

Fieldwork is good ... but why?

Richard J Payne

Environment, University of York, York YO10 5DD, UK.

richard.payne@york.ac.uk

ABSTRACT

Field-based teaching and learning is perhaps the most characteristic aspect of pedagogy in Geography and Environmental Science higher education. While it is clear that both staff and students place a high value on fieldwork it is not clear whether students and staff share the same views or prioritise the same factors in making this judgement. Here we surveyed staff and students at years 1-3 to demonstrate important differences in value judgements. Staff members ranked the importance of fieldwork in student recruitment much more highly than students themselves which may give cause to question the focus of many universities on ever-more exotic field destinations. Staff members were much more positive than students about the value of fieldwork in learning transferable skills and preparing students for final year research projects. Both staff and students were very positive about the value of fieldwork as a 'bonding' experience, particularly at first year level, supporting the common inclusion of fieldtrips in the early stages of degrees. Overall there was strong evidence that most students felt fieldwork was a valuable way to learn about the subject with responses highlighting many of the same key attributes as staff members.

KEYWORDS

Higher Education; Geography; Environmental Science; Fieldwork; Field-course; Field teaching.

INTRODUCTION

Field teaching is deeply embedded in geography and environmental science higher education in the UK. The QAA benchmark statement for Geography states that

'An essential and characteristic aspect of geography is the role of fieldwork and other forms of experiential learning in the development of knowledge and understanding' (QAA, 2014).

There are similar strong statements in the benchmark statement for Earth and Environmental Science and the Geological Society includes a minimum number of field days as a criterion for accreditation of Geology degrees (Geological Society, 2016). Field teaching, defined simply as any teaching and learning which takes place away from the designed learning environment ('the classroom'), is one of the most disciplinarily distinctive aspects of pedagogy in these subjects (Gold *et al.* 1991). There is a widespread viewpoint that field-based teaching and learning is 'a good thing' (Boyle *et al.* 2007) but the underlying reasons for this viewpoint are often not made explicit and are both complex and nuanced. Fieldwork is indeed so firmly established that the rationale for its inclusion is often not questioned as it is simply an expectation based on disciplinary norms, external requirements and conceptions of subject identity. In the literature and in practise a number of rationales are frequently used to advocate for fieldwork, with these

ranging from fundamental pedagogy to practical and business-driven. The focus of this paper is on how staff and students at different degree stages value and prioritise these arguments. It is useful to begin by reviewing the literature to establish the key discussion points.

What is the point of fieldwork?

Both Geography and Environmental Science are concerned with the natural environment with a focus on landscapes and processes which cannot easily be replicated in the classroom. It is widely accepted as being easier for a student to appreciate the key attributes of a coastal environment by standing on a beach, seeing waves acting on unconsolidated sediment, than it would be to gain the same knowledge indoors. Despite the changing nature of fieldwork activities this role for fieldwork as 'observation' remains important (Haigh and Gold, 1993; Kent *et al.* 1997). Clark (1996) argues that observation of landform and process forms a crucial first step in a chain leading to deep learning and Fuller *et al.* (2000) provide direct evidence for the efficacy of a 'descriptive-explanatory' approach. Ideas of 'putting classroom theory into context' in the field are one of the justifications most frequently cited by lecturers for the inclusion of field-based teaching in curricula (Scott *et al.* 2006).

The essentially field-based character of much of Geography and Environmental Science also provides a rationale for fieldwork in terms of technical skills. Many of the techniques which are critical to practise, both in academia and beyond, can only be learned in a field setting (Scott *et al.* 2006). From describing a soil profile, to conducting a questionnaire, to surveying a moraine, all require technical skills which are difficult or impossible to acquire in the classroom alone (Clark, 1996). One specific application of these technical skills is the final year research project which will often include an element of fieldwork. There is anecdotal evidence that quantity and quality of prior fieldwork experience is an important determinant of final year project success (Kent *et al.* 1997). The 'skills' justification for field teaching goes beyond discipline-specific technical skills to encompass a broader suite of transferrable skills (McEwen, 1996; Scott *et al.* 2006). Whilst many of these skills can be learnt in other settings the intensive nature of the field-course experience provides a context which many practitioners have found valuable for promoting career-relevant skills such as team-working and problem-solving which are assuming increasing significance in the curriculum (Fuller *et al.* 2006; Wall and Speake, 2012). In many institutions fieldwork is explicitly placed within a framework of problem-based learning with group projects often having a central role (Bradbeer, 1996; Haigh and Gold, 1993).

