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Making the case for A-level biology residential fieldwork: what has nature got to do with it?

Melissa Glackin and Kate Greer

Abstract This article provides an up-to-date list of reasons for teachers to create a case for residential fieldwork. The list was developed as part of a project examining ‘learning journeys’ of inner-urban school visits to residential field centres in England. Uniquely, it draws from the perspectives of students and teachers in light of the changes to A-level biology assessment. As resourcing constraints following the COVID-19 pandemic threaten fieldwork, this evidence-based case shows that residential visits are more valuable than ever. It is argued that, amidst the post-pandemic ‘catch up’ discourse and by putting ‘nature’ at the centre, field visits can work even harder for the benefit of urban students.

Since the early 1990s, A-level biology fieldwork (i.e. for ages 16–18) in England has been in decline (Lock, 2010; Tilling, 2018) and its place in the curriculum said to be ‘*contested, unclear and at times under threat*’ (Lambert and Reiss, 2015: 89). The pressure of curriculum time and lack of financial resources for fieldwork are two consistently cited reasons for this trend (Glackin and Jones, 2012). Following the COVID-19 pandemic lockdowns in 2020–2021, as schools return to a more ‘normal’ state, school leaders, alongside their heads of subjects, will face a range of resourcing decisions. Difficult choices will be necessary concerning the allocation of the subject timetable alongside the distribution of, almost certainly, a restricted budget. As school leaders juggle new and pressing demands, and teachers become accustomed to alternative approaches introduced to substitute for fieldwork during the lockdowns, there is a credible argument that the decline of fieldwork could accelerate, particularly for residential visits.

This situation seems somewhat ironic given the phenomenal call from young people around the world for more, and better quality, environmental education. Hence, we present this article as a form of preventative action, and argue that the pandemic strengthens the case for A-level biology fieldwork, particularly residential field visits. Below, we set out a research-informed argument to support our rationale and present an easily accessible list for teachers who want to make a case for fieldwork post lockdowns. While many of the reasons are generalisable, this list arises from a recent research study that focused on the often omitted, but important, perspectives of teachers and young people studying A-level biology who are living and working in urban environments. The discussion sets out recommendations for how A-level biology fieldwork might be further developed in response to

young people’s call for an improved environmental education in a post-pandemic world.

The benefits of fieldwork: what does the literature tell us?

In general terms, fieldwork involves leaving the classroom and engaging in teaching and learning activities through first-hand experience of phenomena out-of-doors (Lambert and Reiss, 2015). Residential fieldwork experiences are expansions of this, where students spend multiple days living and learning together, usually in settings close to nature. Frequently, fieldwork’s learning outcomes are broadly evaluated in terms of cognitive/knowledge/procedural gains and affective/behaviour gains. These gains have been assessed in the short, medium and longer terms. See Rickinson *et al.* (2004) for a comprehensive overview.

Specific to A-level biology residential fieldwork, a study by Winks and colleagues (Winks *et al.*, 2020) of 900+ biology students attending three residential field centres in the UK, highlights very high cognitive gains during and following field visits in areas that overlap significantly with exam specifications, such as populations, climate cycles, food and ecosystems. High affective and behaviour gains were also noted related to students’ feelings of peace, relaxation and inclination to campaign and change behaviours related to pollution. Winks *et al.* argue that A-level biology residential field visits create a unique set of opportunities for relational learning to take place, enabling students to simultaneously have a closer connection with their own community (e.g. peers and teachers), as well as what is often described as the ‘*more than human world*’ (i.e. the world more broadly).

However, residential field visits do involve a (sometimes significant) cost, which hinders attendance of A-level groups from schools serving lower socio-economic communities, often situated in urban environments. Indeed, Winks *et al.* (2020) note the absence of this participant group as a limitation of their data set. However, students in urban environments, often from lower socio-economic groups, can experience a disconnect between themselves and the natural world and may not notice their direct impacts on the environment (McKenzie *et al.*, 2017). Hence, an important aim of this study was to gain an insight into the value of residential fieldwork from an inner-city school perspective and whether nature connectivity held a prominent role.

