

1 **Expectation, motivation, engagement and ownership: Using student reflections in the conative**
2 **and affective domains to enhance residential field courses.**

3

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11

12 **Abstract**

13 Residential field courses are important and should be designed and delivered to maximise their
14 value to students, staff and institutions. In this context we use a novel approach involving analysis of
15 the daily affective and conative reflections of students immersed in the field course experience to
16 better understand student engagement with fieldwork. We show that students base their field
17 course choice on a range of factors (costs and benefits) and that these choices subsequently
18 influence student expectations and motivation to engage with fieldwork. We also show that the
19 motivation of students to engage with fieldwork based learning varies from person to person and
20 from day to day. Our findings suggest that having a more nuanced understanding of the decisions
21 students make when deciding which field course to enrol upon would enhance our ability to design
22 attractive, accessible and useful field courses; that having an awareness of the expectations of
23 students around field courses would enable us to better prepare them to undertake them; and, that
24 students are more motivated when they are afforded an opportunity to work independently and
25 perceive themselves to have ownership of their learning.

26

27 **Key words**

28 Field course; fieldwork; motivation; engagement; reflection

29

30 **Introduction**

31 Residential field courses are essential components of undergraduate degree programmes in the
32 Environmental Sciences (Biology, Ecology, Geography, Geology etc.) (e.g. Brannstrom & Houser,
33 2015; Maskall & Stokes, 2008; Scott et al., 2012). Field courses facilitate deeper and transformative
34 learning (Boyle et al., 2007), enabling students to connect theory and practice (Gibson, 2007; Welsh
35 & France, 2012); to develop discipline specific skills and knowledge (Scott et al., 2012); and to
36 develop transferable skills (e.g. communication, team working and criticality) (Arrowsmith, Bagoly-
37 Simó, Finchum, Oda & Pawson, 2011). The immersive nature of residential field courses can also
38 serve to focus the attention of students on their learning in a way that increases their motivation
39 (Ballantyne, Anderson & Packer, 2010). Graduates in the Environmental Sciences often refer to a
40 residential field course as being one of, if not the, highlight of their undergraduate degree (*pers obs*).
41 They may also enable students to demonstrate that they have the experiences, skills and
42 professional competencies valued by employers (Arrowsmith et al., 2011; Welsh & France, 2012).
43 University managers recognise their value in enhancing institutional reputation (Munge, Thomas &
44 Heck, 2018); in attracting students to enrol on their courses (Maw, Mauchline & Park, 2011; Stokes
45 & Boyle, 2009); and in enhancing student retention (Bester, Muller, Munge, Morse & Meyers, 2017;
46 Millenbah & Millspaugh, 2003). These benefits of field courses have been usefully discussed and
47 summarised by Munge, Thomas and Heck (2018) among others.

48

49 However, in spite of their academic, social and reputational benefits field courses are not valued to
50 the same extent by all stakeholders. Wilson, Leydon and Wincentak (2016) have suggested that in
51 Canada there is a perception that fewer students with a genuine motivation to undertake fieldwork
52 enrol upon geography programmes than has previously been the case. The motivation/willingness of
53 students to participate in fieldwork varies and even within the environmental disciplines that count
54 fieldwork as a signature pedagogy not all students want to do fieldwork and not all who participate
55 value/enjoy it to the same extent (Boyle et al., 2007; Goulder, Scott & Scott, 2013). Cost, conflicting
56 time pressures, issues around inclusivity and employment schedules have all been raised as
57 potential barriers to student participation in field courses (Hall, Healy & Harrison 2002; Hughes 2016;
58 Smith, 2004). As class sizes have increased and curricula have become more crowded field courses
59 have become more expensive, more difficult to organise, and more difficult to staff (Higgitt, 1996;
60 Mauchline, Peacock & Park, 2013; Mullens, Bristow & Cuper, 2012; Wilson et al., 2017). These
61 pressures have resulted in a decline in fieldwork provision in some areas and at times field courses
62 have been described as being under threat (Smith 2004). Declining field course provision has been
63 documented in Australia (Burke da Silva, 2014), in North America (Mullens et al., 2012) and in the
64 United Kingdom (Maw, Peacock & Park, 2011; Smith 2004). In Canada Wilson et al. (2017) suggest

65 that levels of fieldwork provision are not currently adequate (fewer than half of the departments
66 they considered required students to undertake fieldwork). Recently however Mauchline et al.
67 (2013) have suggested that the situation in the biosciences in the UK has improved, reporting a
68 perception that as a minimum the decline in the amount of fieldwork undertaken had been halted
69 and in some cases that it had been reversed.

70

71 Drawing all of the above together it is clear that field courses are important, but it is also clear that if
72 they are to persist in the curriculum they should be designed and delivered to maximise their value
73 to students, staff and institutions. We believe that our study makes a positive contribution in this
74 context. Our over-arching aim was to evaluate student engagement with three field courses with
75 broadly similar learning outcomes but which represent very different levels of investment and
76 opportunity on the part of students. We note that published field course evaluations tend to adopt a
77 pre/post trip questionnaire/interview approach to evaluate the importance of fieldwork as practice
78 in the acquisition of disciplinary knowledge and in the development of technical and personal skills
79 and competencies. This approach is valuable if the aim is to measure the knowledge/skills gained by
80 students but it has the limitation that it inevitably places some distance between the occurrence of
81 the experiences of students and their reflections upon them, and it may therefore result in the field
82 course being conceptualised by both staff and students as an extended homogenous learning event.
83 However, field courses are in fact composites of a range of sometimes quite diverse learning events
84 presented in a concentrated block. It is our experience, and that of others (e.g. Dunphy & Spellman,
85 2009; Ishii, Gilbride & Stensrud, 2009; Simm & Marvell, 2015) that individual students respond to,
86 and engage with individual events across the field course differently. Residential field courses
87 expose students to new and unfamiliar locations and cultural environments which may be both
88 physically and personally challenging (della Dora, 2011; Nieto, 2006), and field courses may
89 therefore represent an example of a disruptive learning space (Savin-Baden, 2008) where students
90 attempt to develop an understanding of the congruence (or lack off) between their prior
91 expectations and current experiences. Through our personal practice as educators providing
92 students with opportunities to undertake residential field courses in the biological and
93 environmental sciences we most frequently consider the physical and intellectual challenges
94 experienced by our students, and as a consequence we scaffold our teaching around the cognitive
95 (e.g. acquiring new knowledge) and psychomotor (becoming competent in new practical field skills)
96 domains, both of which are relatively well researched in the pedagogic literature (Simm & Marvell,
97 2015). A number of authors have suggested that in order to fully understand and evaluate the
98 student field course experience it is important to also consider both the affective domain (concerned

99 with personal values and emotional responses) (Blair & Deacon, 2015; Golubchikov, 2015; Simm &
100 Marvell, 2009) and the conative domain (concerned with personal motivations) (Blair & Deacon,
101 2015), both of which are relatively under researched.

