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**Learning from a study visit to Norway:
observations to implications for practice as
Teacher Educators**

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Abstract

Student engagement when learning outdoors was the focus of a study visit to Northern Norway for two members of the primary science team in an English University. The University College that was visited in Northern Norway has a well-established reputation for its outdoor learning provision. The visit focussed on the structured observation of teacher educators working with student teachers in a woodland playground project and a 'Land art in the tidal zone' residential fieldwork project. This afforded rich opportunities for the observation of the teacher educators' pedagogical practice and of student teacher responses. Implications for our practice have been derived from an analysis of what was observed and reflections from the academic literature in this field. Suggestions are made for the development of practice in the primary science team in our University, and proposed for initial teacher education. It is suggested that high quality outdoor learning experiences, including fieldwork, encourage skill development and that positive teacher –student relationships with the development of self-efficacy for student teachers is important for securing high levels of engagement and involvement when learning outdoors.

Key words

Learning outdoors; Norway; teacher educators; student engagement; primary science.

Introduction

The research interest in outdoor learning for teacher educators in primary science in our English University developed from our perception that primary student teachers did not fully engage with the outdoor learning experiences that their initial training offered. The extensive green spaces in the campus facilitate fieldwork within the taught science modules for student teachers. Given the rich opportunities that learning outdoors presents for student teachers, who are able to develop both scientific knowledge and skill and their understanding of effective pedagogical approaches when working with pupils outdoors, the teacher educators regarded securing higher levels of engagement as essential for further investigation.

Our interest in the use of pedagogical approaches by teacher educators in an outdoor context to secure higher levels of student teacher engagement led two members of the primary science team to travel to a University College in Northern Norway, in receipt of a UCET travel scholarship. The intention of the study visit was to observe at first hand the pedagogical approaches employed by the Norwegian teacher educators in a setting known for its focus on learning through field work and in the Norwegian context of a positive cultural approach to spending time outdoors (Sandseter, Little and Wyver, 2012). The study visit allowed us to observe and work with a number of teacher educators, from early years, primary and secondary backgrounds, teaching science and a range of other curricular subjects.

The research questions which framed the study visit were:

- Through structured observations, how do teacher educators at a University College in Norway secure engagement when working outdoors with student teachers?
- Through structured observations, how are student teachers in the Norwegian context encouraged to be self-directed and purposeful when learning outdoors?

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- How can the study visit to Norway be used to inform curriculum development in primary science in our English University?

In this paper the term student refers to children and young people and student teacher is used to refer to ITE (Initial Teacher Education) students throughout.

Literature Review

The benefits of teaching and learning outdoors have been widely documented in the educational literature, the charity sector and the media. This study seeks to explore the authentic learning experience that learning outdoors offers and the impact for learners on environmental awareness, engagement, motivation and cognitive development. I will consider the implications for teacher educators, who are concerned, not only with the barriers that may prevent student teachers from engaging in learning outdoors, but with equipping a teacher work force with the skills and attitudes required for leading learning outdoors with success.

Dillon et al. (2005) present a wide-ranging rationale for the benefits of learning outdoors, which spans cognitive and affective elements of the outdoor experience. The rich and varied learning gains from learning outdoors are echoed in the work of a number of studies that report attitudinal and cognitive change from exposure to fieldwork (Rickinson et al., 2004; Nundy, 1999; Mackenzie and White, 1982). Distinctive of fieldwork is an authentic and immersive experience that allows the learner to encounter a context-rich environment for learning that Fägerstam (2014) reports as having a positive impact on student and teacher interpersonal relations. The personal and societal benefits gained from learning outdoors are attested by The National Trust (Moss, 2012) and the RSPB (2010) and are considered especially important for children with a predominantly sedentary lifestyle. The recently published National Trust research report (2017), 'Places that make us', used neuroimaging studies as evidence of the positive neurophysiological benefits from exposure to significant places. Both organisations call upon the Government to provide funding that would ensure first-hand experience of the natural world to be part of a healthy childhood. This would be especially beneficial for children who are disadvantaged (Dillon et al, 2005).

The UK context is significant for an approach to consumerism and a fracturing of family life that some have seen as negatively influencing childhood wellbeing. In a comparison of children's wellbeing in the UK, Sweden and Spain, Nairn (2011) uses activity, being outdoors, and time spent with family and friends as child-reported indicators of wellbeing. She also points to the complex interaction of factors such as materialism, consumption and family time that present as inequalities in the experience of childhood (Nairn, 2011).