Fieldwork can be an intense experience with participants spending more time in each other's company than would be the case in a classroom, often in an environment which can be physically challenging. Consequently, fieldwork is often considered to have a valuable role in group bonding and integration (Boyle *et al.* 2007). This may operate on multiple levels, both socially and through shared academic endeavour and both within the student group and between staff and students. Previous studies frequently note students reporting benefits in terms of getting to know their peers and teaching staff on a more informal basis (Fuller *et al.* 2006). This bonding process may enhance cohesion within the student group and ultimately have benefits for both student attainment and student retention.

Justifications for fieldwork in terms of 'observation', 'skills' and 'cohesion' are essentially practical in nature but a more fundamental issue is whether students learn better in a field-setting. Consideration of this topic has focussed particularly on the *affective* domain, namely the idea that fieldwork elicits a positive emotional response which is believed to promote adoption of 'deep' approaches

to learning (Entwistle, 1991). There is little doubt that most students enjoy the fieldwork experience and many academics believe that this is likely to enhance interest in the subject matter and lead to more positive approaches to learning. In one of the most rigorous studies on this topic 365 students on 9 field course in 7 institutions were asked to complete questionnaires before and after fieldwork participation (Boyle *et al.* 2007). Student attitudes started positive pre-fieldwork and became more positive post-fieldwork with the improvement greatest in students who were initially most negative. These findings mirror one of the only formal experiments published on this topic in which Kern and Carpenter (1984) exposed groups of students to curricula with and without fieldwork. The field-taught students reported higher levels of both interest and enjoyment than the classroom-taught group. While these findings do not provide direct evidence that fieldwork enhanced student learning the links between student enjoyment, student engagement and student attainment are quite well established in the general educational and psychological literature (Greene and Noice, 1988). In short, happy students learn better. It is a reasonable assumption that engaged students are more likely to succeed and plausible that the engagement engendered by fieldwork may induce positive change on return to the classroom.

A final common rationale for fieldwork is as a recruitment tool. This is perhaps the most recent role for fieldwork but there is little doubt amongst many academics that in a competitive student market 'fieldwork sells degrees'. This viewpoint is probably the driver of a trend for Universities to offer ever-more exotic fieldwork destinations (McGuinness and Simm, 2005). UK Geography undergraduates can now opt for fieldwork in far-flung destinations such as New Zealand (e.g. Aberystwyth University), Cuba (e.g. University of Manchester) and Vietnam (e.g. University of Sussex). Such options were rarely available ten or twenty years ago (McGuinness and Simm, 2005) and the same trend appears less apparent in countries with less 'marketised' higher education systems (Fuller *et al.* 2006).

Aims of this project

While multiple arguments are frequently propounded in favour of field teaching, evidence for the efficacy of fieldwork in achieving many of these stated goals remains quite limited (Fuller *et al.* 2000; Gold *et al.* 1991; Kent *et al.* 1997). Particular gaps in the literature concern consideration of two important aspects: 1) how student attitudes to

fieldwork change through the course of their degree, and 2) whether staff members and students similarly recognise and prioritise different rationales for fieldwork. Both are potentially important. If student's perceptions change through the course of their degree then this is important and should be considered and planned for in curriculum development (Stokes *et al.* 2011). If staff member's perceptions do not match those of students then there is a danger of mis-matched teaching which does not adequately provide for student needs. Despite their seeming importance both of these questions have been little considered in the published literature (Fuller, 2006; Scott *et al.* 2006; Stokes *et al.* 2011). To address these questions this paper presents an institutional case-study of staff and student perceptions of fieldwork at the University of York.

METHODS

The key data collection instruments were questionnaire surveys completed by students at the end of field course for field-based undergraduate modules, and a similar questionnaire completed by teaching staff. Students studying on three modules at first, second and third year level in BSc degrees in the Environment Department at the University of York were targeted. Students undertaking these modules were registered on both the BSc Environmental Science and BSc Environmental Geography programmes. It is likely that the role of fieldwork in Geography and Environmental Science is subtly different however there are likely to be more commonalities than differences and in practise it is easier to follow the example of several previous studies (e.g. Fuller *et al.* 2003) in considering both collectively. Each of the modules considered was primarily field-based with the fieldwork component lasting from three days to a week. The modules were:

- **Environmental Field Project.** This is a compulsory first year module for all Environmental Science and Environmental Geography students. The central component of the module is a three day field trip to the North York Moors. Field activities include ecological surveying, levelling, surveying, coastal environments and peat coring. The assessment includes a report on a project conducted in the field on the last day of the fieldtrip.
- **Tenerife Field Course.** This is a compulsory second year module for all Environmental Science and Environmental Geography students conducted within a one-week trip to Tenerife. The first half of the trip is staff-led with topics including water, energy, waste and nature protection.