102

103 In this study we have focused particularly upon the *motivations, expectations* and *experiences* of
104 students *during* the field course through an analysis of their affective and conative responses to
105 learning experiences. In doing so we have taken a somewhat novel approach and rather than
106 comparing pre- and post-trip experiences and opinions of students we focus upon student
107 expectations of fieldwork and student engagement with fieldwork on a day-to-day basis throughout
108 the course. Our objectives were to: 1) understand how student choice of a particular field course is
109 related to engagement within a field course; 2) establish student expectations at the outset of the
110 field course, and their perceptions of the level to which they are met during it; and 3) understand
111 the day-to-day motivation of students to undertake fieldwork within the field course context. As a
112 result of this evaluation our secondary aim was to be in a position to make recommendations for
113 optimal field course design.

114

115 **Methods and Results**

116 *The students and field courses involved*

117 35 students from two UK universities attended the three field courses that are the focus of our
118 study. 11 students (6 male and 5 female, average age 22) completed a 5 day course at the Field
119 Studies Council Field Centre on the Isle of Cumbrae (Scotland); 13 students (8 male, 5 female,
120 average age 21) completed a 7 day course on the North of the island of Mallorca residing in Port
121 d'Alcúdia (Spain); and, 11 students (3 male, 8 female, average age 22) completed an 8 day course
122 within the Atlantic Rainforest of Vale Reserve (Brazil). The students were all about to enter the final
123 year of a range of undergraduate programmes in the Geographical/Environmental Sciences (4
124 students) Marine Sciences (8 students) and Biological Sciences (23 students) at two mainstream
125 English universities. Only the Scotland field course involved students and staff from two universities
126 and participants in the Brazil and Mallorca field courses were all from the same university. In
127 Scotland and Brazil staff and students were accommodated at field stations, in Mallorca they stayed
128 in a tourist hotel. University staff taught all components of the Scotland and Mallorca courses but
129 while University staff were present during all sessions of the Brazil course local experts delivered
130 some of the teaching. All courses were subsidised by the student's own university, but as is

131 increasingly the case students were asked to make a financial contribution to the more expensive
132 courses (Scotland students made their own way to the field course but did not make a direct
133 financial contribution, Mallorca students made a £300 contribution, and students on the Brazil field
134 course made a £1300 contribution).

135

136 Each field course involved a combination of guided and independent learning. During guided
137 learning sessions the students were introduced to fieldwork locations and (re)-introduced to field
138 techniques and data collection protocols by the University staff through a series of tutor designed
139 group-based learning activities. They were encouraged towards active learning through purposeful
140 questioning and in-situ problem solving. During the small group based independent learning sessions
141 the students were required to formulate, design and implement small-scale hypothesis-testing
142 projects incorporating the locations/techniques introduced to them during the guided sessions. In
143 Scotland and Mallorca the guided learning preceded the independent learning, in Brazil it was
144 necessary to intersperse the two (see figure 1) and the students had a more limited range of options
145 for independent project design because their projects needed to sit within the framework of
146 fieldwork offered by the field station. However, in spite of this constraint the students were able to
147 make key decisions about hypotheses to be tested and data collection/analysis protocols and so the
148 University staff did consider the Brazil projects to be independent student work.

149

150 *Data collection*

151 Data were collected directly from individual students who were invited to write their responses to
152 prompt questions in a pre-printed booklet. To understand why students chose a particular
153 destination and to establish student expectations at the outset of the field course we asked *Why did*
154 *you choose this particular field course?* and *What three words sum up your thoughts about your*
155 *upcoming field course?* during a briefing meeting at the beginning of the field course. To establish
156 student perceptions at the conclusion of the field course we asked *What three words sum up this*
157 *field course?* during the end of trip de-briefing meeting. To understand the day-to-day motivation of
158 students to undertake fieldwork within the field course context we have adapted elements of the
159 balanced reflective practice advocated by Blair and Deacon (2015) who have suggested that *in action*
160 reflection (immediately before, during and after fieldwork) focusing separately upon each of the four
161 dimensions of learning (the cognitive, psychomotor, affective and conative domains) recognised by
162 Bloom and colleagues (e.g. Bloom, Englehart, Furst, Hill & Krathwohl, 1956; Krathwohl, Bloom &

163 Masia, 1964) results in balanced reflective practice that can lead to a more holistic approach to
164 fieldwork among practitioners. During a briefing session at the outset of each field course students
165 were given a short introduction to the research project and the process of data collection and took
166 part in a discussion about Blooms learning domains and the terminology around them as
167 preparation for the task. Specifically, because we were interested in the motivation of students to
168 engage with fieldwork we developed two questions from the work of Blair & Deacon (2015) to
169 prompt our students to consider the learning/fieldwork that they are about to embark upon. The
170 first question was related to their feelings and emotional responses towards the site of the fieldwork
171 they were about to undertake (a question in the affective domain), and the second focused
172 specifically upon their immediate motivation to undertake the fieldwork activity (a question in the
173 conative domain). Prior to each fieldwork activity students were asked to take a few moments to
174 reflect upon the work that they were about to undertake and respond to the following questions in
175 the form of a short written statement:

176 *How do you feel about this site emotionally and aesthetically? Why?*

177 *How motivated do you feel at this site? Why?*

178

179 Throughout our analyses we have taken the decision to focus on the individual reflection rather than
180 the individual student as the unit of interest. We acknowledge the potential for pseudo-replication
181 that arises as a result (one student may contribute up to six reflections) but feel that the unique
182 nature of each field-based activity overcomes this to a sufficient degree. For statistical purposes, we
183 present results at the reflection and the student levels, using non-parametric analyses that are less
184 prone to the degrees of freedom errors associated with pseudoreplication. Student responses to
185 these questions and their own reflections have then been used to develop emergent themes as part
186 of a 'Grounded Theory' approach (Atkins & Wallace, 2012; Glaser & Strauss, 1999) to develop a
187 possible explanation of emerging patterns of motivation and engagement. Through this approach
188 data analysis proceeds first without an initial hypothesis (unlike the traditional positivist approach)
189 and instead through exploration of the data a theory, theoretical framework or hypothesis are
190 constructed.

191

192 *Why this field course?*

193 All 35 students responded to the question *Why did you choose this particular field course?* (11
194 Scotland; 13 Mallorca; 11 Brazil). From their responses we identified six key themes that are
195 summarised in Table 1.

196 Given that the majority of the students taking part in these field courses were enrolled on a
197 biological/environmental degree programme it is perhaps not surprising that students often cited an
198 interest in the fauna/flora/habitats of a location as a reason for choosing the trip. Scotland students
199 often linked this to career aspiration (UK based conservation for example), whereas Mallorca, and
200 particularly Brazil students tended to emphasise the novelty of the species/habitats involved and the
201 unique opportunity with which they were afforded (two of these students explained that they had
202 already been to Scotland and Mallorca). Novelty was not a theme raised by Scotland students who
203 were more likely to refer to past experience and familiarity with the setting and habitats/species
204 around which the field trip was designed.

