

Education in the Green Space was an interdisciplinary project between Biological Sciences and Southampton Education School at the University of Southampton. Funded by the Natural Environment Research Council (NERC), the key aims of the project were to engage with Key Stage 1 to 3 pupils, in schools within Southampton, UK, on their connectedness with nature. The project examined perceptions held by local teachers on nature and environmental topics, and the barriers they face in teaching such topics within the current school system in the UK. Here we discuss how the project was implemented and the challenges of working between the university and school sectors.

A loss of connection with nature, referred to as Nature Deficit Disorder (NDD) is a relatively recent phenomenon first documented around 50 years ago, whereby increased urbanization, dependence of technology and anxiety regarding outdoors is leading to society being disconnected from nature (Louv, 2005). The most concerning trends are recorded in urban children (Moss, 2012). The phrase was coined by Richard Louv in 2005 in his book, *The Last Child in the Woods*. It describes how with increasingly less time in natural outdoor environments children particularly are demonstrating a reduced affinity for nature (Louv, 2005).

This disconnection with nature is significant, as it has been shown to impact upon an individual's health, well-being, and their attitude towards the environment (Barbosa et al., 2007). It has been shown that children with increased exposure to nature demonstrate greater levels of biophilia and are more likely to support wildlife conservation causes (Zhang et al, 2014). For the sustainability of the natural environment, this indicates the importance of encouraging children to spend time in nature whilst growing up, ensuring a future population whom value and protect biodiversity (Turpie, 2003). Further to this, spending time experiencing nature enhances adolescent developmental processes (Kellert, 2002), benefiting children's mental and physical health (Miller, 2007).

Globally, there are now more people living in cities and urban environments than in the rural countryside environments (World Bank, 2017). This has the potential to exacerbate the disconnection between humanity and the natural world (Soga and Gaston, 2016). The extent that this disconnect is part of society can be seen through actions such as Oxford Dictionaries removing around 50 words connected with nature from revised editions of Oxford Junior Dictionary (Guardian, 2015) and natural history training being on the decline in schools (Bebbington, 2005) and universities (CIEEM, 2011). This suggests there is a need to look for ways the population in the UK can use the environment around them to reconnect with the nature.

Currently in the UK, the National Curriculum does not provide adequate time for schools to be able to provide the valuable experience of spending quality time in nature. This is particularly an issue in urban schools as many do not have access to green spaces (Zhang et al. 2014), and some lack outdoor areas. Though there may be urban green spaces in the areas surrounding the school, schools are unwilling to take their students off site regularly due to constraints such as transport, paperwork and perceived risks.

The city of Southampton provides an ideal case study location to investigate the relationship between urban green space and the development of connections with the natural world. It is one of the most densely populated cities in the UK, with 4,096 people per km² (Office for National Statistics 2015). Despite its dense population, Southampton is also one of the greenest cities in Southern England, with over 50 parks and green spaces (Southampton City Council, 2015) (Figure 1).

