The use of campus based field teaching to provide an authentic experience to all students

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Fieldwork is an important part of undergraduate degrees in Geography and has been shown to be an effective pedagogic strategy. Fieldtrips are often to remote locations, both residential and shorter day trips. For institutions field trips can be costly in terms of money and staff time and difficult to timetable. Some students may have difficulty attending due to caring commitments or employment. For some, going to a novel environment to learn new skills can be overwhelming. At Askham Bryan College a 'Field and Environmental Techniques' module for Foundation Degree level students, ran in weekly two hour sessions, for 24 sessions. These were formatted to suit the College timetable and to fit with students other commitments. It resulted in a structure re-think, moving from individual lectures and longer fieldtrips to an integration of theory and fieldwork in short sessions utilising the campus environment. Student surveys revealed this structure benefited learning as they could link theory with practice and it prepared them for carrying out future fieldwork in novel locations. In addition, students highlighted the social benefits of the module. Social aspects of fieldwork are regularly reported as a benefit of residential trips, but it was an unexpected benefit of this module.

Keywords: Fieldwork, Campus-based, Widening Access

Introduction

Fieldwork is an important part of undergraduate degrees in the GEES disciplines and Biosciences, it is included throughout the QAA Benchmark Statement for Geography (2014) including, 'Geography is intrinsically a field-based subject. Field experience is an essential part of geographical learning.' It is also referred to several times in the QAA Benchmark Statement for Bioscience (2015), and a requirement of professional bodies (e.g. RGS, 2016). Fieldwork has been shown to be an effective pedagogic strategy (Boyle et al., 2007; Fuller, Edmondson, France, Higgitt, & Ratinen, 2006; Maskall & Stokes, 2009; Resler and Kolivras, 2009; Stokes, Magnier, & Weaver, 2011; Krakowka 2012; Wilson, Leydon, & Wincentak, 2017) providing not just field skills,

but increasing the employability of students (Andrews, Kneale, Sougnez, Stewart, & Stott, 2003) and for attracting and retaining students (Mauchline, Peacock, & Park, 2013). It is also important way to link theory to practice (Scott, Fuller, & Gaskin, 2006).

Fieldwork ranges from residential fieldwork which typically lasts between two and ten days, to full day local fieldwork and campus based fieldwork which may last between a full day and an hour (Maskell & Stokes, 2009). Residential fieldwork enables students to become immersed in the field study (Stokes & Boyle, 2009) and has benefits for professional skills and social bonding (Andrews et al., 2003). Residential fieldwork also has the benefit of increasing student cohesion within groups (Maskell & Stokes, 2009) and it is thought that it may be harder to develop this group cohesion on a non-residential fieldtrip (Jenkins, 1994) although Fuller (2006) found students reported a natural interaction after day trips, despite no group work or social activities. In addition, residential fieldwork brings with it informal and social interactions between staff and students which can be beneficial for future student learning and giving them increased confidence to approach staff later on in their courses (Hart, Stafford & Goodenough, 2011; Welsh & France, 2012).

Exotic fieldwork locations may aid the attraction of students onto courses however, it goes against an increasing trend of HEIs to reduce their carbon footprint (Welsh & France, 2012). In addition, there is continuing pressure on fieldwork in terms of cost, staff time, increasing student numbers (Maskell & Stokes, 2009) and timetabling (Mauchline et al., 2013). Although recent work by Mauchline et al. (2013) and Welsh and France (2012) suggest that fieldwork will remain a central part of both the Bioscience and GEES curriculums, this is frequently due to the hard work of a few committed individuals.

The novel environment of residential fieldtrips is often thought to add to the learning experience. However, the 'novelty effect' may actually inhibit student learning if they become overwhelmed by the complexity of the new environment (Falk, Martin, & Balling, 1978; Cotton & Cotton, 2009). To prepare students electronic resources are often used to disseminate students both information on the field location and techniques to be used (Fletcher, France, Moore & Robinson 2007). Welsh, Mauchline, Park, Whalley, & France (2013) showed that 5.3% of practitioners had introduced technology for pre-fieldwork preparation and Friess, Oliver, Quak, & Lau, (2016) found students who viewed virtual videos pre-fieldwork found these useful for the actual trip.

In addition to the threats of costs and staff time many students now have additional commitments which make it increasingly difficult for some students to attend residential or even a long day of fieldwork with external pressures such as caring responsibilities (Smith, 2004) or part-time work (Curtis & Shani, 2002). With the pressure on fieldwork various attempts have been made to find alternative ways of teaching including virtual and remote access to fieldtrips (e.g. Thorndycraft, Thompson, & Tomlinson. 2009). Both of these methods are good at preparing students for field work or allowing them to experience inaccessible environments, but they do not replace actual field experience and cannot be claimed to be an equivalent learning experience (Friess, et al., 2016; Scott, Fuller, & Gaskin. 2006; Scott et al., 2012).