The second part of the trip involves students working within groups to conduct a research project of their own devising which forms 80% of the assessment.

- **Glaciology and Volcanism in Iceland.** This is an optional third year module which is available to both Environmental Science and Environmental Geography students. The students spend a week in Iceland in the summer between the second and third years. Study topics include volcanological, geomorphological and glaciological processes and landforms. Students work in groups to conduct daily research projects which are assessed in the field and one of these is assessed by a project report on return to York.

In designing the questionnaire a key focus was to minimise the workload involved to maximise the number of responses received. The majority of questions required answers on the Likert scale with one free response question. Likert scales were arranged from 1 ('strongly agree') to 5 ('strongly disagree'). All staff and students were also asked the question '*Do you think fieldwork is an effective way to learn about Environmental Science and Environmental Geography? Why?*' Paper questionnaires were used for the student surveys to allow these to be completed in real-time at the beginning of the return journey. Staff questionnaires were distributed to a broader array of staff involved in field teaching, not simply staff involved in teaching the three focus modules. To maximise response rate these questionnaires were produced and disseminated electronically to academic staff and post-graduates who teach (PWT) using departmental mailing lists.

Questions were designed to address the motivations for fieldwork but were not intended to provide comprehensive coverage of all possible motivations. The selected questions aimed in particular to address the issues raised by Fuller *et al.* (2006) as under-researched including the roles of fieldwork in group bonding, transferable skills development and recruitment. All participants were also asked whether they would like to see more fieldwork in the curriculum. In analysing the results ten questions listed in table 1 were considered. To make it easier to refer to these questions in the remainder of the report they are each assigned a 'topic' name. In general the questionnaires were very similar for all groups. The only difference between the questionnaires distributed to the three student cohorts was the name of the destination and module. Two of the questions were worded exactly the same for both staff and students (subject identity, learning effectiveness) and seven were worded differently but with an attempt to maintain the same nuance of meaning

Table 1: Questions considered in this report.

Topic	Statement (students)	Statement (staff)	Response type
Degree choice	Q2. The opportunity to participate in fieldwork was an important part of my decision to pursue a degree in Environmental Science or Environmental Geography.	Q3. The fieldwork on offer is an important factor in undergraduate student choice of degree.	Likert scale (1-5)
Institution choice	Q3. The opportunity to participate in fieldwork was an important part of my decision to come to the University of York.	Q4. Fieldwork is an important factor in undergraduate student choice to come to the University of York.	Likert scale (1-5)
Subject identity	Q4. Fieldwork is an important part of being an Environmental Scientist or Environmental Geographer.	Q5. Fieldwork is an important part of being an Environmental Scientist or Environmental Geographer.	Likert scale (1-5)
Learning efficiency	Q6. I have learnt more by doing a field course than in an equivalent amount of teaching on campus.	Q7. Students learn more on a field course than in an equivalent amount of teaching on campus.	Likert scale (1-5)
Group bonding	Q7. I know other students in my year better than I did before the field course.	Q8. Field teaching helps students bond as a group.	Likert scale (1-5)
Transferable skills	Q11. The field course has helped me learn transferable skills which will be valuable after I graduate.	Q9. Fieldwork helps students learn transferable skills which will be valuable after graduation.	Likert scale (1-5)
Research preparation	Q12. The field course has helped prepare me for my final year research project.	Q10. Fieldwork helps prepare students for their final year research projects.	Likert scale (1-5)
Quantity of fieldwork	Q14. I would like to have more fieldwork as part of my degree.	Q11. We should have more fieldwork in our curriculum.	Likert scale (1-5)
Personal enjoyment	Q5. I enjoyed the field trip to *location*.	Q6. Teaching in the field is more enjoyable than teaching on campus.	Likert scale (1-5)
Learning effectiveness	Q15. Do you think fieldwork is an effective way to learn about Environmental Science and Environmental Geography? Why?	Q13. Do you think fieldwork is an effective way for students to learn about Environmental Science and Environmental Geography? Why?	Open response

(degree choice, institution choice, learning efficiency, group bonding, transferable skills, research preparation, amount of fieldwork). The only substantively different question was that of personal enjoyment where the student question referred to student enjoyment of the specific trip and the staff question to staff enjoyment of fieldwork in general.