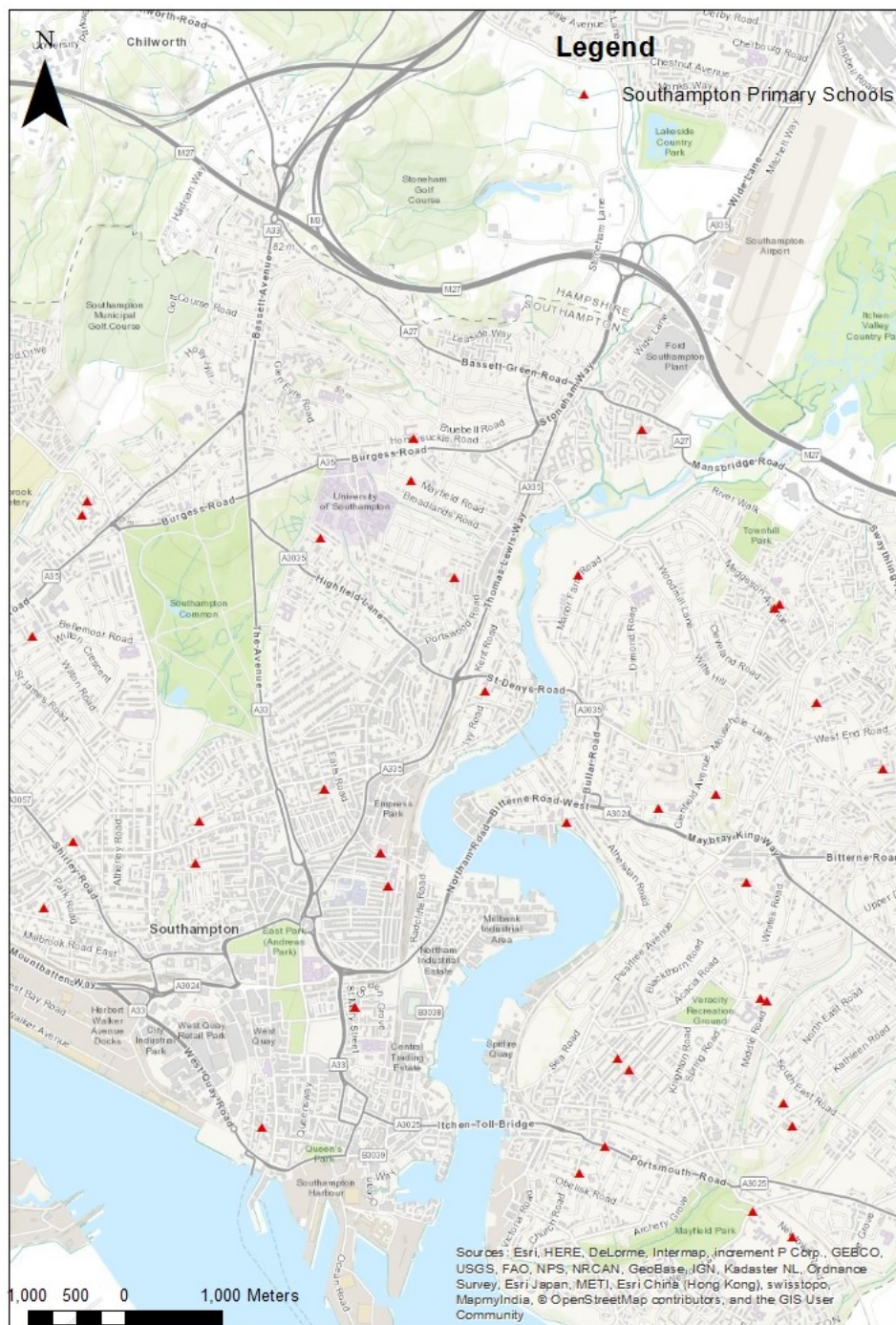


Figure 1: Map of Southampton City Centre, showing urban green spaces in green. Each primary school's location is shown as a red triangle. All are within walking distance of a green space.

Education in the Green Space evaluated the barriers and solutions to teaching outside. A mixed methods approach was used, combining expert interviews, questionnaires and workshops. The short time frame of the project (just three months), required a focused approach in order to meet the study aims (figure 2). The timing of the workshops was an immediate consideration, with February half term identified as a good time. This was at the halfway point of the project.

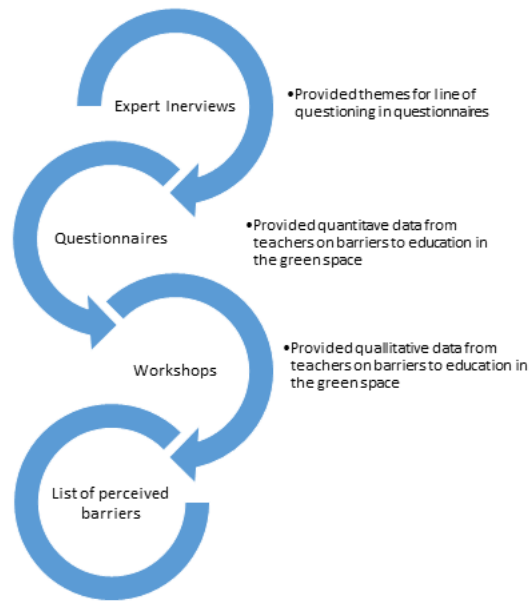


Figure 2: The series of steps the project activities followed to allow for the development and use of formative feedback during the project.