The study context

This study was undertaken for the Field Studies Council (FSC), an environmental education charity with a commitment to create ‘*outstanding opportunities that inspire everyone to engage with and care for the environment*’ (FSC, 2019: 4). The FSC provides residential fieldwork opportunities across some 20+ sites within the UK and has particular expertise teaching A-level fieldwork. The research was carried out between 2016 and 2018, which was a period of significant change for A-level biology assessment in England. Practical skills assessment moved from graded coursework into written exam questions alongside a separate pass/fail grade for practical skills assessed through 12 core practicals via the Common Practical Assessment Criteria (CPAC) (Department for Education, 2014).

Methods

The research sought to capture and understand *in situ* and accumulative learning bound up in the entirety of a residential field visit; we were interested in the residential field visit as a ‘learning journey’. We studied four residential field visits attended by three inner-city schools that serve local communities often from families of lower socio-economic status. The schools were a co-educational sixth-form college where 80% of the students identify as black minority ethnic (this school made two visits with different students), a



Figure 1 Biology A-level students commencing a fieldwork day

co-educational inner-city secondary school serving an ethnically diverse community, and a co-educational inner-city secondary school serving a large Bangladeshi community. The residential field visits ranged from 2 to 5 days in duration. Two of the field centres were in rural settings approximately 2 hours’ coach ride from the schools (Figure 1). The third centre was in a coastal location, approximately a 4-hour coach ride from the school. In total, 171 students attended the field visits.

Based on our characterisation of the field visit as a ‘learning journey’, we collected data before, during and after the residential experience (see Table 1). We conducted pre- and post-visit interviews with teachers, focus groups with students, lesson observations in school and at the field centres, and analysis of visit-related documents. The interviews and focus group discussions were transcribed. We analysed the data sets from each of the learning journeys using thematic analysis. This process involved multiple rounds of review and peer discussion to identify themes before we arrived at a set of findings for each visit/learning journey. The findings presented in this article, which focus on the views of A-level biology teachers and students, have been identified by reflecting on those of each learning journey, and by revisiting the original data and our analysis of the interviews and focus groups.

Findings

Eight reasons were identified as to what A-level biology teachers and students valued from their experience of a

Table 1 Data collection for each ‘learning journey’

Research stage	Data collection location	Data type	Participants
Pre- and post-field visit	school	interviews	lead/organising teacher and biology teachers
		focus groups	A-level biology students
		lesson observations	biology teacher and A-level biology students
During field visit	field centre (arrival and final day(s))	observations, including initial meeting, classroom and outdoor teaching	A-level biology teachers and students

residential field visit (Box 1). While these are all inter-related, we organised these reasons into three groups:

- reasons related to A-level assessment;
- reasons related to personal growth;
- reasons related to broadening perspectives.

Prior to the visit, most participants described the value of field visits as being related to the A-level assessment. However, following the visit, the list of reasons grew significantly in range as well as depth. Below we explain each reason in turn and offer illustrative data.

Related to A-level assessment

1 To complete practicals related to the Common Practical Assessment Criteria (CPAC)

A key feature of the residential visits was that they provided an uninterrupted and concentrated opportunity to complete several assessed core practical skills. It was not a surprise that, before the field visit commenced, all participants gave this as the primary reason for the visit. Teachers viewed them as an opportunity for students to work in a focused manner *‘to build up the skills and put them all together’* (teacher). One school’s learning journey highlighted this emphasis. In school, the students were made aware of the core practical skills that would be assessed at the field centre (Figure 2).

Before the residential experience, students visited a local nature reserve to develop familiarity with the practical skills that were required for the assessment. Then, during the initial session at the field centre, the field centre tutors’ programme overview highlighted the specific practical skills that would be accomplished on each day of the visit (e.g. CPAC 12). This programme overview remained on permanent display in the classroom. It was therefore unsurprising that even those students who had expressed scepticism about the value of attending the residential field visit valued the emphasis on assessment and the explicit links to the exam specification: *‘We appreciated knowing exactly what was to be achieved’* (student).