Forbes and Zint (2011) argue that environmental education can promote both the engagement with environmental issues and the development of enquiry practices that are fundamental to the study of science. Such learning is not purely content-driven; the experience of learning outdoors promotes in children and students a responsibility for their development and a positive orientation to future outdoor experiences that can have long-lasting implications (Higgins, 2010, Forbes and Zint, 2011). In contrast to classroom-centred learning, the outdoor environment, with its rich multi-sensory learning opportunities and first-hand experiences, can develop cognitive and social skills which lead to enhanced self-confidence (Nundy, 1999, Lock and Glackin, 2009). Glackin (2016), in a study examining the impact of science teacher's attitudes regarding teaching outdoors, notes that positivity towards learning outdoors is fundamentally important in influencing pedagogical practice. A significant finding was that teachers perceived that working outdoors offered students greater insight into the 'messiness' of scientific endeavour and, crucially, greater control over their learning, an observation echoed in the research of Magntorn and Helldén, 2006.

Carrier (2009) argues for the positive impact of learning outdoors on the development of self-efficacy in student teachers. Whilst the barriers to learning outdoors, for teachers and their students, are well rehearsed in the literature (Scott *et al* 2015), the need to develop confidence in those leading learning is acknowledged but less well explored. Carrier (2009) noted that despite an initial reluctance on the part of the pre-service teachers she surveyed, once the beginning teachers had begun to experience success, as measured through the enthusiasm of the children they worked with, their confidence grew. Such positive exposure to leading learning outdoors can have significant consequences for professional practice. Glackin (2016) noted that beliefs held by science teachers were more fundamental to success than the context within which they worked. The value of positive personal experience, whether as student, student teacher or teacher, and its far-reaching consequences are well-documented (Scott *et al.*, 2015). The professional development of teachers, learning in and from the outdoor environment, from initial training through into the teaching career, is called for both by academics and charitable organisations, eager to equip a teaching profession with the skills and attitudes necessary to build environmental and scientific literacy in young learners (Carrier *et al.*, 2014; Lock and Glackin, 2009; Moss, 2012).

Scott *et al.* (2015) discuss the range of barriers to fieldwork in the UK context, citing a number of factors; cost, the availability of equipment, and an adequate environment to carry out field work were specified as key factors in this research. Other factors, such as a lack of teacher confidence in teaching outdoors, perhaps derived from a lack of childhood exposure to playing outdoors, coupled with concerns about behaviour management and risk are also pertinent as barriers that teachers experience (Muñoz, 2010; Scott *et al.*, 2015; Moss, 2012).

Fieldwork requires careful planning and preparation in order for teachers and their students to experience success and to overcome perceived or real barriers to active participation (Nundy, Rickinson *et al.*, 2004; Dillon *et al.*, 2005; Higgins, 2010). This requires consideration of the challenge that may be posed by the environment, careful risk assessment, thorough prior preparation and the necessary resources with which to conduct the outdoor learning experience (Glackin and Jones, 2012; Glackin, 2016).

The implications for initial teacher education are evident. For student teachers to be prepared with the skills and the positive attitudes required to lead learning outdoors with success, they need effective initial preparation. In a call to Government, the RSPB (2010) argued that the teaching profession needs to be 'confident, competent and committed' to lead learning outdoors and that this requires the development of skills and understanding in initial training and beyond. Positive feedback from working with children outdoors has the potential to develop in student teachers the self-efficacy that will be so important for the challenges of leading learning as a qualified teacher, and indicates why practical training is of value (Carrier, 2009; Scott *et al.*, 2015; Magntorn and Helldén, 1999). University centred initial teacher education is arguably well positioned to offer the professional development programmes that allow student teachers to develop self-efficacy in leading learning outdoors with a well-articulated theoretical underpinning (Lock and Glackin, 2009).

Methods

Two outdoor experiences were central to the study visit to the University in Norway; the Woodland playground designed and executed by Kindergarten student teachers, and the 'Land Art in the Tidal Zone' residential fieldwork project that was undertaken by a group of secondary school student teachers and a number of initial teacher educators from the University.

Structured observation was the primary data collection method focus during the study visit to Norway. This provided qualitative case study material. The use of field notes allowed for observations to be made with the addition of context specific details. The focus on student engagement and purposeful

learning supported a structured approach to the observations which were recorded against the domains described by Dillon *et al* (2005). The participative nature of the study visit allowed the observers to be fully immersed in the projects they were observing. It should be noted that the language barrier meant that we had to rely on translation and at times missed some of the detail and nuances of what was being discussed.