205 All of the students who made reference to employability or to CV enhancement stated that the trip
206 they had opted to take part in would benefit them. Although no student provided clearly articulated
207 details about their career of choice or about the tangible benefits involved, the Scotland students
208 were perhaps the most direct:

209 *'This trip was a great chance for me to further study UK wildlife, preparing me for a job in the*
210 *UK'* Scotland student.

211 *'It [the Scotland trip] relates much better with the career path (wildlife conservation) that I*
212 *want to pursue and will hopefully help to further my understanding of biology'* Scotland
213 student.

214 The Mallorca and Brazil students were less clear, simply stating that the experience would '*look*
215 *good*' on a CV, or that they were '*aiming for a career in this area*' without actually defining the area.
216 It is not clear how these students perceive the link between their experience and future
217 employment and we believe that it is therefore likely that any link is a weak one.

218 *'I chose this trip [Brazil] as I may never experience this type of environment again and it will*
219 *look very good on my CV.'* Brazil student.

220 Students choosing the Scotland field trip made positive comments about the location being close to
221 home (short distance to travel) and about Scotland being somewhere that they had an existing
222 affinity for. Although one student made what we interpret as a partly negative comment stating:

223 *'This was my second choice after Brazil, I felt the Brazil trip was a unique opportunity*
224 *however this [Scotland] trip was a great choice to further study UK wildlife'* Scotland student.

225 Similarly both of the students who made a negative comment with respect to their participation in
226 the Mallorca field trip stated that Brazil would have been their preferred destination in absence of
227 personal barriers (see below).

228 Monetary cost was referred to as a barrier to participation in the Mallorca and Brazil field courses by
229 four of the Scotland students. The remaining student expressed the same constraint in a more
230 positive fashion by stating that the Scotland field trip offered '*value for money*'. Similarly the
231 Mallorca students reported that the trip was priced within their budget envelope (a positive
232 response, but one perhaps suggesting that they may have felt that Brazil was too expensive). The
233 Brazil student who raised the issue of cost did so the context that although they could afford the trip
234 they had chosen it because it was less expensive than an alternative opportunity (one that is not
235 considered in the current study).

236 Climate was also raised as a factor in field course by four students; three Scotland students all stated
237 that they had chosen to avoid Mallorca/Brazil because they were too hot, and one Mallorca students
238 stated that a warm sunny climate was important to them. Two additional themes were each raised
239 by a single student: One student chose Scotland because they believed that it would be safer than an
240 overseas trip; and one student chose Mallorca because the trip dates fitted around their
241 employment constraints.

242 *The views of students at the onset and conclusion of the field trips.*

243 The responses of students to the 'three-word questions' were collated as word-clouds and are
244 presented in figure 2. From the pre-trip word clouds (figure 2a, 2c, 2e) it is evident that all students
245 were excited at the prospect of the field course that they were about to complete. Scotland students
246 expected their trip to be challenging and subsequently reported it as having been challenging. From
247 these data however it is not clear if the perceived challenge was an intellectual, social or physical
248 one. Those students about to complete an overseas field course reported anxiety (80% of Brazil
249 students and 40% of Mallorca students). None of the Scotland students used this word, but it is
250 possible that the word challenging was used in this context. Post trip perceptions of the three field
251 courses varied (figure 2b, 2d, 2f); Scotland and Mallorca students reported their trips were
252 fun/enjoyable and to some level exhausting and educational. However, Brazil students appear at
253 that stage to have had a less positive view; 30% reported the trip as being exhausting; 30% as
254 stressful; and, 20% as unorganised.

255 *Potential consequences of choice*

256 From the results presented thus far it is clear that the three field courses represent very different
257 levels of monetary and social investment on the part of students. It also appears that not all
258 students are able to participate in the course that would be their first choice in an ideal world. We
259 believe that their expectations of the field course need to be considered in this context. We believe
260 that high expectations probably put pressure on students, staff and destinations to 'deliver'; low
261 expectations may induce limited levels of student motivation/engagement.

262

263 **Student engagement with learning during the field courses.**

264 Upon arrival at the fieldwork location each day students were asked to take a few minutes to
265 complete an in-situ reflection and to write their responses to questions designed to guide their
266 reflection towards the affective and conative learning domains.

267

268 *Reflections in the affective and conative domains.*

269 Our thematic analysis revealed to us that student reflections revealed either a positive or negative
270 affective response towards the impending fieldwork. Conative reflections revealed that the students
271 were, or were not motivated to engage with fieldwork. Each Scotland student had an opportunity to
272 complete five pre-activity reflections, Mallorca and Brazil students could chose to complete six (not
273 all students completed every reflection and our analysis is based upon 51 Scotland reflections, 69
274 Mallorca reflections and 44 Brazil reflections in the affective domain, and 52, 69 and 50 reflections in
275 the conative domain). The data are further categorised in relation to the learning activity type
276 undertaken (guided or independent). The outcome of this categorisation of the data is presented in
277 table 2, which presents the numbers of reflections by students allocated to each of the categories
278 and indicates the numbers of individual students making reflections in each category. In table 2 we
279 also present the results of statistical analyses (exact binomial tests) to compare the ratios of positive
280 to negative, and motivated to not motivated reflections in each category to a 1:1 hypothetical
281 expectation. Students were more likely to make a positive affective statement than a negative one
282 and more likely to state that they were motivated than not motivated in all cases, but the difference
283 was not statistically significant in four situations (affective statements Mallorca independent
284 learning and Brazil guided learning; conative statements Brazil guided learning and independent
285 learning).

286

287 *Affective reflections*

288 During the guided learning phase of the trips Scotland and Mallorca students expressed a sense of
289 satisfaction with, or connection (current or nostalgic) to, the place in which they found themselves:

290 *“Absolutely love this shoreline and feel completely at home with conditions such as these*
291 *[presumed reference to weather] on a Scottish Island”* Scotland student.

292 *“It feels like home in the summer and my holidays in Italy as a kid”* Mallorca student.

293 *“The site is beautiful and is teeming with bird life”* Mallorca student.

294 The small number of Scotland and Mallorca students expressing a negative view focused upon
295 personal discomfort/anxiety (working with strangers; working on new things; being bored) and/or
296 intrusions of society upon their sense of place (traffic; proximity to industry). The reflections of the
297 Brazil students reveal a slightly different picture. 55% of the time these students did write a positive
298 reflection and in common with their peers on other field courses they most often referred to their
299 setting (a sense of peace and an appreciation of natural beauty). 45% of the time Brazil students
300 wrote negative reflections which focused upon their anxieties around the potential dangers of the
301 site (scratches, stings and bites; insects and spiders) and upon the fact that the site did not meet
302 their expectations. These students wrote about being *“disconnected from the pristine forest”* (Brazil
303 student). During the independent learning phase the proportion of reflections that were positive
304 increased in all cases and significantly more Scotland and Brazil reflections were positive (Table 2). In
305 these reflections the students focused again on a sense of place, valuing the aesthetics and
306 tranquillity of the space and its’ disconnect from the built environment. Some of the Brazil students
307 particularly valued the fact that their expectations and experiences were more aligned:

308 *“Feels tropical and exotic. Very beautiful and relaxing. Looks unaffected by humans which*
309 *makes me happy”* Brazil student.