Responses to the free-form question were classified into responses which were broadly positive or broadly negative. The frequency of occurrence of three key themes was tabulated. Themes were: 'putting skills into practise', 'observing environments and landforms' and 'learning field-based skills'. These themes were identified following initial inspection of the results; it is acknowledged that there is a degree of subjectivity in how responses are classified, that there is some overlap and that many responses are not classifiable using these categories. This categorisation does however provide a semi-quantitative indication of some frequent themes.

Data analysis

The appropriate analysis of Likert-scale results is a contentious topic in the statistical literature. There is debate over whether Likert scale positions are equally

separated and whether ANOVA methods are appropriate for ordinal data (Jamieson, 2004; Norman, 2010). Here, as a precautionary approach, non-parametric methods were used throughout with a focus on testing for difference in median scores amongst year groups and between staff and students. Kruskal-Wallis tests were used to test for equality of medians between student groups with post-hoc testing using Mann-Whitney pairwise tests with a Bonferroni correction of P-value. Responses of staff and students were compared using Mann-Whitney tests to test for equality of median score. All students were grouped for this analysis and responses from academic staff were not separated from those of postgraduates who teach as only ten PWT responses were received. All questions were treated as providing unique information; no correction for multiple comparisons was applied between questions.

RESULTS

Sixty two responses were received for the first year course, forty nine for the second year and twenty two for the third year course. In all cases this represented the vast majority of the students enrolled on these modules.

Table 2: Mean responses to questions (Table 1) for students in each of the three year groups, students overall, and staff members (including PWTs). Showing mean score and in parentheses rank order amongst the scores for all questions in that cohort.

	First year	Second year	Third year	All students	Staff
Degree choice	2.4 [7]	1.8 [5]	1.6 [7]	2.0 [7]	1.2 [1]
Institution choice	3.0 [9]	2.4 [9]	1.7 [8]	2.6 [9]	1.9 [6]
Subject identity	1.7 [2]	1.4 [2]	1.3 [=2]	1.6 [2]	1.3 [3]
Learning efficiency	2.1 [3]	1.7 [5]	1.3 [=2]	1.8 [4]	2.2 [9]
Group bonding	1.4 [1]	1.5 [3]	1.5 [5]	1.5 [1]	1.3 [2]
Transferable skills	2.1 [4]	1.9 [7]	1.4 [4]	1.9 [6]	1.4 [4]
Research preparation	2.4 [8]	2.3 [8]	2.2 [9]	2.3 [8]	1.7 [5]
Quantity of fieldwork	2.3 [6]	1.7 [4]	1.6 [6]	1.9 [5]	1.8 [7]
Personal enjoyment	2.2 [5]	1.3 [1]	1.1 [1]	1.7 [3]	2.1 [8]
Overall mean:	2.2	1.7	1.5	1.9	1.7

Likert Scale Results

The first clear finding from the Likert scale questions (Table 2; Figure 1) is that there is general agreement with essentially all of the statements in the questionnaire. None of the questions in any of the groups had a mean score less than 3 and responses of 4 and 5 (disagree/strongly disagree) were rare overall. It seems that in most respects both staff and students viewed fieldwork in a positive light, at least in relation to the aspects probed here. The second clear finding was that amongst the student groups there was a general increase in positivity of response from year 1 to 3, with the largest jump between the year 1 and 2 groups.

Data analysis

Degree choice: There were significant differences amongst the three student groups for scores on the question of the importance of fieldwork in degree choice (Kruskal-Wallis $H=11.03$, $P=0.002$) with significant pairwise differences between the first year group and both the second (Mann-Whitney pairwise $U=1074$, Bonferroni corrected $P=0.01$) and third year groups (Mann-Whitney pairwise $U=407$, Bonferroni corrected $P=0.008$). The first year group generally considered that fieldwork availability was less important to their choice of degree than second and third year students. Staff results were significantly different from those of students overall (Mann-Whitney $U=792$, $P<0.001$) with median scores more positive and the vast majority of staff giving a score of 'strongly agree'.

Institution choice: There was a significant difference between year groups for the question on whether fieldwork availability was an important factor in choice of institution (Kruskal-Wallis $H=22.54$, $P<0.001$). Scores were most positive that fieldwork was an important factor in the third year group and least positive in the first year group, and

all were significantly different from each other (Bonferroni corrected $P<0.01$). There was a strong and significant difference between staff and student scores (Mann-Whitney $U=1099$, $P=0.005$) with staff believing more strongly that fieldwork availability was a factor in student choice of institution.