The categorisation used by Dillon *et al.* (2005) of four domains of learning outdoors was applied to the observations that were made in order to structure and focus a response. Dillon *et al* (2005) report the findings of a research team that observed young people engaged in outdoor activities in a range of settings. They note that although cognitive benefits from learning outdoors had been anticipated, there were other 'domains' evident in the experience of the students as they engaged in learning outdoors. The four domains: cognitive impacts (knowledge and understanding); affective impacts (attitudes and values); interpersonal/social impacts (communication and team work) and physical/behavioural impacts (physical skill and behaviour) (Dillon *et al.* 2005:22) were used to structure the discussion of what was observed and begin to draw an analysis of the impact of this for us as teacher educators. The use of the domains allowed for a focus on knowledge and skill development when learning outdoors, attitudinal change, the development of interpersonal skills such as team work and leadership and the physical and behavioural benefits that arise when learning outdoors (Dillon *et al.*, 2005).

Nundy (1999) helpfully emphasises that such categorisations are not mutually exclusive. Learning and experiencing may well involve more than one domain active at any one time and the interaction, for example of the cognitive and affective, may be crucial in securing long term benefits from the experience (Nundy, 1999). Thus, although discussed separately in the following section the impact of the study will integrate what was observed across the domains where possible.

The intention in this paper is to use Dillion's categorisation to describe what was observed and to create a frame of reference with which to structure a response. It is essential that the experience of the visit to Norway can be used to reflect on, and ultimately develop, our pedagogy as teacher educators in the UK Higher Education context for it to have a value with wider application. In so doing, it is important to be aware of any of our own cultural preconceptions that may bias the interpretations we make.

Findings

The observations that were made during the study visit are discussed under the domain headings as outlined in the methods section.

Cognitive outcomes

It was not possible within the scope of the study visit to gauge the extent to which the woodland playground project and the 'Land art in the tidal zone' fieldwork led to a development in knowledge and understanding in individual students. However, what was evident was the number of opportunities for students to learn in the field and for skill development to take place. In the 'Land art' project, student teachers were required to locate and then identify a number of invertebrates that could be found in the intertidal zone; the biology tutor explained how to use tools such as identification keys and microscopes, and discussed the organisms and the habitat in which they were found. Cross curricular links were made as the learning activities continued, with students creating a representation of one of the organisms they had observed using natural materials from the beach and then writing a poem in Nynorsk, a written standard form of the Norwegian language. There was further learning from the culture and history of the Island on which the student teachers were staying, with students participating in a dramatic re-enactment of events from the Second World War, an activity which was sustained over several hours after a full day of field work.

Skill development was evident in the student teachers' use of tools and cooking. They were taught how to whittle small sticks of wood to create a small knife or spoon, using a whittling knife safely to create a smoothly carved shape. At the beginning of the beach project, the student teachers were instructed how to cook a meal in a fire pit dug into the ground, cooking lamb and diced vegetables under pebbles heated in a fire. The kindergarten student teachers in the woodland playground project were required to learn knot tying in order to create playground structures using ropes for the young children to experience, and to create a healthy meal that the children could participate in cooking over a fire pit. The kindergarten student teachers, in working with a group of young children visiting the woodland playground site, were further required to observe the interactions of the children as they played with the structures they had created, in order that they could reflect pedagogically from the experience in subsequent sessions. The woodland setting was also used by the student teachers to plan and carry out a science activity with the children.

Affective outcomes

Observations of the student teachers and the teacher educators in both settings indicated that opportunities for the open expression of ideas and critical reflection were maximised when working outdoors. Following each activity, the student teachers and teacher educators spent time together, reflecting on the successes and the possible limitations of their work. Of note was evidence of open dialogue between student teachers and teacher educators with a willingness for critique in what appeared to be a non-threatening environment.

Student teachers were expected to challenge themselves. This was most evident in the woodland playground project where, within a short time frame, they were expected to plan and build structures for the children to experience and to work as a team of professionals, supervising and observing the young children as they visited the playground for a morning session. The student teachers were actively encouraged by their tutor to take risks and to challenge themselves, for it was recognised that in doing so they would benefit from personal and professional development.

The field work offered further opportunities for affective engagement through its consideration of the environmental effects of pollution and the need to clean the beach of litter. This linked to an ongoing beach project established by the University and provided student teachers with the opportunity to engage with issues of environmental sustainability.