Higher education institutions have been using campus based fieldwork for a long time (for example Hess & Meierding, 1972; Hudak, 2003; Jennings & Huber, 2003; Fuller & France, 2016). However, its potential as a valuable resource for practical work is perhaps over looked with a desire to attract and retain students with exciting and exotic locations. Walking lectures have been used by some practitioners and can

immediately demonstrate to students aspects of theory in their locale environment (Mauchline et al., 2013). Other innovations of campus based fieldwork include the KiteSite application at the University of Reading for monitoring biodiversity across campus (White et al., 2015). Carrying out fieldwork on campus should also reduce the 'novelty effect' for students and allow them to concentrate on techniques and skills being undertaken without the additional pressure of working in an unfamiliar environment. By being familiar with the surroundings the number of new pieces of information that must be processed by the students is reduced, hence reducing the cognitive load, allowing the students to focus on the fieldwork and skill development (Jolley, Wilson, Kelso, O'Brien, & Mason, 2016). In addition, short trips can make the link between theory and practice apparent to the students quickly (Bacon & Peacock, 2016).

This research focuses on a module which was designed to fit the weekly timetable and to enable students with external commitments to take a full part in a field course. Students perceptions of the course were investigated particularly with relation to: their confidence in fieldwork; social interactions; linking theory with practice; and novelty affect/cognitive load.

Methods

The course

At Askham Bryan College a 'Field and Environmental Techniques' module for Foundation Degree level students, ran in weekly two hour sessions, throughout the academic year for a total of 24 sessions, late September to April. The module was run in this format for three years from 2012/2013 to 2014/2015, with approximately 20 students in each cohort. The sessions were formatted in this way originally to suit the

College timetable and to fit with other commitments of the students. This resulted in a re-thinking of how to teach such a course moving from individual lectures and longer fieldtrips to an integration of theory, fieldwork and analysis in short sessions. The sessions were split so that in total there were approximately 28 field hours and 20 hours of classroom based activities.

A typical session would include an introduction to the theory or technique, delivered by faculty staff through an interactive discussion with material available to the students before the session on the VLE. This would be followed by data collection in the field and a follow up discussion of results, although occasionally the analysis and discussion would take place the following week. Scaffolding of the students learning was carefully directed from detailed field methods and teacher led activities to greater independence until in the final sessions students planned and carried out group projects based on the techniques learnt throughout the course and presented their findings in a conference format.

Students taking the module were an even mix of school leavers and mature students with a wide range of previous field experience (nothing to decades working as game keepers and everything in between) and scientific knowledge. Selective grouping of students allowed for differentiation of learning, with either students with similar skill set and prior knowledge/experience grouped together with different degrees of tutor support for each group and slightly different group tasks or more experienced students tasked with leading groups to share their knowledge and support their peers. Groups or group leaders were often changed between fieldwork and data analysis tasks as students had very different skill sets and extension activities were provided for some students to provide appropriate challenge. Ice breaker exercises at the beginning of the course

around previous field experience as well as performance in sessions and conversations with students informed how students were grouped.

Module evaluations and follow up survey

At the end of the module in all three years, students were asked to submit a generic paper module evaluation. Questions relevant to this study include the open ended questions, 'What was the best feature of this module?' and 'In what ways could this module be improved?' In addition, the question, 'Overall I am satisfied with this module' was asked with answers given on a five-level Likert scale. 14 students completed this in 2012/2013 and 8 in 2013/2014.

In addition to this, a follow up survey was undertaken in November 2015 with the first two cohorts, 2012/2013 and 2013/2014. An anonymous online survey was administered with the URL sent to all students via email. This looked to assess the students' confidence carrying out fieldwork both before and after the module, and how well they felt the fieldwork developed their skills. Answers were given in the form of a five-level Likert scale. Open questions were employed to ascertain students thoughts on what was the most valuable and best and worst experiences undertaking the fieldwork. Ten students from the two cohorts of approximately 40 completed the survey, five from 2012/2013, four from 2013/2014 and one who did not answer which cohort they were in.

Results and Discussion

Overall students were satisfied with the module, with 100% of students in 2012/2013 agreeing or strongly agreeing with the statement 'Overall I am satisfied with this module.' In 2013/2014 88% of students agreed or strongly agreed, with 12% (one individual) giving a neutral response.

Confidence

In general students reported feeling more confident after completing the module, than before starting it (Figure 1). [Figure 1 near here] The increase in confidence was only slight, with most identifying themselves against the next point on the Likert scale (i.e. those that chose slightly confident before starting, chose fairly confident after completion).

By repeatedly carrying out fieldwork in familiar environments throughout the first year of study, techniques and methods become familiar to students and future fieldwork to unfamiliar locations should be less daunting and more successful for students. In response to the survey 80% of students either agreed (40%) or strongly agreed (40%) with the statement, 'As a result of the fieldwork I feel able to apply the techniques developed to unfamiliar situations.' Twenty percent of respondents gave a neutral response. In addition, a student added that the best thing about the course was "Being able to fully understand a technique and then using that technique in further studies".

The design of the module scaffolded the students fieldwork, moving from detailed set field methods to follow, and culminating with the students undertaking the design of their own group projects. This developed their problem solving skills with 30% of respondents strongly agreeing and 60% agreeing to the statement 'The fieldwork gave me a chance to develop my problem-solving skills'.

