April 2014).

- Egege, S., & Kutieleh, S. (2004) Critical thinking; teaching foreign notions to foreign students, *International Education Journal*, 4 (4), 75-85.
- Elliot, A. & Urry, J. (2010) *Mobile lives* (Abingdon, UK, Routledge).
- Ewert, A. & Sibthorp, J. (2009) Creating outcomes through experiential education: the challenge of confounding variables, *Journal of Experiential Education*, 31 (3), 376-389.
- Fullan, M. (2006) *Change theory: A force for school improvement* (Victoria, Australia: Centre for Strategic Education, Paper No 157).
- Fägerstam, E., & Samuelsson, J. (2014) Learning arithmetic outdoors in junior high school – influence on performance and self-regulating skills. *Education 3-13*, 42(4), 419-431.
- Fägerstam, E. (2014) High school teachers' experience of the educational potential of outdoor teaching and learning, *Journal of Adventure Education and Outdoor Learning*, 14(1), 56-81.
- Fägerstam, E. & Blom J. (2013). Learning biology and mathematics outdoors: effects and attitudes in a Swedish high school context. *Journal of Adventure Education and Outdoor Learning*, 13(1), 56-75.
- Garcia, L.C. (2005) Utilizing local governmental issues in developing critical thinking among high school students, *Alipato: A Journal of Basic Education*, 32-41.
- General Teaching Council Scotland (GTCS) (2013) *Revised professional standards*. Available online at: <http://www.gtcs.org.uk/about-gtcs/Consultations/consultation-revision-professional-standards.aspx> (accessed 2 October 2014).

- Geyer, J. (2013) *Developing an understanding of greenspace as a resource for physical activity in adolescents*. Unpublished PhD thesis, University of Edinburgh.
- Gruenewald, D. A. & Smith, G. A. (Eds) (2008) *Place-based education in the global age: Local diversity* (New York, Lawrence Erlbaum).
- Halpern, D. F. (2014) *Thought and Knowledge: An Introduction to Critical Thinking* (5th ed) (New York, Psychology Press).
- Higgins, P & Nicol, R. (eds) (2002) *Outdoor education: authentic learning through landscapes volume 2*. An international collaboration project supported by the European Union Comenius Action 2. European In-Service Training Courses.
- Higgins, P., Nicol, R. & Ross, H. (2006) *Teachers' approaches and attitudes to engaging with the natural heritage through the curriculum* (Perth, Scottish Natural Heritage).
- Higgins, P. & Lavery, A. (2013) Sustainable Development Education, In: T. Bryce, W. Humes, D. Gillies and A. Kennedy (Eds), *Scottish Education (4th ed)* (pp.337-342) (Edinburgh, Edinburgh University Press).
- Higgins, P. & Nicol, R. (2013). Outdoor education. In T. Bryce, W. Humes, D. Gillies, and A. Kennedy, (Eds.), *Scottish Education (4th ed)* (Edinburgh, Edinburgh University Press).
- Higgins, P., Nicol, R., Beames, A., Christie, B. & Scrutton, R. (2013) *Education and Culture Committee, Outdoor Learning. Submission from Peter Higgins. University of Edinburgh*. Available online at:
http://www.scottishparliament.uk/S4_Educationandculturecommittee/Inquiries/Prof_Higgins_submission.pdf (accessed 1 October 2014).

- Hoad, C., Deed, C. & Lugg, A. (2013) The potential of humor as a trigger for emotional engagement in outdoor education, *The Journal of Experiential Education*, 36(1), 37-50.
- Kelly, Y.L.K. (2009) Assessing students' critical thinking performance: Urging for measurements using multi response format, *Thinking Skills and Creativity*, 4(1), 70-76.
- Learning and Teaching Scotland (2007) *Taking learning outdoors*. Available online at: www.educationscotland.gov.uk/Images/TknLrnOutA4_tcm4-402066.pdf (accessed 5 March 2014).
- Learning and Teaching Scotland (2010) *Curriculum for excellence through outdoor learning*. Available online at: www.educationscotland.gov.uk/Images/cfeOutdoorLearningfinal_tcm4-596061.pdf (accessed 18 February 2014).
- Loynes, C. (2002) The generative paradigm, *Journal of Adventure Education and Outdoor Learning*, 2(2), 113-126.
- Mannion, G. & Adey, C. (2011) Place-based education is an intergenerational practice, *Children, Youth Environments Special Issue on Place-based Education*, 21(1), 35-58.
- Mannion, G., Fenwick, A. & Lynch, J. (2013) Place-responsive pedagogy: learning from teachers' experiences of excursions in nature, *Environmental Education Research*, 19 (6), 792-809.
- Mannion, G., Mattu, L. & Wilson, M. (2015) Teaching, learning, and play in the outdoors: a survey of school and pre-school provision in Scotland. *Scottish Natural Heritage Commissioned Report No. 779*.