Social and Interpersonal outcomes

Team work and peer collaboration was an essential component of all that we observed in the outdoor settings as the student teachers negotiated and completed tasks related to the learning activities. The cooking of a meal, as previously described at the beginning of their work on the beach, required high levels of cooperation and some problem solving as instructions were carefully followed to create a fire pit with the correct conditions for baking meat and vegetables. It was evident that some student teachers were able to develop their leadership skills through the tasks which had been set, motivating others in their teams and taking a lead on an element of construction or design. Student teachers were praised by tutors in the reflective conversations and in feedback that followed the activities for their positive co-operation, indicating that success had been met as a group.

Observation notes indicated that communication was valued between teacher educators and student teachers. Extended periods of dialogue facilitated open reflections in an atmosphere that indicated high levels of mutual respect amongst the teacher educators and their students.

Physical and Behavioural outcomes

The physical nature of the challenges encountered by the student teachers in both settings has been previously discussed, ranging from preparing food using a fire pit, tool use when whittling wood,

creating a natural playground with trees and ropes, and sustaining concentration for learning and teaching in the outdoor environment of a beach or a steeply banked woodland. There was an expectation from the teacher educators that the student teachers would fully engage in all activities, learning to use tools safely under instruction and responding to the physical challenges with appropriate clothing, positive teamwork, and motivation.

Impact and analysis

The learning opportunities for the student teachers that we observed in Norway were interconnected and drew from a range of subject disciplines, with links made between curricular areas. Such contextualised learning has the ability to offer a richly immersive and memorable experience.

Nundy (1999) and Rickinson *et al* (2004) argue that fieldwork experiences offer positive cognitive and affective learning gains as students and student teachers are able to develop their knowledge and understanding, in this case across a range of curricular areas. The ability of field work, perhaps particularly in a residential setting, to offer an immersive experience, has been found in a number of studies to be beneficial, adding value to that which may not be achieved in the classroom setting (Lock and Glackin, 2009; Dillon *et al.*, 2005; Nundy, 1999; Magntorn and Helldén, 2006; Rickinson *et al.*, 2004).

Both outdoor settings in Norway offered authentic outdoor environments in which the student teachers could develop their confidence and competence. (Carrier, 2009). The development of 'self-efficacy', meeting success through a positive experience of learning and teaching outdoors, is essential for the student teacher to develop as a motivated and confident teacher of science (Carrier, 2009; Carrier *et al.*, 2014). In both settings the student teachers were encouraged to develop their skills with the support of tutors and peers, to take risks, learn from their mistakes, and to be openly reflective in order to develop as professionals.

Self-efficacy was further developed through the opportunity to work with young children from a local kindergarten who visited the woodland playground setting. The student teachers were able to observe the children's interactions with the playground structures and to reflect using their observations. The student teachers were able to derive satisfaction from the enthusiasm of the children as they played in the woodland and this had the potential to build both confidence and a positive motivation towards their teaching of science (Carrier, 2009). The concerns that many teachers express with regards to safety and confidence when working with children outdoors could arguably be ameliorated by high quality, authentic, and immersive experiences of learning outdoors during initial teacher education and through CPD programmes (Forbes and Zint, 2011; Higgins, 2010; Magntorn and Helldén, 2006).

The opportunity to develop personal confidence and self-esteem in a supported yet challenging outdoor learning environment was evident in the observations of the student teachers. There were high levels of involvement in activities with sustained focus from the student teachers, most notable during the beach work, which took place over the duration of several hours with no shelter provided. The Norwegian context may be significant to the interpretations here. Norwegian culture is typified by a close cultural attachment to nature, expressed in the term *friluftsliv* 'free air life' (Sandseter, Little and Wyver, 2012). The ability to roam freely and the small population in a land populated with mountains, fjords and with an extensive coastline, means that for many, growing up playing and enjoying leisure time outdoors is normal. One student teacher told us that they had spent a lot of time outdoors when growing up, with cabins both by the mountain and by the sea. Another talked about how they were taken skiing, fishing, and walking as a child, and learnt to make a fire and to build a tree house. Given their exposure to the outdoor environment and a cultural orientation towards enjoying the outdoors, the sustained focus during the projects we observed is unsurprising.

Teacher educators expected high levels of peer collaboration and they devolved responsibility for personal safety to the student teachers (Higgins 2010). The need for high quality communication with open relationships, where both tutors and their students are able to explore and critique practice, could be argued to be vitally important in establishing and maintaining a social environment within which student teachers are enabled to learn and develop.

The student teachers responded positively to the physical challenges because high expectations were established from the teacher educators. It was apparent that the students felt comfortable and confident in responding to the challenges set and that they were used to learning in the outdoor environment.