Interviews with 5 environmental education experts, typically employed at museums and formal gardens, were invaluable sources of information at the start of the project. This provided information on the potential barriers, solutions and common issues teachers face when taking pupils outside. The themes identified in these interviews were used to develop and refine questionnaires for teachers from primary and secondary schools.

Questionnaires were given to the teachers who attended our workshops, held at the Highfield campus of the University of Southampton. We also left questionnaires with teachers when we attended to deliver sessions ourselves, as exemplars of education in the green space. The questionnaire was designed to assess three main areas which could be seen as potential barriers: 1) teacher's perceptions of nature, 2) teacher's confidence in taking classes outside, and 3) teacher's knowledge on environmental and ecological topics from the relevant key stage of the National Curriculum. This exercise resulted in 30 completed questionnaires providing quantitative data identifying 'real' barriers and 'perceived' barriers to education in green spaces.

Primary school teacher and secondary school teacher workshops were also held at the Southampton Education School. With the permission of the participants, these workshops were recorded, and transcribed, providing qualitative assessments of the barriers to education in the green space. Workshops were composed of three activities to examine barriers teachers face in more detail, and what are the possible solutions. The first of these used a traffic light system of post-it notes, asking teachers to write topics from the National Curriculum on different coloured post-it notes, with the choice of paper depending on their confidence in teaching that topic (figure 3). All the National Curriculum topics assessed by the exercise were ecological or environmental topics that could be taught outdoors. This exercise allowed us to examine teacher confidence in teaching different environmental topics.