- Marin, L. & Halpern, D. (2011) Pedagogy for developing critical thinking in adolescents: explicit instruction for greatest gains, *Thinking Skills and Creativity*, 6, 1-13.
- McIntosh, K., Predy, L. K., Upreti, G., Hume, A. E., & Mathews, S. (2014) Perceptions of contextual features related to implementation and sustainability of School-wide Positive Behavior Support, *Journal of Positive Behavior Interventions*, 16, 29-41.
- Merriam, B. (1998) *Qualitative research and case study applications in education* (San Francisco, Jossey-Bass).
- Miles, M. B. & Huberman, A. M. (1994) *Qualitative data analysis* (2nd ed.) (London, Sage).
- Moseley, D., Baumfield, V., Elliot, J., Gregson, M. , Higgins, S., Miller, J. & Newton, D. (2005) *Frameworks for thinking: A handbook for teaching and learning* (Cambridge, Cambridge University Press).
- Nicol, R. (2013) Entering the fray: The role of outdoor education in providing nature-based experiences that matter, *Educational Philosophy and Theory*, 44 (6), 630-648.
- O'Donnell, L., Morris, M. & Wilson, R. (2006) *Education outside the classroom: an assessment of activity and practice in schools and local authorities*. (Nottingham, National Foundation for Educational Research and Department for Education and Skills)
- Pearce J, (2013) An environmental justice framework for understanding neighbourhood inequalities in health and well-being. In: M.Van Ham, D. Manley, D. Maclellan , N. Bailey, L.Simpson (Eds). *Neighbourhood effects*

or neighbourhood based problems? A policy context, (Dordrecht, Springer Press).

Power, S., Taylor, C., Rees, G., & Jones, K. (2009) Out- of- school learning: variations in provision and participation in secondary schools, *Research Papers in Education*, 24(4), 439-460, DOI: 10.1080/02671520802584095

Robinson, K. (2011) *Out of our minds* (2nd ed) (Chichester, UK, Capstone).

Sahlberg, P. (2015) *Finnish Lessons 2.0* (New York, Teachers College Press).

Scottish Government (2004) curriculum for Excellence. Available online at:

<http://www.scotland.gov.uk/Publications/2004/11/20178/45862> (accessed 1 October 2014).

Scottish Government (2012a) Learning for sustainability report. Available online at:

<http://www.scotland.gov.uk/Topics/Education/Schools/curriculum/ACE/OnePlanetSchools/LearningforSustainabilityreport>. (accessed 1 October 2014).

Scottish Government (2012b) Broad General Education in the Secondary School.

Available online at:

http://www.educationscotland.gov.uk/Images/BGEQandA25052012_tcm4-722372.pdf (accessed 26 March 2013).

Smith, G. A. & Sobel, D. (2010) *Place- and community-based education in schools* (New York, Routledge).

Spillane, J., Halverson, R. & Diamond, J. (2004) Towards a theory of leadership practice: A distributed perspective, *Journal of Curriculum Studies*, 36(1), 3-34.

Stake, R. E. (1995) *The art of case study research* (London, Sage).

Stapleton, P. (2011) A summary of attitudes towards critical thinking among Hong Kong secondary school teachers: Implications for policy change, *Thinking Skills and Creativity*, 6(1),14-23.

- Sternberg, R. (2001) Teaching problem solving as a way of life, In: A.Costa (ed) *Developing minds: A resource book for teaching thinking* (Alexandria, VA, ASCD).
- Tauritz, R.L. (in press) A pedagogy for uncertain times, In: Hindson, J. and Lambrechts, W. (eds.) *Trends in ESD research and innovation*. (ENSI, Belgium)
- Taylor, C., Power, S. & Rees, G. (2010) Out- of- school learning: the uneven distribution of school provision and local authority support. *British Educational Research Journal*, 36(6), 1017-1036, DOI: 10.1080/01411920903342046
- Thorburn, M. & Allison, P. (2013) Analysing attempts to support outdoor learning in Scottish schools, *Journal of Curriculum Studies*, DOI:10.1080/00220272.2012.689863
- Trickey, S. & Topping, K.J. (2004) Philosophy for children: A systematic review, *Research Papers in Education*, 19(3), 365-380.
- Virilio, P. (2000) *The Information Bomb* (London, Verso).
- Wallace, C. & Priestley, M. (2011) Teacher beliefs and the mediation of curriculum innovation in Scotland: A socio-cultural perspective on professional development and change, *Journal of Curriculum Studies*, 43(3), 357-381.
- Waite, S. (2013) 'Knowing your place in the world': How place and culture support and obstruct educational aims, *Cambridge Journal of Education*, 43(4), 413-433.
- Ward Thompson, C. (2013) Activity, exercise and the planning and design of outdoor spaces, *Journal of Environmental Psychology*, 34, 79-96.
- Wattchow, B. & Brown, M. (2011) *A pedagogy of place: Outdoor education for a changing world* (Victoria, Australia, Monash University).

- Williams, R. (2013) Woven into the fabric of experience: Residential adventure education and complexity, *Journal of Adventure Education and Outdoor Learning*, 13(2), 107-124.
- Zhang, L. (1999) A comparison of US And Chinese university students' cognitive development: the cross culture applicability of Perry's theory, *Journal of Psychology*, 133, 425-439.