Subject identity: The three year groups gave different scores to the question on whether fieldwork was an important part of being an environmental scientist or environmental geographer (Kruskal-Wallis $H=9.06$, $P=0.003$), although all were generally positive overall. In pairwise comparisons, third years were marginally more positive about the importance of fieldwork to subject identity than first years (Mann-Whitney pairwise $U=414$, Bonferroni corrected $P=0.007$). There was a very marginally significant difference between student and staff scores (Mann-Whitney $U=1238$, $P=0.047$) with staff scores slightly more positive overall.

Learning efficiency: There was a significant difference in scores amongst year groups to the question on whether students learn more in the field than in an equivalent amount of teaching on campus (Kruskal-Wallis $H=15.43$, $P<0.001$). Mann-Whitney pairwise comparisons showed that differences were significant between the third years, who were most positive, and both the second (pairwise $U=366$, Bonferroni corrected $P=0.04$) and first years (pairwise $U=333$, Bonferroni corrected $P<0.001$) who were least positive. There was no significant difference between staff and student scores (Mann-Whitney $U=1337$, $P=0.09$, ns).

Group bonding: There was no significant difference between student group results for the question on group bonding (Kruskal-Wallis $H=0.2$, $P=0.8$). However it is notable that first years were generally the most positive,

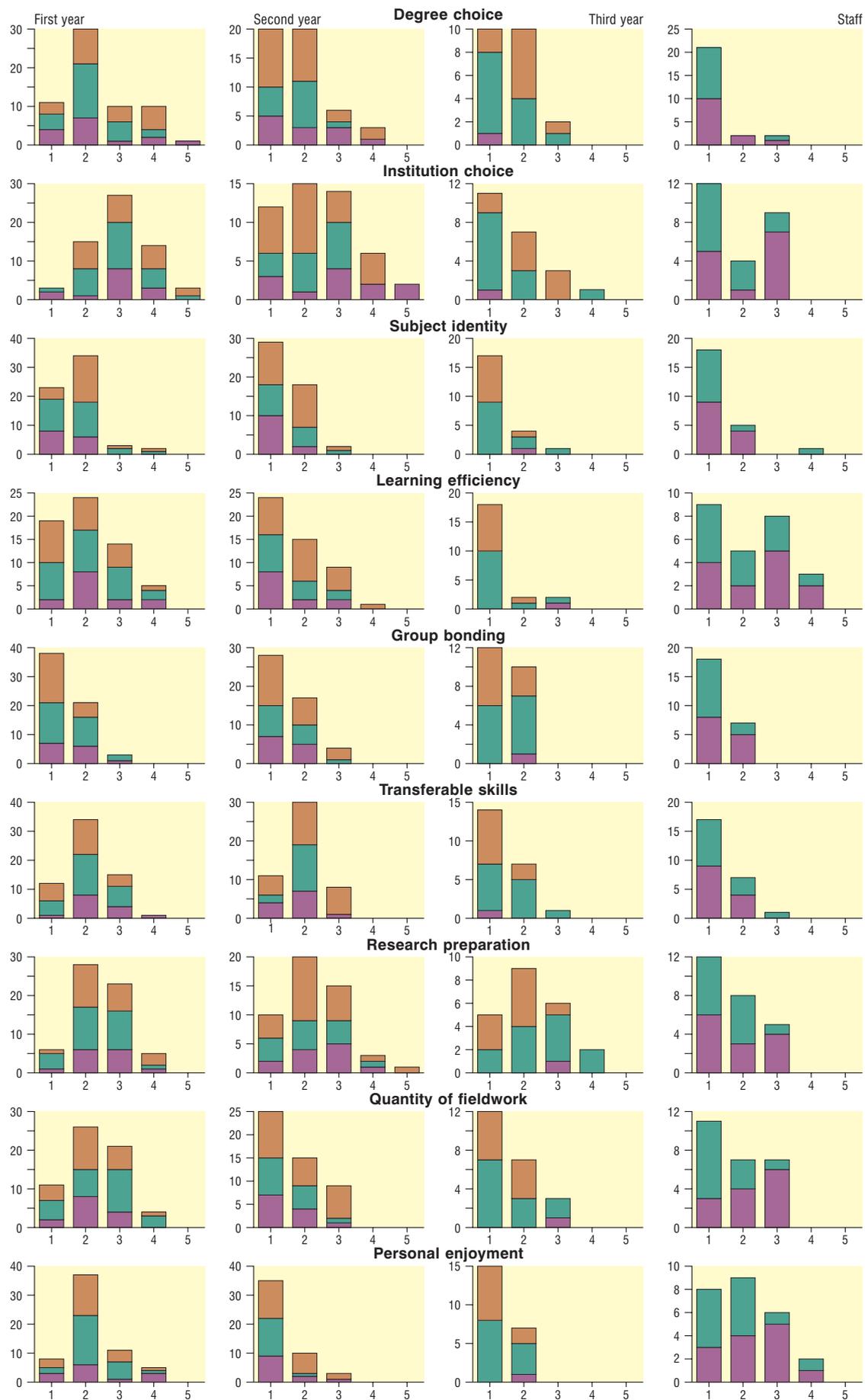


Figure 1: Full results of questionnaire surveys for years 1 (left) to 3 and staff (right). See table 1 for full question details. Purple bar segments are Environmental Science staff or students, green segments are Environmental Geography staff or students and brown segments represent students who did not specify their degree.