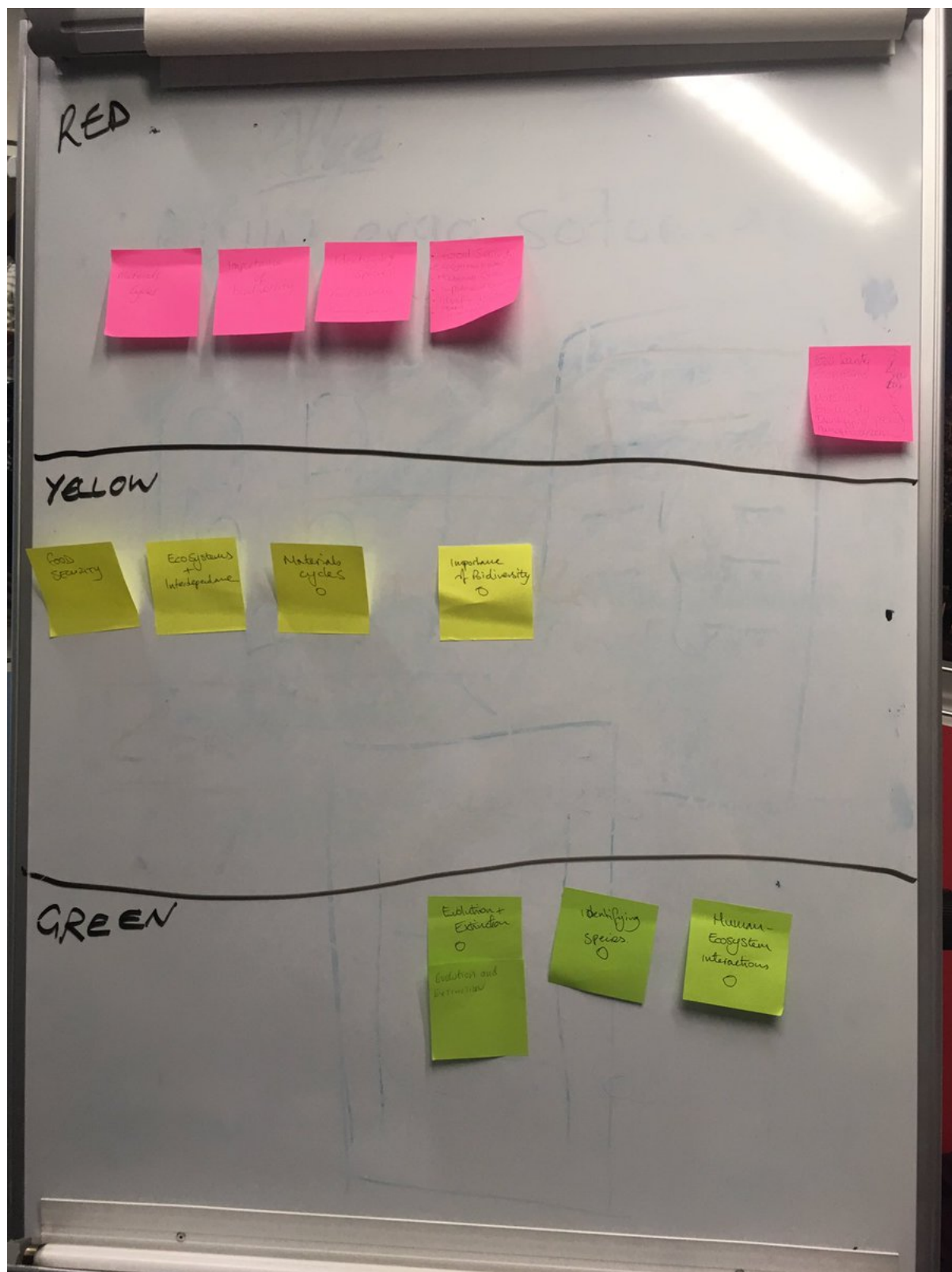


Figure 3: Traffic lights workshop activity – teachers were asked to rate their confidence in teaching environmental/ecological topics, red for not confident, yellow for OK and green for confident.

The second activity used 'barrier boats' (figure 4). Here, pairs of teachers drew a boat on which they drew labelled anchors to represent topics that were barriers to teaching outdoors, and labelled winds to represent progress and solutions. This exercise aimed to identify more clearly the reasons why certain barriers were stopping outdoors learning, and what methods teachers were already using as solutions.