310 Negative reflections during the independent learning phase focused on personal problems (Scotland
311 and Mallorca), on the negative impact of society upon the site (Mallorca and Brazil), and some Brazil
312 students still felt that their expectation of a tropical forest had not been met:

313 *“Drier than I thought it would be. Fewer organisms.”* Brazil student.

314 *“I’d prefer it if it was more rainforest and less built up”* Brazil student.

315 *Conative reflections*

316 During the guided learning phase students made reference to a broad range of factors that they
317 linked to higher or lower levels of individual motivation to undertake fieldwork. Scotland and
318 Mallorca students who reported that they were motivated (positive conative reflections) explained
319 their motivation by connecting it to being interested in the species/habitats/topic to be studied
320 (Mallorca students often added that the species/habitats were novel to them) and prior to several of
321 the fieldwork sessions they linked their positive motivation to the fact that the weather was good for
322 fieldwork. Several of the Scotland students also explained that they were motivated because they
323 were prepared for the learning that was about to take place. The Brazil students connected their
324 positive motivation to the novelty of their surroundings and of the species and habitats that would
325 be encountered. Several students stated that they were motivated because they were excited.

326 However, not all students reported being positively motivated during the guided learning phase of
327 the courses. Scotland students made reference to poor weather (it was cold and it was raining) to
328 explain their low level of motivation prior to some sessions. Similarly, Mallorca students often
329 'blamed' the weather (in their case it was too hot); some made reference to being too tired to
330 complete the fieldwork or suggested that the task before them was too strenuous. One Mallorca
331 student stated that they were not motivated because they would like the opportunity to relax and
332 be a tourist. Brazil students linked low motivation to being too hot, feeling unwell/tired, feeling
333 apprehensive (about the possibility of bites and stings), and one student expressed the view that
334 there was not enough work to do (which we interpret as a suggestion that the learning session about
335 to be undertaken may have been perceived to be a 'Cooks Tour' lecture out doors rather than a
336 participatory exercise).

337

338 During the independent learning phase the students made reference to a narrower range of factors
339 that they linked to higher levels of motivation. A number (3) of the reflections recorded by Scotland
340 students who stated that they were motivated during the independent learning phase made
341 reference to good weather. Almost all of the Scotland student reflections made reference to being
342 motivated to collect data and the majority of them made reference to the fact that they were
343 working on their own project. Similarly the Mallorca and Brazil students referred directly to the fact
344 that they were working on their own project, or described their enthusiasm for the topic that they
345 had chosen to study (which we interpret as an expression of project 'ownership').

346

347 Fewer students expressed low motivation during the independent phase than during the guided
348 phase, but one Scotland student stated that they were not motivated because they still had data
349 collection to do (we believe that they were anxious that they would miss their deadline). Two
350 Mallorca students reported low motivation, one was too tired to work and the other wanted to relax
351 and join tourists swimming at the field site. Five Brazil students lacked motivation because they were
352 tired, because they were not working on their own project, and because they perceived the
353 fieldwork to be disorganised and repetitive. We believe that this is a response to the fact that in this
354 case the freedom for truly independent working was more limited than was the case in the other
355 field courses and as a result of this student feedback we have reconceptualised this field course
356 (figure 1).

357

358 **Discussion and implications for practice**

359

360 Although there is a view that over-reliance on feedback from students who themselves have little or
361 no pedagogic experience to inform curriculum design might be a case of ‘the tail wagging the dog’
362 (Shah, Cheng & Fitzgerald, 2017) we contend that an evaluation of student reflections on their in-
363 situ experience of fieldwork does provide educators with an invaluable insight into the ways in which
364 the courses they design are experienced by students who take them. Based upon our findings we
365 suggest that structured reflections built into field courses enable both tutors and students to
366 monitor and perhaps self-regulate in-course levels of engagement and motivation. Furthermore by
367 recording individual reflections on a day by day basis both educators and students are able to
368 recognise changes in individual attitude and attributes as a result of fieldwork. This is important
369 because the ability of students to recognise and reflect upon an initial sense of discomfort and
370 increasing sense of comfort with time and familiarity during a field course will for example help
371 them to develop a sense of their personal interaction with the field course location and perhaps in
372 turn develop a sense of place (Simm & Marvell, 2015). The development of a sense of affinity with
373 the ‘place’ in which the field course is situated may enable students to develop a sense of
374 ‘possession’ when coupled with control over elements the activities undertaken (in our case through
375 independent work) and thereby facilitate the development of a sense of ownership of learning
376 (Simm & Marvell, 2015). In our study students often linked ‘place’ and ‘possession’ in a positive
377 association as drivers of increased motivation and engagement.

378 Henri, Morrell and Scott (2018) have suggested that whilst it is undoubtedly important that students
379 are provided with opportunities to be independent or autonomous and to 'own' their learning it is
380 also important to enable students to recognise their autonomy. Boud, Keogh, & Walker (2013) have
381 suggested that the integration of self-reflective exercises within learning frameworks might be an
382 appropriate way to support students in the development of a personal recognition of their learner
383 autonomy, and Yang (1998) has observed that students who maintain a continuous reflective diary
384 demonstrate enhanced learner autonomy. However, Glass (2015) has also shown that students may
385 find reflexive practice difficult without prior training and that the value of student reflection as part
386 of a short-term field course may be limited if students are ill prepared or if the field course lacks
387 dedicated space for purposeful reflection to take place.

388

389 *Managing and meeting student expectations*

390

391 In common with a range of authors, we have shown that when deciding which field course to attend
392 students make a judgement that requires them to balance a range of actual and potential costs and
393 benefits. Key among the costs raised (often conceptualised in the literature as barriers to
394 participation) are financial cost (see also: Fleischner et al., 2017 and Maw et al., 2011), social costs
395 (time spent away from family, work, etc., and pressure to conform to the social culture of the
396 course) (see also: Cotton & Cotton, 2009; Durrant & Hartman, 2015; Hall, Healy & Harrison, 2002),
397 and anxieties around risk. Although the focus of this paper is residential field courses we
398 acknowledge that the financial and social costs of field courses, and to some degree anxiety
399 associated with novelty might be mediated if more use is made of the field sites that are available on
400 or close to campus (Peacock, Mewis & Rooney, 2018) or if the benefits of a residential course can be
401 realised through non-residential alternatives, such as the classroom-based field course advocated by
402 (Hovorka & Wolf, 2009). However, we believe that the well documented benefits of residential field
403 courses outlined in the introduction to this paper (and the references there-in) more than
404 adequately reinforce the view that it is important that these barriers to participation/engagement in
405 residential courses are overcome.