in contrast to all other questions. There was no significant difference between staff and student results (Mann-Whitney $U=1416$, $P=0.17$, ns). All were generally positive.

Transferable skills: There were significant differences between the student groups for the question on transferable skills (Kruskal-Wallis $H=12.94$, $P<0.001$). Pairwise comparisons showed significant differences between the first and third years (Mann-Whitney pairwise $U=340$, Bonferroni corrected $P<0.001$) and second and third years (Mann-Whitney pairwise $U=304$, Bonferroni corrected $P=0.003$). First years agreed least and third years agreed most that fieldwork was useful to gain transferable skills. There was a highly significant difference between overall staff and student scores with staff generally agreeing more strongly with the statement (Mann-Whitney $U=942$, $P<0.001$).

Research preparation: There were no significant differences between the three student groups for scores on the role of fieldwork in research preparation (Kruskal-Wallis $H=1.4$, $P=0.44$, ns). There was a significant difference between students and staff (Mann-Whitney $U=942$, $P<0.001$) with staff tending to be more positive in agreeing that fieldwork is important to research preparation (Mann-Whitney $U=1022$, $P=0.001$).

Quantity of fieldwork: There was a significant difference amongst student groups in relation to the question on whether the student would like to see more fieldwork in the curriculum (Kruskal-Wallis $H=16.59$, $P<0.001$). Pairwise comparisons showed significant differences between the first and both the second (Mann-Whitney pairwise $U=925$, Bonferroni corrected $P<0.001$) and third years (Mann-Whitney pairwise $U=376$, Bonferroni corrected $P=0.003$). The first years were less likely to strongly agree that they would like to see more fieldwork and were the only group where anybody disagreed with the statement. There was no significant difference between staff and student median scores (Mann-Whitney $U=1555$, $P=0.6$, ns).

Personal enjoyment: There was a highly significant difference amongst student groups in terms of scores for enjoyment of their trips (Kruskal-Wallis $H=40.09$, $P<0.001$). In pairwise comparisons this difference is primarily due to lower scores from the first year group who predominantly gave a score of 'agree' while the second (Mann-Whitney pairwise $U=506$, Bonferroni corrected $P<0.001$) and third year (Mann-Whitney pairwise $U=245$, Bonferroni corrected $P<0.001$) groups most frequently gave a score of 'strongly agree'. There was no significant difference between staff and student scores (Mann-Whitney $U=960$, $P=0.99$, ns).

Free form responses

Responses to the free-form question were given by roughly half the participants. The vast majority of the comments were positive. Across all students and staff only a single first year student gave a response which was classified as broadly negative about the effectiveness of fieldwork: 'I do not think it is crucial as a lot of information and techniques I have learnt I could have done so on campus/lectures. You aren't given a choice about what you learn so you can't make it specific to your interests'. Most student comments were uncritically positive although, for instance one first year student noted '... Although a balance is important as you can learn theory in some ways more efficiently in lectures (more detailed notes tend to be taken)'. Staff comments were also overwhelmingly positive but generally more detailed and nuanced. One staff member commented 'Yes. Students can learn almost as much without fieldwork, but the inspiration for wanting to learn about the broad subject is encouraged massively by going into the field. They are therefore more engaged with all forms of University learning as a result.'

Table 3: Answers to free-form question classified in terms of frequent response types.

Response type	1 st yr	2 nd yr	3 rd yr	Staff
Broadly positive	34	24	16	17
Broadly negative	1	0	0	0
Put skills into practise	9	7	1	9
See landforms and environmental features for real.	12	12	8	9
Learn new field-based skills	10	2	2	3
Total responses received	35	24	16	17

The most frequent responses were on the theme of seeing real-world environments and landforms (Table 3). For instance a third year student wrote that 'Yes, I feel I can actually form an opinion on glaciers now I have seen some'. The second most frequent response type was about putting skills into practise, for instance 'Yes because it means that you are able to put the theory into practise and better understand it'. A related response was about learning new specifically field-based skills, for instance 'Yes, certain skills can't be learnt in the classroom and much of an environmental career would be in the field'. Many of these themes were combined within individual responses. For instance, one first year student commented 'Yes, because it is important to see examples or evidence of landscapes and/or processes that you've learnt about in lectures. Seeing and doing things first hand can be easier to understand and remember than if you are taught about it, which

can help in exams etc. You also learn different skills like teamwork which will be useful in the future'.