Fieldwork is a regular component of work with students at the University College we visited; for some tutors a substantial proportion of their teaching time is spent working with student teachers outdoors. What might seem extra-ordinary outdoor learning experiences in the UK context is commonplace for initial teacher education students at this University in Norway.

Conclusions

Analysis from the observations made during the study visit and the subsequent reflection of the impact using the categorisation devised by Dillon *et al* (2005) enable conclusions to be drawn which aim to influence our pedagogical practice as teacher educators in primary science at an English University. The development of practice is ongoing and there are implications for short and longer-term curriculum development.

Fieldwork facilitates interconnected and contextualised learning and high quality immersive experiences of learning outdoors should be planned for students and student teachers. The undergraduate Y1 residential field trip to the Peak District has been developed with a stronger cross-curricular emphasis on the development of knowledge and skill which is supported by tutors from a range of subject disciplines. Observation of an art activity that student teachers engaged with on a recent fieldwork visit indicated that they were very able to connect the theoretical input of taught sessions into skill development in the field. The student teachers were able to explore the possibilities for science in a woodland and moorland environment alongside an artistic response and to begin to explore the environment as both a learner and beginning teacher. The development of residential field work and its integration into taught modules is ongoing in the primary team.

Student teachers are able to develop self-efficacy through positive experiences of learning outdoors which are further enhanced through opportunities to teach children outdoors. Following the study visit to Norway the primary science team have developed opportunities for student teachers to work with visiting students in the green spaces on campus. A geocaching trail was set up with educational 'caches' hidden around the nature trail of the campus and the locations logged in hand held GPS units. We have worked with local partnership schools to invite primary children onto the campus and student teachers have been challenged to develop educational caches and lead the children as they engage in the activity. The opportunities to integrate teaching science directly into the taught course in university are welcomed by student teachers and will be further developed by the primary science team.

Physical familiarity with learning outdoors enables a successful learning environment with enhanced teacher and student confidence. Learning outdoors has become a more regular and planned for aspect of our work in primary science. We have worked with student teachers on identifying and celebrating engagement when learning outdoors and communicated clear expectations for their engagement. The opportunity for student teachers to elect to undertake Forrest School training on the campus has

further enhanced their positive orientation to leading learning outdoors and the possibilities it affords for young learners.

High levels of involvement are seen where peer collaboration and cooperation are valued and promoted. The residential field work has a strong focus on team building for first year student teachers in their first term at university. A number of physical challenges are designed to encourage them to take risks in a controlled environment and to collaborate with their peers. The primary science team have developed the use of peer teaching and work with visiting children which require significant peer collaboration.

One of the key insights from the Norwegian experience for us as practising teacher educators is the importance of prioritising fieldwork opportunities to facilitate a more deeply immersive experience that allows student teachers time to engage and critically reflect. We have paid attention to developing positive relationships with student teachers and to promoting high quality dialogue between teacher and student as was observed in Norway. The less formal outdoor environment is positive in facilitating a more relaxed atmosphere for communication. Familiarity in learning outdoors needs to be planned for and developed systematically throughout initial teacher training, in order that the student teacher can be equipped with the necessary skills and attitudes to successfully lead learning outdoors (Dillon *et al*, 2006; Magntorn and Helldén, 2006). Confidence and security when learning outdoors, which will lead to higher levels of engagement on the part of student teachers, will only be achieved when this becomes part of established practice.

Further, it could be argued that more support and instruction needs to be provided for both the student teacher and into the early teaching career and beyond, through CPD programmes, in order that teachers feel equipped to lead learning outdoors and that the barriers to such work are at least partially overcome (Dillion *et al* 2006). Universities are well placed to support such development; Lock and Glackin (2009) argue that University tutors are particularly well able to integrate an understanding of curricular links with the effective choice of pedagogical tools for learning in this context. The primary science team now wish to develop a CPD offer focussed around leading learning outdoors for qualified teachers.

The study visit as discussed here has been used to consider how the structured observations that were made in Norway could support us as teacher educators in securing higher levels of engagement and involvement when leading learning outdoors with student teachers. The implications for the practice of the primary science team have been the principal focus of this discussion but generalisations are suggested for initial teacher education. There is compelling evidence in the literature that an immersion in outdoor learning through high quality, well planned experiences for student teachers can develop the familiarity and the self-efficacy which leads to teacher success in leading learning outdoors. University-led teacher education has a key role to play in developing the confidence and competence with which the next generation of teachers can inspire the children they will teach to benefit from rich learning experiences outdoors.

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