2 To experience the ecosystems listed by the examination board

Teachers expressed that first-hand experience of the context described in the exam questions (e.g. woodlands, sand dunes and meadows) improved students’ exam question literacy. Teachers regarded this exposure as being particularly important for their city-based students, many of whom had little to no experience of these habitats:

If we were to say ‘shingle ridge’ to them now they would know what a shingle ridge actually looked like. But if you were to show them a photo in the classroom only,

Box 1 Reasons to attend a residential A-level biology field visit

Related to the A-level assessment

- 1 To complete practicals related to the Common Practical Assessment Criteria (CPAC).
- 2 To experience the ecosystems listed by the examination board.
- 3 To acquire a bank of shared memories to use as a *recall* resource back in school.

Related to personal growth

- 4 To build individual, and collective, resilience towards ‘being out of our comfort zone’.
- 5 A unique opportunity to establish and foster peer and student–teacher relationships.

Related to broadening perspectives

- 6 To showcase the importance of ecology and the subject’s interconnections across the curriculum.
- 7 To meet, get to know and learn from, over an extended period, ‘real scientists’ in their workplace.
- 8 To engender an appreciation of nature and the environment.



Figure 2 Programme objectives reflecting the examination specifications, displayed in the classroom at the field centre

they don’t get that. It actually says in the exams ‘you are on a shingle ridge and succession occurs along here’. They are like, ‘what does that mean’, as it is very difficult to conceptualise. (teacher)

Students similarly expressed the need to see habitats *‘with our own eyes’*. They appreciated that they could learn and memorise ecological concepts from textbooks, but that experiencing them enhanced their ecology learning by making it more tangible and real.

3 To acquire a bank of shared memories to use as a recall resource back in school

The benefits derived from a collective memory created from the field visit became apparent back in the classroom. Teachers explained that they recalled experiences, images and sights visited during discussions to illustrate points or to remind students of particular practical skills

or biological concepts. Such recall occurred immediately following the field course and also months later during revision lessons. An additional benefit of this shared experience was evident when students built on their peers' memories during class sessions. For example, in a discussion concerning interdependence, one student's recollection of their experience of the rock pool, and the different temperatures recorded, prompted another student to recall the number of different organisms observed in a range of rock-pool locations. The co-creation of the memory not only brought to life the biological concepts but with it a sense of shared experience, fostering affective qualities of camaraderie.

Related to personal growth

4 To build individual, and collective, resilience towards 'being out of our comfort zone'

The experience built a new-found resilience, both individually and collectively, towards '*being out of our comfort zone*' (student). Some students described living in such proximity to nature as initially overwhelming, but that their anxiety subsided:

Because some people were really scared of spiders. Because I think there were two people who had arachnophobia, but they got used to it and they learnt to deal with them rather than scream. (student)

Other students described the experience of being out of their local community for the first time as overwhelming. Yet, the residential field visit was a legitimate and school-related opportunity for students to travel somewhere new, which was perceived as being excellent preparation for adulthood and, in particular, for university. As one teacher explained:

They were totally out of their comfort zone. They were in an area where, because here it is mostly a Bangladeshi community, whereas there they were the minority. So that was very new and that was very scary for them. But that is more like real life; it was nice to get them out of this comfort zone, out of this bubble that a lot of them do tend to stay in. It was nice to expose them to new food, new people and new areas, so that they could see how the houses look different and all of that.