Other responses not included in the classification system included comments on career development such as 'Yes, gives you an insight into careers/what the job entails'. Some students commented that the hands-on approach suited their personal learning style or that they felt the practicalities of the field learning style better suited them. For instance 'Yes. It's hands on. Easier to ask questions when actually doing tasks. Can actually see first-hand what we're learning about'.

DISCUSSION

The positive attitude to fieldwork amongst staff and students is old news to environmental scientists and geographers and to anyone who has read the literature in this field (Boyle *et al.* 2007; Fuller *et al.* 2003; Kent *et al.* 1997). However we should not overlook how remarkably positive these results are overall. Were field teaching a new idea it would surely be acclaimed as a major educational innovation! It is clear that perceptions of the value of fieldwork are deep-rooted with some of the most positive staff and student responses recorded for the question of whether fieldwork is 'an important part of being an Environmental Geographer or Environmental Scientist'. From these results it seems apparent that students agree with the general perception of staff that a degree in these subjects without fieldwork is almost unthinkable, a view which appears to be widespread internationally (Fuller *et al.* 2006). Scott *et al.* (2006)'s assertion that 'fieldwork ... is not central to geography and environmental science education' does not appear to be supported by the majority of respondents here.

Differences among student year groups

A clear finding of the study is the general trend towards more positive scores across questions from first to third year. Understanding the underlying reasons for this is difficult due to the lack of replication between modules, cohorts and institutions. Stokes *et al.* (2011) found relatively little difference between three undergraduate year groups while Dunphy and Spellman (2009) found generally more positive perceptions of fieldwork in third years than second years. It is plausible to imagine that as students progress through their degree they experience more variety of fieldwork in a greater variety of contexts and therefore better appreciate the advantages of field teaching. However there a number of factors which urge caution in interpretation. The trend towards increasingly positive scores is present (although not necessarily large or significant) across all questions with

the exception of that of group bonding where, perhaps unsurprisingly, the first year students gave the most positive responses. This trend holds true even for questions where we might expect greater similarity between year groups such as questions on recruitment. This suggests that there may be important secondary influences and possibly carry-over effects between questions on different topics (Tourangeau *et al.* 1989). Particularly important may be environmental conditions in the lead up to the students completing the questionnaires. The largest difference in positivity is between the first and the other two years. At the time of completing the questionnaire the first year group had just spent much of a day outside in cool temperature and light rain whereas conditions were more clement for the second and third year groups; such factors are known to be capable of leading to biases in survey results (Williams *et al.* 1997). Another significant factor may be the exoticness of the destination. The second and third year groups were exposed to environments much more different from their normal environment than the first year group and this may be reflected in their evaluations. Finally, the most positive scores overall were from the third year group. This module is optional and therefore participants are a self-selected sample of students who chose to study a field-based module. The positive trend may be real but it is impossible to exclude other factors.

Training and skills

Both staff and students agreed that fieldwork had a role to play in both learning transferable skills and preparing students for their final year dissertation. However responses were more positive for transferable skills than for research project preparation and for both of these questions staff responses were highly significantly more positive than student responses. This disparity strongly contrasts with the findings of Scott *et al.* (2006) who found that when fieldwork was removed students expressed more concern than staff about the lost opportunity to learn transferable skills. For both these questions student responses become generally more positive from first to third year level, although not all pairwise comparisons were significant. Clearly these are questions where the content of the field course is particularly important and this may also explain difference in responses across years.

Recruitment

Students and staff members generally considered that availability of fieldwork was a factor in student choice of

degree and institution. However there were interesting differences. Student responses on this question were generally the least positive of any while staff were both significantly more positive in absolute terms and gave more positive scores to these questions compared to others. There could be several reasons for this. It could be that staff have a broader overview of the recruitment process whereas students only have their own experience to draw on. It could be that students believe that saying fieldwork was important of their decision appears 'shallow' and are unwilling to acknowledge this. It could be that staff over-estimate the significance of fieldwork in student decision making. It could be that the institution surveyed is unrepresentative as the fieldwork on offer is less exotic than some competitor institutions. It would clearly be interesting to ask the same question of students currently going through the application process. The national trend for increasingly exotic fieldwork destinations seems to be at least partly driven by a perception that fieldwork is an important factor in student degree choice and considerable resources are invested on this basis (McGuinness and Simm, 2005). It is therefore very interesting that staff perceptions of the importance of this factor do not match those of 'the market', i.e. students themselves.