This type of field course would prepare students for more intensive fieldwork and fieldwork in novel environments. The skills learnt could be transferred to alternative locations reducing the potential for students to be overwhelmed by novel environments (Cotton, 2009) which students may experience when learning skills in unfamiliar environments. Pre-lab work has been shown to improve student learning in

practical classes (Johnstone, 1997) through reducing the cognitive load (Jolley et al., 2016). Reducing the novelty effect has previously been done through the use of virtual environments (Cotton, 2009) which are becoming increasingly realistic (e.g. Houghton, Lloyd, Robinson, Gordon, & Morgan, 2015), yet it is agreed these cannot replace field work (Maw, Mauchline, & Park, 2011) and are perhaps better for students to experience remote or inaccessible environments than focusing on field skills.

Social Interaction

Although social activities were not written into this module there were opportunities for social interaction during the short walks between the classroom and field site and the group work enabled students to get to know each other and staff quickly. All students who completed the survey strongly agreed (60%) or agreed (40%) with the statement, 'During the fieldwork I was able to socialise and communicate with other students'. On residential trips the benefit of social interaction is widely reported (Maskell & Stokes, 2009) and Fuller (2006) reported important social interactions on day length trips, our findings highlight the benefit of much shorter sessions for group cohesion. In addition, all respondents agreed (60%) or strongly agreed (40%) with the statement, 'Fieldwork enabled me to get to know staff on the module and communicate with them.' Bacon and Peacock (2016) found that staff reported students more willing to speak with them after a short field session, suggesting that these sessions are good for promoting good communication between students and staff.

This social interaction helped ensure the students felt confident in being able to work with others, with the majority strongly agreeing (50%) or agreeing (40%) with the statement 'As a result of the fieldwork I feel confident in being able to work with others'. This was supported by a respondent who stated the best experience of the module as, "The fieldwork was carried out soon after starting the course which enabled

us to make friends and naturally migrate to similar minded people. Which helped in other topics and further group work". The social cohesion was probably supported by students working in groups for some of the field tasks.

Linking theory to practice

Through running the module throughout the year and integrating the theory with the practical in all sessions the link between the two was apparent. 'Applying theory to practice' was the most comment response (70%) to the question in the follow up survey, 'What was the most valuable aspect of the field work?' In addition, ninety percent of students strongly agreed (50%) or agreed (40%) with the statement, 'The fieldwork gave me first-hand experience of themes/topics studied in class.'

One student added in the follow up survey that the worst aspect of the module was 'Not being able to undertake all the theory learned in class' suggesting they valued this linkage and would like even more chance to put theory into practice.

This was also highlighted in the module evaluation form, in which students highlighted this area as the best feature of the course:

- "Very interesting subject with good balance of theory and practical."
- "Backing up classroom work with practical work."
- "Been involved and carried out practical tasks in lesson to help us understand different techniques."

Student issues with the course

The timing of the academic year, not being ideal for fieldwork was highlighted by the students in response to the module evaluation when asked for comments on 'Points for improvement:'

- “Possibly arrange the dates better so we have a better chance of collecting data."
- "Impossible to get any results in winter."

‘Impossible’ was an overstatement, but it may have been better to carry out fieldwork in early summer after the module had finished, when the weather may have been better, but importantly the plants and animals are no longer dormant as they are in the winter months. The timing of the academic year, in the UK, leads institutions to opt to go abroad for undergraduate fieldwork (Mauchline et al., 2013), which clearly would not fit with a module designed in this way. However careful planning of sessions within this module, balanced with a flexible approach to accommodate severe weather or delayed Spring phenology maximises the opportunities for successful fieldwork.

Adaption of the course

The course could easily be adapted to different settings and cohorts. Although this course had a relatively small cohort of 20 it could easily be adapted to a larger group, which is a challenge for many organising fieldwork as discussed by Leydon and Turner (2013). Bacon and Peacock (2016) reported a successful campus based Urban Ecology session with 40 students and to scale up to 100 plus students, simple interventions such as splitting the cohort into smaller groups of around 20 which graduate student support would enable all students to be actively engaged in an activity at the same time with additional faculty support (Leydon and Turner, 2013).

Although this course used suitable space on campus, for non-campus based HEIs any local space within walking distance would be suitable. The space does not need to be large; trees planted along a street; a sports field, hedgerow or waste ground are all suitable. As with setting up any new course there is a time cost involved, though this was no more than a traditional lecture based course or residential trip, indeed once set-up there was probably less preparation time required.

Conclusion

Although campus based fieldwork should not replace traditional and residential fieldtrips it provides a good introduction for techniques and small project work, while making sure fieldtrips are more accessible to all. The non-traditional set-up of the field course was successful in fitting in with the timetable and budget constraints, and enabling students with additional commitments to take a full part in fieldwork and also in providing a good learning experience for the students. Repeated exposure to fieldwork throughout the year can scaffold students learning and can improve student confidence in performing techniques in unfamiliar environments. This method of field teaching could easily be adapted to different HEI settings and provide students with a solid based of field skills which can be developed later in their course.

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Figure 1: Students confidence undertaking field work before and after completing the Field and Environmental Techniques module