406

407 The positive drivers of residential field course choice raised by our students focused upon a desire to
408 visit a particular location because they had been before or because the field course offered an
409 opportunity to visit somewhere new (see also Arcodia, Cavlek & Abreu-Novais, 2014 who record

410 similar motivations on the part of tourism students undertaking field trips), and an expectation that
411 the course would have particular employability enhancement benefits. However, even
412 acknowledging the potential limitations of our data collection protocol (short, snap shot self-
413 reflections) the level to which expected benefits were explained was quite superficial and like others
414 we feel that the students may lack an ability to clearly articulate the linkages between the field
415 course experience and the development of their *curriculum vitae* (see also France et al., 2016; Scott
416 et al., 2012; Stokes & Boyle, 2009; and, Wakeham, 2016). These findings suggest two things to us.
417 Firstly, that having a more nuanced understanding of the decision making process that individual
418 students undertake when deciding which field course to enrol upon (or even whether to undertake a
419 field course at all) would make it easier for us to design field courses that are attractive, accessible
420 and useful. This should therefore be a priority area for future research in this field. Secondly, that
421 having an awareness of the expectations of our students (hopes and fears) around field courses
422 would enable us to better prepare them to undertake them.

423

424 The importance of preparation for fieldwork has been highlighted by Maskall and Stokes (2008),
425 particularly with an emphasis on introducing to students the learning that will take place and the
426 learning activities that they will undertake. However, our feeling is that while they may prepare
427 students for learning (e.g. Herrick, 2010; Hill & Woodland, 2002) pre-course lectures or briefings
428 delivered by teaching staff to students about to choose a field course can only prepare students to a
429 limited degree and to fully prepare students a different approach is needed. One strategy might be
430 to invite students to undertake preparatory virtual field trips perhaps incorporating 360° immersive
431 video of the places and activities involved. The potential of this approach to enhance learning has
432 been confirmed by a number of authors including Friess, Oliver, Quak & Lau (2016), McMorrow
433 (2005) and Stainfield, Fisher, Ford and Solem (2000). Carefully constructed, such virtual primers,
434 could also be used to enable students to recognise at an early stage differences in their
435 preconceptions of particular localities and the reality on the ground. As an example, our Brazil
436 students report that the forests in which they work do not meet their preconception of a tropical
437 forest (mediated by television documentaries with which they are familiar) and as a result their
438 expectations have not been met. Seeing video of students like them (perhaps a previous cohort)
439 undertake the activities of a field course might enable students to prepare themselves for the
440 activities to be undertaken. By focusing on the whole residential course experience
441 (accommodation, social experience, wider learning context, etc.) a virtual primer might help to
442 prepare students for the challenges presented when they face the challenge of differing cultural
443 norms (Hughes, 2016). Another strategy might be to develop a dialogue (in person or via social

444 media) between students who have undertaken fieldwork and those about to undertake it. Enabling
445 students to gain a realistic understanding of a field course from near-peers is likely assist in the
446 formation of more realistic preconceptions/expectations to a greater extent than through a dialogue
447 with tutors. Either way, reserving the more challenging fieldwork tasks (such as independent
448 projects) to after an initial acclimatisation period is likely to be beneficial in mitigating student
449 anxieties.

450

451 *Building motivation and engagement through autonomy*

452 Our data demonstrate that the self-reported motivation of our students to engage with fieldwork
453 based learning varies from person to person and from day to day. The subtleties of the underlying
454 causal agents and the diversity of responses of individual students (Ishii, Gilbride & Stensrud, 2009)
455 almost certainly preclude the development of a magic bullet to ensure the high levels of
456 motivation/engagement that we might desire. However, one clear message that does arise from our
457 analysis is that students report themselves as being more motivated when they are afforded an
458 opportunity to work independently in their project groups and perceive themselves to have a level
459 of individual ownership of their independent group based learning. A similar finding was reported by
460 Goulder and Scott (2009) in the context of pre-certificate stage (level 3) undergraduate one-day field
461 trips and described by Scott (2017) in the context of classroom based learning. In support of this
462 argument Porter, King, Goodkin and Chan (2012) have reported that although students undertaking
463 a short day field excursion believed that their experience was useful in the context of their learning,
464 they were dissatisfied that the experience did not offer them an opportunity to undertake
465 independent active experimentation and learn through direct personal experience. The wider
466 literature highlights ownership as an important aspect of motivation in education through the
467 related constructs of interest, value and intrinsic motivation (Komarraju & Nadler, 2013). Its wide-
468 spread importance suggests that the link between independence and engagement/motivation is a
469 general phenomenon that should be incorporated into all learning activities at an appropriate level.

470 Involvement in authentic learning experiences such as placement-based learning or independent
471 research are understood to assist students in the development of learning autonomy by enhancing
472 self-efficacy and self-regulation (Smyt et al., 2016; Tytler, 1992). Field courses provide an
473 opportunity for this to happen in the context of the environmental sciences, particularly if it is
474 designed to incorporate 'industry-standard' fieldwork protocols and an element of student-designed
475 research. Research-based learning in a field course context is well established (e.g. Boyle, Ryan &
476 Stokes, 2009) and so our over-arching recommendation that to be effective a field course should

477 include a guided learning phase (when students learn how to conduct field work) and an
478 independent learning phase (when students carry out their own fieldwork project) is not in itself
479 novel. But our nuanced observation of the affective and conative responses of our own students to
480 these activities *within* a field course suggests to us that to be really effective three things are
481 important. Firstly, the guided learning phase should include appropriate elements of ownership.
482 Students could for example be allowed some lee-way to determine some of the details of the tasks
483 at hand (for example what species/samples to focus on or where to sample e.g. Goulder & Scott,
484 2009). Secondly, students should understand the link between the preparatory and independent
485 phases, and independence should increase between them in a scaffolded way. In short, ownership is
486 important, but student-choices should be structured, limited and supplemented to ensure that the
487 student's sense of self-efficacy is not overwhelmed (Baeten, Struyven, & Dochy, 2013). For example,
488 in one case study, geography, earth and environmental sciences students early on in their academic
489 careers benefit from being given a topic for their project; as this task can easily overwhelm students
490 new to the subject and the autonomy required in project-based learning (Harmer & Stokes, 2016).
491 Finally, it is important that work labelled as independent is actually independent. In our case studies
492 this was not fully the case in Brazil (see figure 1) and as a result the expectations of our students
493 were not fully met and their motivation was reduced.

494

495 Conclusions and practitioner recommendations

496 In conclusion we suggest that an effective field course will be one for which students are adequately
497 prepared and have realistic expectations, one which incorporates research based learning in a
498 transparent and scaffolded way to maximise students understanding of their ownership of their
499 learning, and one that has built into it an element of structured reflection and the space for both
500 tutors and students to respond to the substance of those reflections in a constructive way. Based on
501 the discussion above we suggest the following practices may support these outcomes:

- 502 • Regular use of 'indoor' preparation or local field resources to practice core field-skills.
- 503 • Support preparation for residential fieldtrips with 'mixed-media' or virtual primers to match
504 student expectations to fieldtrip reality.
- 505 • Reserving the more challenging fieldwork tasks (such as independent projects) to after an
506 initial acclimatisation period to mitigate student anxieties.
- 507 • Allowing room for student ownership of outcomes during both the guided and independent
508 stages (e.g. methods, choice of study organism, or sub-disciplinary focus).
- 509 • Increasing the level of student ownership of learning as the field course progresses.