Enjoyment or education?

For both the second and third year groups the most positive responses were recorded for the question of personal enjoyment. On the face of it, it is perhaps not surprising that students enjoy fieldwork. Even students on courses with no need to leave a lab/computer room/library would most likely enjoy teaching which involves travel to exotic locations. Is there any reason to believe that students are positive about fieldwork for its own sake rather than just because it involves travel and a change of environment? Students generally agreed that they learned more in the field than in an equivalent amount of teaching on campus and answers to this question were amongst the more positive of all the questions. The free form responses demonstrated that students and staff were overwhelmingly positive about the value of field based teaching. Many students were able to clearly articulate why they found fieldwork valuable in terms of teaching and learning and, interestingly, the arguments they made closely mirrored those of staff members. Arguments based on 'putting theory into practise', 'development of field skills' and 'experiencing the subject for real', closely reflect those recorded in other surveys (Fuller *et al.* 2003). The results provide little support for the finding

of Stokes *et al.* (2011) that staff value a conception based on 'understanding and making sense of the world' more than students. Several students explicitly or implicitly linked the perceived benefit of fieldwork to their own learning style which contrasts with the results of Dunphy and Spellman (2009) who in a large survey could find no link between the value placed on fieldwork and learning styles (based on Kolb's LSI (Healey and Jenkins, 2000; Kolb and Kolb, 2012)). Students clearly do enjoy the travel and the social aspect of fieldwork but there is little reason to doubt that most also believe it is an effective teaching approach which should be part of their education. It appears that the positive affective domain responses recorded by Boyle *et al.* (2007) are also present in these groups. Most students also agreed that they would like to see more fieldwork in their degree. Fieldwork is costly in terms of direct cost and staff time. It would be interesting for future research to probe student views of the trade-offs which must be made in curriculum design: would students still like to see more fieldwork if it meant fewer computer practicals or lectures? If it meant fewer resources in the library or laboratories? Would these decisions be the same as those made by staff members?

Group bonding

The results here confirm the widespread perception that fieldwork is a valuable tool for group bonding. This was particularly true of first year students as these students are likely to know each other less well and supports the widespread inclusion of field-courses in the early stages of degree programmes. Scott *et al.* (2006) and Fuller *et al.* (2003) found that staff and students ranked the social experience of fieldwork below that of its pedagogical value. It is interesting to note therefore that both staff and students in this study consistently gave more positive scores for the question on group bonding compared to that of learning efficiency. However the importance of this bonding function should not be underestimated as there is strong evidence that students who bond better with their peers perform better and are less likely to drop-out (Starke *et al.* 2001).

CONCLUSIONS

The most interesting results of this study relate to the difference in perceptions between student year groups, and particularly between staff and students. The results of the study suggest that difference in perceptions of the role played by fieldwork between staff and students may lead to poor choices. For instance, if fieldwork really is less important to recruitment than staff believe then resources

invested in exotic fieldtrips may not deliver the expected benefits. Differences in views of the role of fieldwork in technical and transferable skills training may suggest either that teaching is not filling student needs or that students aren't adequately aware of the skills which employers seek and the rest of their degree may demand. In either case these are issues which deserve consideration.

Overall these results provide support for the central role of fieldwork in Geography and Environmental Science Higher Education with both staff and student views overwhelmingly positive. An interesting example of the value placed on fieldwork is raised by the case of Foot and Mouth disease in the UK in 2001 which effectively halted fieldwork in many degree programmes (Fuller *et al.* 2003; Scott *et al.* 2006). In focus group discussion students

consistently reported negative perceptions of fieldwork withdrawal with consequences for their general learning experience (Fuller *et al.* 2003). Parallel concerns were reported by student's lecturers with concerns about student's abilities to contextualise information taught in the classroom and lack of generic and technical skills (Scott *et al.* 2006). Fieldwork in higher education is under pressure due to constraints including larger class sizes, the need to accommodate a diverse student body, and pressures on staff time and finance (Haigh and Gold, 1993; Kent *et al.* 1997). In particular, student expectation that tuition fees should include all costs, including fieldcourses, is currently placing finance for fieldwork under considerable additional pressure. Fieldwork needs to be adequately justified and value maximised if it is to retain a central role in the curriculum.

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