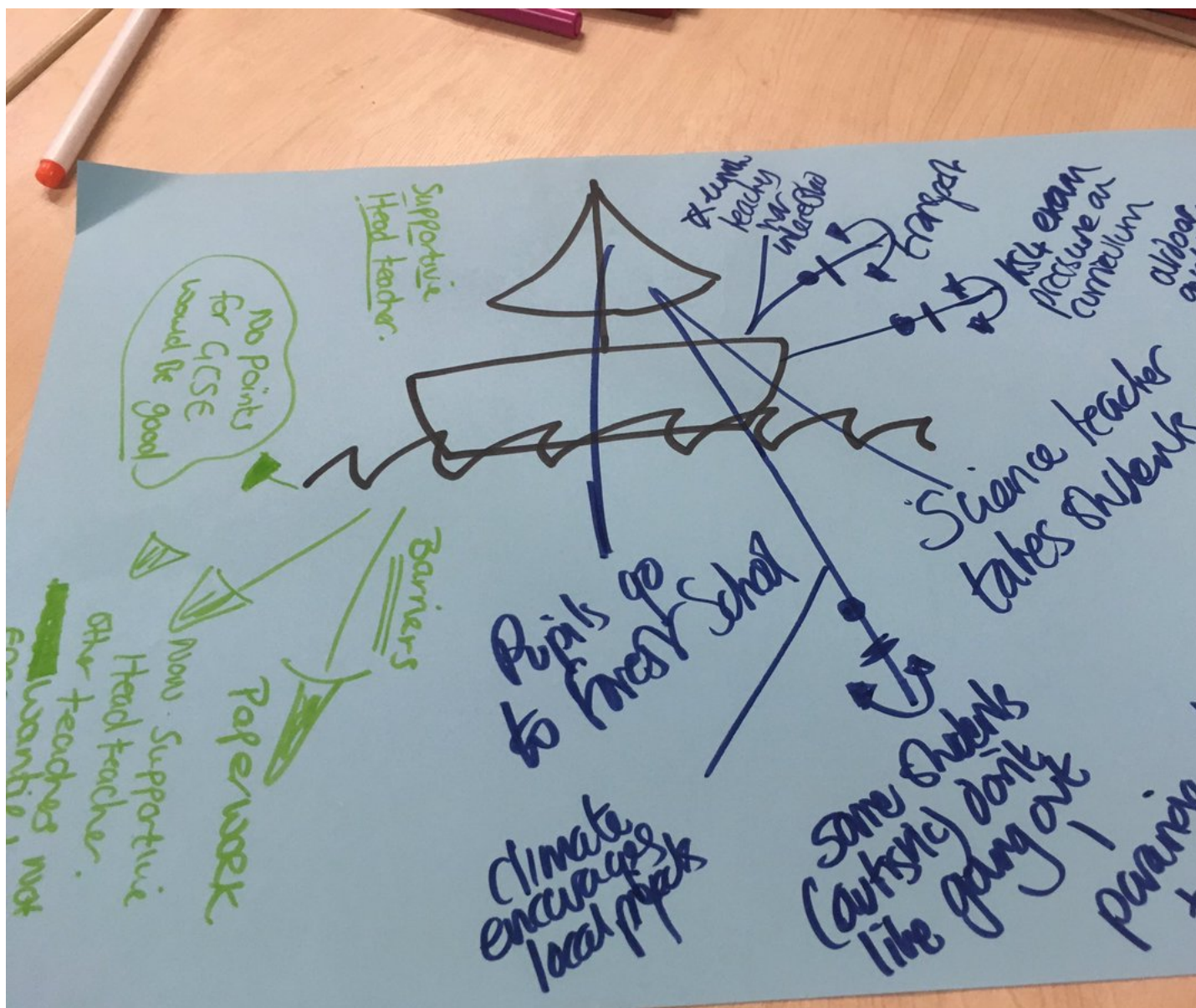


Figure 4: A 'Barrier Boat' created by teachers at the Education in the green space primary school teachers' workshop

In the final workshop task, teachers were asked to make a poster demonstrating how a topic from the National Curriculum could be taught outside. This encouraged them to think about how to integrate their everyday teaching into a green space. It allowed us to assess the teachers' application of the focus of the workshop.

The workshop activities allowed us to gather a list of barriers to teachers, which are currently preventing them from moving lessons outside the classroom. The list of barriers could be sub-divided into 'real/actual' barriers and 'perceived barriers'. Real barriers included the costs associated with taking children away from school grounds. Perceived barriers included education in green spaces not being implicitly mentioned in the national curriculum.

Visits to schools in Southampton were an important part of the project, not only for demonstrating the lessons in green spaces but also to encourage teacher engagement with the project. It allowed us to begin communications with teachers, to recruit workshop participants, obtain completed questionnaires and to build a community of practice. There was also a desire for training opportunities. Therefore, we ran a free training course for primary school teachers who wished to gain confidence in taking their classes outside, with Sir Harold Hillier's Gardens' Education Department.

The project ended with a networking event, something that we had not anticipated when proposing the project. We invited all of those who had participated in the project to attend the event, in order to meet each other. We were struck by the important and unique role of the University of Southampton, as the local seat of learning which is separate to governmental initiatives.

We faced several challenges whilst working on this short but ambitious project. Working with schools can be a rewarding experience for researchers, and most teachers and university students are keen to be involved in outreach and research. However, projects involving schools are complicated, with difficulties due to administrative complexity and restrictions within the educational system. This was a particular difficulty for our project, as it was only three months long. This was not the only difficulty that we encountered. We identified three groups of challenges: working across university faculties; timing of the project; and access to schools.