- 510 • Incorporating longitudinal reflective activities help students consolidate progression on
511 learning outcomes, particularly for ‘tacit’ skills, maximising the benefits of fieldwork
512 activities.

513

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515

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519 **References**

520

521 Arcodia, C., Cavlek, N. and Abreu-Novais, M. (2014) Factors influencing motivations and expectations
522 of field trip attendance. *Current Issues in Tourism* 17(10), 856-861.

523 Arrowsmith, C., Bagoly-Simó, P., Finchum, A., Oda, K., & Pawson, E. (2011). Student employ-ability
524 and its implications for geography curricula and learning practices. *Journal of Geography in Higher*
525 *Education*, 35, 365-377.

526 Atkins, L. & Wallace, S. (2012) *Qualitative Research in Education*. BERA, Sage London.

527 Ballantyne, R., Anderson, D. & Packer, J. (2010) Exploring the impact of integrated fieldwork,
528 reflective and metacognitive experiences on student environmental learning outcomes. *Australian*
529 *Journal of Environmental Education*, 26, 47-64.

530 Bester, L., Muller, G., Munge, B., Morse, M., & Meyers, N. (2017). Those who teach learn: Near-peer
531 teaching as outdoor environmental education curriculum and pedagogy. *Journal of Outdoor and*
532 *Environmental Education*, 20, 35-46.

533 Blair, E. & Deacon, A. (2015) A holistic approach to fieldwork through balanced reflective practice.
534 *Reflective Practice*, 16(3), 418-434.

535 Bloom, B., Englehart, M., Furst, E., Hill, W., & Krathwohl, D. (1956) *Taxonomy of educational*
536 *objectives: The classification of educational goals. Handbook 1: Cognitive domain*. Longmans Green,
537 New York and Toronto

538

539 Boud, D., Keogh, R. & Walker, D. (2013). *Reflection: Turning experience into learning*. Routledge.

540

541 Boyle, A., Maguire, S., Martin, A., Milsom, C., Nash R, Rawlinson S, ..., Conchie, S. (2007) Fieldwork is
542 good: the student perception and the affective domain. *Journal of Geography in Higher Education*,
543 31, 299–317.

544 Boyle, A., Ryan, P. & Stokes, A. (2009) External drivers for changing fieldwork practices and provision
545 in the UK and Ireland. *The Geological Society of America Special Paper* 461, 313-321.

546

547 Brannstrom C. & Houser, C. (2015) "Riding the rip": an experiential and integrated human-physical
548 geography curriculum in Costa Rica. *Journal of Geography in Higher Education* 39(4), 527-542.

549 Burke da Silva, K. (2014) Biological fieldwork in Australian Higher Education: Is the cost worth the
550 effort? *International Journal of Innovation in Science and Mathematics*, 22(2), 64-74.

551

552 Della Dora, V. (2011) Engaging sacred space: Experiments in the field. *Journal of Geography in Higher*
553 *Education*, 35, 163-184.

554

555 Dunphy, A. & Spellman, G. (2009) Geography fieldwork, fieldwork value and learning styles.
556 *International Research in Geographical and Environmental Education*, 18, 19-28.

557

558 Easton, E. & Gilburn, A. (2012) The field course effect: gains in cognitive learning in undergraduate
559 biology students following a field course. *Journal of Biological Education*, 46(1), 29-35.

560

561 Fleischner, T. L., Espinoza, R. E., Gerrish, G. A., Greene, H. W., Kimmerer, ..., Zander, L. (2017)
562 Teaching Biology in the Field: Importance, Challenges, and Solutions. *BioScience*, 67, 558-567.

563

564 France, D., Powell, V., Mauchline, A.L., Welsh, K., Park, J., ..., Rewhorn, S. (2016) Ability of students
565 to recognise the relationship between using mobile APPS for learning during fieldwork and the
566 development of graduate attributes. *Journal of Geography in Higher Education*, 40(2), 182-192.

567

568 Friess, D.A., Oliver, G.J.H., Quak, M.S.Y. & Lau, Y.A. (2016) Incorporating "virtual" and "real world"
569 field trips into introductory geography modules. *Journal of Geography in Higher Education*, 40(4),
570 546-564.

571

572 Gibson, C. (2007). Geography in higher education in Australia. *Journal of Geography in Higher*
573 *Education*, 31, 97-119

574 Glaser, B. J. & Strauss, A.L. (1999) *The Discovery of Grounded Theory*. Chicago IL: Aldine Transactions.

575 Glass, M.R. (2015) Teaching critical reflexivity in short-term international field courses: practices and
576 problems. *Journal of Geography in Higher Education*, 39(4), 554-567.

577

578 Golubchikov, O. (2015) Negotiating critical geographies through a "feel-trip": Experiential, affective
579 and critical learning in engaged fieldwork. *Journal of Geography in Higher Education*, 39, 143-157.

580

581 Goulder, R., Scott, G.W., and Scott L.J. (2013) Students' Perceptions of Biology Fieldwork: The example
582 of students undertaking a preliminary year at a UK university. *International Journal of Science*
583 *Education*, 35(8), 1385-1406

584

585 Goulder, R. and Scott, G.W. (2009) Field study of plant diversity: extending the whole-class
586 knowledge base through open-ended learning. *Bioscience Education*, 14(9), Retrieved from
587 <http://www.tandfonline.com/doi/full/10.3108/beej.14.1>.

588

589 Hall, T., Healy, M. & Harrison, M. (2002) Fieldwork and disabled students: discourses of exclusion
590 and inclusion. *Transactions of the the Institute of British Geographers*, 27(2), 213-231.

591

592 Harmer, N. & Stokes, A. 2016. "Choice may not necessarily be a good thing": student attitudes to
593 autonomy in interdisciplinary project-based learning in GEES disciplines. *Journal of Geography in*
594 *Higher Education*, 40(4), 531-545.
595

596 Henri, D.C., Morrell, L.J., & Scott, G.W. (2018) Student perceptions of their autonomy at university.
597 *Higher Education*, 75(3), 507-516.
598

599 Herrick, C. (2010) Lost in the field: Ensuring student learning in the "threatened" Geogrpahy field
600 trip. *Area*, 42, 108-116.
601

602 Higgit, M. (1996) Addressing the new agenda in fieldwork in higher education. *Journal of Geography*
603 *in Higher Education*, 20(3), 391-398.
604

605 Hill, J. & Woodland, W. (2002) An evaluation of foreign fieldwork in promoting deep learning: A
606 preliminary investigation. *Assessment & Evaluation in Higher Education*, 27(6), 539-555.
607

608 Hughes, A., (2016) Exploring normative whiteness: ensuring inclusive pedagogic practice in
609 undergraduate fieldwork teaching and learning. *Journal of Geography in Higher Education*, 40(3),
610 460-477.
611

612 Hovorka, A.J. & Wolf, P.A. (2009) Activating the classroom: Geographical fieldwork as pedagogical
613 practice. *Journal of Geography in Higher Education*, 33(1), 89-102.
614

615 Ishii, H., Gilbride, D.D. & Stensrud, R. (2009) Students' internal reactions to a one-week cultural
616 immersion trip: A qualitative analysis of student journals. *Journal of Multicultural Counseling and*
617 *Development*, 37, 15-27.
618

619 Kent, M., Gilbertson, D.D. & Hunt, C.O. (1997) Fieldwork in geography teaching: A critical review of
620 the literature and approaches. *Journal of Geography in Higher Education*, 21(3), 313-332.
621

622 Komarraju, M. & Nadler, D. (2013). Self-efficacy and academic achievement: Why do implicit beliefs,
623 goals, and effort regulation matter?. *Learning and Individual Differences*, 25, 67-72.
624

625 Krathwohl, D., Bloom, B. S., & Masia B.B. (1964) *Taxonomy of educational objectives, the*
626 *classification of educational goals – handbook II: Affective domain*. McKay, New York.
627

628 McMorrow, J. (2005) Using a Web-based Resource to Prepare Students for Fieldwork: Evaluating the
629 Dark Peak Virtual Tour. *Journal of Geography in Higher Education*, 29(2), 223-240.
630

631 Maskall, J. & Stokes, A. (2008) *Designing effective fieldwork for the environmental and natural*
632 *sciences*. Higher Education Academy Subject Centre for Geography, Earth and Environmental
633 Sciences Plymouth, UK.
634

635 Mauchline, A.L., Peacock, J. & Park, J.R. (2013) The future of bioscience fieldwork in UK Higher
636 Education. *Bioscience Education*, 21(1), Retrieved from
637 <https://www.tandfonline.com/doi/full/10.11120/beej.2013.00014>.
638

639 Maw, S. J., Mauchline, A. L. & Park, J. R. (2011) Biological Fieldwork Provision in Higher Education.
640 *Bioscience Education*, 17(1), Retrieved from
641 <https://www.tandfonline.com/doi/full/10.3108/beej.17.1>
642

643 Millenbah, K.F. & Millspaugh, J.J. (2003) Using experiential learning in wildlife courses to improve
644 retention, problem solving, and decision-making. *Wildlife Society Bulletin*, 31, 127–137.

645 Mullens, J.B., Bristow, R.S. & Cuper, P. (2012) Examining trends in international study: A survey of
646 faculty-led field courses within American departments of geography. *Journal of Geography in Higher*
647 *Education*, 36(2), 223-237.

648 Munge B., Thomas G. & Heck D. (2018) Outdoor Fieldwork in Higher Education: Learning From
649 Multidisciplinary Experience. *Journal of Experiential Education*, 41(1), 39-53.

650

651 Nieto, J. (2006) The cultural plunge: Cultural immersion as a means of promoting self awareness and
652 cultural sensitivity among student teachers. *Teacher Education Quarterly*, 33, 75-84.

653

654 Porter, G.W., King, J.A., Goodkin, N.F. & Chan C.K.Y. (2012) Experiential learning in a common core
655 curriculum: Student expectations, evaluations, and the way forward. *International Education Studies*
656 5(3), 24-38.

657 Peacock, J., Mewis, R. & Rooney, D. (2018) The use of campus based field teaching to provide an
658 authentic experience to all students. *Journal of Geography in Higher Education*, Published online 09
659 April 2018.

660

661 Savin-Baden, M. (2008) *Learning Spaces: Creating opportunities for knowledge creation in academic*
662 *life*. Maidenhead: Society for Research into Higher Education/Open University Press.

663

664 Scott, G.W. (2017) Active engagement with assessment and feedback can improve group-work
665 outcomes and boost student confidence. *Higher Education Pedagogies*, 2(1), 1-13.

666

667 Scott, G. W., Goulder, R., Wheeler, P., Scott, L. J., Tobin, M. L. & Marsham, S. (2012) The Value of
668 Fieldwork in Life and Environmental Sciences in the Context of Higher Education: A Case Study in
669 Learning About Biodiversity. *Journal of Science Education and Technology*, 21(1), 11-21.

670

671 Simm, D. & Marvell, A. (2015) Gaining a “sense of place”: students’ affective experiences of place
672 leading to transformative learning on international fieldwork. *Journal of Geography in Higher*
673 *Education*, 39(4), 595-616.

674

675 Shah, M., Cheng, M. & Fitzgerald, R. (2017) Closing the loop on student feedback: the case of
676 Australian and Scottish universities. *Higher Education* 74(1), 115-129.

677

678 Smith, D. (2004) Issues and trends in higher education biology fieldwork. *Journal of Biological*
679 *Education*, 39(1), 6-10.

680

681 Smyth, L., Davila, F., Sloan, T., Rykers, E., Blackwell, S. & Jones, S.B. (2016) How science really works:
682 the student experience of research-led education. *Higher Education*, 72(2), 191-207.

683

684 Stainfield, J., Fisher, P., Ford, B. & Solem, M. (2000) International Virtual Field Trips: a new direction?
685 *Journal of Geography in Higher Education*, 24(2), 255-262.

686

687 Stokes, A. & Boyle, A. P. (2009) The undergraduate geoscience fieldwork experience: Influencing
688 factors and implications for learning. *Geological Society of America Special Papers*, 461, 291-311.

689

690 Tytler, R. (1992) Independent research projects in school science: case studies of autonomous
691 behaviour. *International Journal of Science Education*, 14(4), 393-411.

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718

719

720

721

722

723

Wakeham, W. (2016) The Wakeham Review of STEM Degree Provision and Graduate Employability. Department for Business Innovation and Skills and Higher Education Funding Council for England.

Welsh, K., & France, D. (2012). *The future of higher education fieldwork in geography, earth and environmental sciences*. Retrieved from https://www.heacademy.ac.uk/system/files/the-future-of-higher-education-fieldwork-gees_2012.pdf .

Wilson, H., Leydon, J. & Wincentak, J. (2016) Fieldwork in geography education: defining or declining? The state of fieldwork in Canadian undergraduate geography programs. *Journal of Geography in Higher Education*, 41(1), 94-105.

Yang, N.D. (1998) Exploring a new role for teachers: promoting learner autonomy. *System*, 26(1), 127-135.