The project was run across two separate faculties at the University of Southampton, with the majority of researchers based in Biological Sciences and the others in Southampton Education school. The team had worked together on smaller projects as part of Southampton BioBlitz, but it was the fact that one of the main researchers had recently graduated from Biological Sciences and subsequently worked on a schools partnership project in Southampton Education School, which was most useful to our project. This was especially useful due to time constraints of this project.

Due to the project's emphasis on utilizing green space, conducting activities out of doors would have been preferred. The terms of our project funding required that it ran between the start of January and the end of March 2017. Sunny weather is usually optimal to encourage participation in outdoor activities, something that is not very frequent during the winter. Many teachers were concerned about allowing children outside during rain or if the ground was wet, due to perceived risks or worries that muddy clothes would anger parents. Teachers perceived that taking children into an outdoor environment was inherently risky or not worthwhile. We

overcame this limitation by bringing nature into the classroom. Our project used taxidermy specimens of native animals loaned from a local collection, which enabled pupils to experience wildlife of which they were previously unaware.

The final set of challenges were centred on gaining access to schools. Many schools plan their timetable a term in advance, so were not able to fit our sessions into the timetable at short notice. Therefore, if your project allows, it is advisable to make contact as early as possible before you intend to deliver any sessions in schools. Teachers and pupils are under a lot of pressure to perform well in exams, which can additionally complicate fitting around timetables. Attainment goals add stress to taking time out of the curriculum, and it is particularly difficult to gain access to Years 6, 10 and 11, especially close to the examination period. This can be bypassed by targeting other school years or visiting schools during the June/July period, after examinations are complete.

Our sessions in primary schools had to include a certain number of National Curriculum topics. This was exacerbated by the removal of Science SATs as many classes (particularly in Year 6) were being pushed to attain in literacy and numeracy. This meant that our focus on urban green spaces had to be skewed in many schools for us to be allowed access. We overcame this challenge by making activities cross-curricular, including literacy or numeracy aspects.

The Education in the Green Space project required direct communication with Southampton's teachers, in order to invite them to our workshops and to let them know about the support that we were able to offer them. We initially used contact information provided by the Southampton Education School but these were often generic administrative email addresses and our messages were not always passed on to teachers. In many instances, the schools never responded, this was demonstrated as out of 54 primary/infant/junior schools, we only ran outreach at 4 of these schools. Responses from the 12 secondary schools, at which we were able to contact the heads of science, were a little better with two schools receiving outreach sessions within the project timings. We were eventually able to build a network that has proved invaluable to our efforts.

Compared to the number of schools in Southampton relatively few schools were visited. The challenges of reaching teachers and arranging visits were the limiting factors in this time-restricted project, and it was obvious that we had been unrealistic in our project proposal. However, at many of the schools that we did visit, we taught all year groups, and therefore all pupils and most teachers in the school engaged with the project, which was a wonderful outcome.

The project aim of increasing education in the green space was met very positively by many teachers that we encountered. One teacher said, "The children were absolutely buzzing about the activity... It was a great introduction to our topic and I know some children will go home and look at their garden tonight". This suggests that by doing activities such as a minibeast hunt in school, children are much more likely to take an interest in the nature around them.

Education in the Green Space engaged with approximately 1300 pupils from 6 schools who all took part in outreach sessions lasting between 30 mins to a whole day. Further to this, by running activities at science festivals (Brighton Science Festival, Southampton University Science and Engineering Day and Pint of Science) we interacted with a further 3,050 (approx.) members of the public.

We also created a school pack, with resources for teachers to support them in taking pupils outside, which has been taken to every primary school in Southampton. We have also made a website that gathers many pre-existing online resources, websites, as well as activities and worksheets designed during the project and information specific to Southampton (www.efolio.soton.ac.uk/blog/education-green-space). This project has shown that despite restrictions due to timetabling and the National Curriculum requirements, many teachers and environmental educators are passionate about Education in the Green Space and its benefits for students and teachers. This 3-month public engagement pilot project has provided a basis for further development of engagement with schools. Undergraduate interns have been appointed to continue visits to schools during the summer 2017.

Acknowledgments

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