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727
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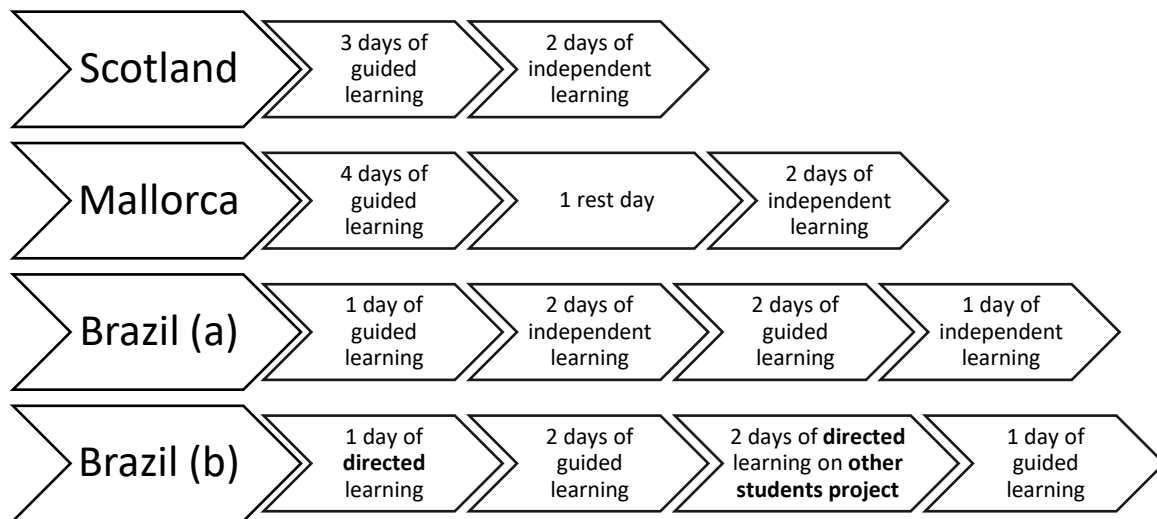
Figure 1. The structure of the three field trips. Brazil (a) is the structure we believed to be in place prior to this study, Brazil (b) is our reconceptualised structure as a result of the study.

Figure 2. Word clouds capturing the views of students pre/post participation in the field trips. Larger font indicates number of responses. Within each of figures a-f words are sized to scale and directly comparable. Between figures words are not necessarily to scale and therefore not necessarily directly comparable, however the relative importance of words can be compared between figures.

Table 1. The table shows how many of the students taking each field course made reference to one of the six main themes. Individual students may have mentioned multiple themes. The figures in parentheses indicate the number of positive and negative references respectively; so 6 (5,1) indicates that a total of 6 students mentioned a theme, 5 in a positive context and 1 in a negative context.

Table 2. Themes arising from daily reflections in the affective and conative domains. Figures represent the number of statements recorded and the numbers of students making a statement in reflections in each category (i.e. 26 (11) indicated that 26 individual reflections were made by 11 students). P values are derived from exact binomial tests which assume a 1:1 ratio of possible outcomes.

Table 3. Themes arising from daily reflections in the affective and conative domains prior to either guided or independent learning activities. Themes highlighted in bold text are those that were considered as commonly arising in those categories that included a larger number of reflections.



753

754 Figure 1. The structure of the three field trips. Brazil (a) is the structure we believed to be in place
 755 prior to this study, Brazil (b) is our reconceptualised structure as a result of the study.



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758 **Figure 2.** Word clouds capturing the views of students pre/post participation in the field trips. Larger
 759 font indicates number of responses. Within each of figures a-f words are sized to scale and directly
 760 comparable. Between figures words are not necessarily to scale and therefore not necessarily
 761 directly comparable, however the relative importance of words can be compared between figures.

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766 **Table 1.** Why this trip? Themes arising from the responses of 35 students.

	Scotland (n11)	Mallorca (n13)	Brazil (n11)
Biology	5 (5,0)	9 (9,0)	10 (10,0)
Location	6 (5,1)	5 (3,2)	10 (10,0)
Cost	5 (4,1)	5(5,0)	1 (1,0)
Novelty	0	1 (1,0)	7 (7,0)
Employability	2 (2,0)	2 (2,0)	4 (4,0)
Climate	3 (0,3)	1 (1,0)	0

767

768 **Table 1.** The table shows how many of the students taking each field course made reference to one
769 of the six main themes. Individual students may have mentioned multiple themes. The figures in
770 parentheses indicate the number of positive and negative references respectively; so 6 (5,1)
771 indicates that a total of 6 students mentioned a theme, 5 in a positive context and 1 in a negative
772 context.

773

Location	Learning activity	Affective positive	Affective negative	P	Conative motivated	Conative not motivated	P
Scotland	Guided	26 (11)	6 (5)	< 0.001	26 (11)	7 (7)	< 0.01
	Independent	19 (10)	2 (1)	< 0.001	18 (11)	1 (1)	< 0.001
Mallorca	Guided	51 (13)	2 (2)	< 0.001	43 (13)	10 (8)	< 0.001
	Independent	12 (10)	4 (4)	0.08	14 (10)	2 (2)	< 0.01
Brazil	Guided	15 (9)	12 (8)	0.70	19 (10)	10 (5)	0.13
	Independent	16 (10)	5 (5)	< 0.05	15 (9)	6 (5)	0.08

Table 2. Themes arising from daily reflections in the affective and conative domains. Figures represent the number of statements recorded and the numbers of students making a statement in reflections in each category (i.e. 26 (11) indicated that 26 individual reflections were made by 11 students). P values are derived from exact binomial tests which assume a 1:1 ratio of possible outcomes.

Location	Learning Task	Positive Affect	Negative Affect	Motivated	Not Motivated
Scotland	Guided Learning	Peaceful environment, nice scenery , feeling relaxed, nostalgic (remembering childhood experience in similar paces). Connection to site and lack of intrusion by 'public'.	Anxiety about working with new people and working on new material. Traffic is an intrusion.	Nice location and people. Nice weather. Keen to learn about organisms and habitats involved. Confident in own abilities.	Rain. Working with 'strangers'. Would like coffee (basic needs not being met).
	Independent Learning	Peaceful environment, nice scenery and weather. Connection to site and lack of intrusion by 'public'.	Worried about risk of sunburn. Disheartened at own progress.	Drive to collect data for project. Ownership of project. Feeling prepared for work and confident in own abilities. Good weather.	Worried about lack of data.
Mallorca	Guided Learning	Peaceful environment, nice scenery , feeling relaxed, nostalgic (remembering childhood experience in similar paces). Enthusiasm for habitats/organisms in a functional ecosystem.	Boredom. Site spoiled by proximity of industry.	Enthusiasm for organisms/habitats involved. Novelty (site, species, skills). Nice scenery. Nice weather.	Tourists are having fun/relaxing – would like to join in. Too hot. Tired
	Independent Learning	Peaceful environment, nice scenery.	Pollution/litter etc detracts from 'beauty' of site. Personal illness and sadness.	Driven to understand topic at hand. Ownership of project. Drive to collect data. Intrinsic interest in topic.	Tired. Tourists are having fun – would like to join in.
Brazil	Guided Learning	Peaceful and beautiful area. Novelty of sights and sounds. Isolation from built-up areas.	Tired and hot. Anxious about the environment, insects, spiders and illness. Not a pristine forest. Expectations not met.	Novelty of habitats and species. Opportunity to explore and learn new things. Intrinsic interest in biota. Nice weather.	Tired, poor weather, feel unwell, anxiety about surroundings and unseen dangers.
	Independent Learning	Feels like a tropical and exotic rain forest. Relaxing sounds of forest.	Habitat drier and less species rich than expected. Area too built up (not rainforest).	Nice scenery. Novelty (species, habitats and skills). Collecting own data.	Tired. Lack of organisation. Not working on own project. Repetitive task (data collection)

Table 3. Themes arising from daily reflections in the affective and conative domains prior to either guided or independent learning activities. Themes highlighted in bold text are those that were considered as commonly arising in those categories that included a larger number of reflections.