The visit also offered students an opportunity to understand and appreciate different perspectives and the need for compromise – key attributes for building resilience. This was evident in a discussion related to food, religion and the environment:

The food for example, the students were expecting halal meat every single night. Whereas, when you've got a socially responsible and environmentally responsible

centre, halal meat is not always going to be the first choice, or the available choice as well. The students had to adapt and understand that the vegetarian option was also an acceptable, and perhaps preferred, option. (teacher)

5 A unique opportunity to establish and foster both peer and student-teacher relationships

Teachers and students reported that the residential experience was a unique and precious opportunity to establish positive relationships. The relationships between students and teachers, and between peers, were valued for what they enabled during and on return from the field visit. Students reported that, while peer-to-peer relationship development could be limited during school time because of large A-level cohorts and students' taking various subject pathways, the residential visit included opportunities for informal conversations (e.g. eating meals together) and extended periods of formal teamwork (e.g. collecting data). The relationship development came as a surprise for some:

and that is what surprised me as well. (student 1)

we worked together so well. (student 2)

And, while emotional changes can be difficult to capture, during two student focus groups after field visits, a visceral change was identified in the tone and flow of communication between the students. Students were much more at ease when speaking in the groups and several enthusiastically shared their memories and shared funny anecdotes.

Related to broadening perspectives

6 To showcase the importance of ecology and the subject's interconnections across the curriculum

Several teachers observed that, prior to the residential field visit, students often did not take the ecology unit seriously; rather, it was something to get through. Teachers linked this to student perceptions that ecology was not relevant for a health-related career: '*the career pathway to which many A-level students aspire*' (teacher). However, as one teacher explained, the field course effectively reframed the ecology unit and enabled students to start to see the important and authentic role that environmental biologists have to play in addressing complex social, political and ecological issues.

7 To meet, get to know and learn from, over an extended period, 'real scientists' in their workplace

The field centre visit played an important role in enabling students to meet 'real scientists' in their place of work. While ecologists work in inner-city parks close

to students' schools, students did not report having met any ecology-related science professionals in these settings and had no awareness that such careers existed. Several students, however, commented that they appreciated talking to the field tutors about ecology and their career journeys and, as one student remarked, *'I enjoyed talking to the field tutors and about their life in the village'*. Because of the residential element, and the extended time it afforded, such informal conversations were more available to students.

8 To engender an appreciation for nature and the environment

The final reason related to engendering, or nurturing, a more developed appreciation of diversity, both in terms of natural and socio-cultural environments. This appreciation became evident in student actions and in teacher and student perspectives. As mentioned previously, given that many of the students had limited nature-based experience outside of urban parks, it was understandable that they reported initially feeling stressed by the environmental contrast. However, students gradually grew accustomed to the outdoor context, and, over the period of the visit, they adapted their behaviours. For example:

[A student] *who wouldn't touch the grass in the park the week before, was handling crabs and handling beetles by the end of the visit. Another student, who you would not expect to be into it at all, was calling home to say, 'I have held a crab', and he was holding beetles and persuading others to hold beetles.* (teacher)

One students' reflection highlighted what such visits can offer for broadening perspectives on the environment:

Based on what we experienced, personally me being a city boy, we are so used to being around tall buildings and things like that you can't... if you close your eyes right now, you won't be able to hear the wind and you won't be able to hear the rustling of the trees... but there you could. (student)

In addition to expanding students' understanding of diverse natural environments, the field visit also afforded opportunities to develop their appreciation of socio-cultural diversity, specifically in relation to how nature is valued by different cultures:

I think the adaptation to the cultural norms of Devon. And understanding that Devon's culture also has to be respected, as well as the people of Devon respecting their culture, was quite a difficult one for the students to understand. Because they were initially saying, they need to understand where we are from and I was saying, well you need to understand where they are from. (teacher)

Teachers perceived that a school-organised field visit to unfamiliar communities afforded students insight into natural and social environments that would enable them to think differently about what their lives meant now and what they could become.

Discussion

This article sets out an evidence-based list of reasons to support teachers to make a case for residential field visits in their school. Building on previous research of residential fieldwork learning outcomes (Rickinson *et al.*, 2004), we provide an up-to-date case that accounts for the current model of A-level biology assessment and that draws from the perspectives of teachers and students from schools situated in urban areas serving lower socio-economic communities, captured during their residential field visit 'learning journey'.

Clearly, teachers and students in our study recognise that there are multiple reasons why schools should provide students with opportunities to participate in residential field visits. These reasons attest to field visits enabling students to meet the A-level biology practical skills assessment criteria effectively and efficiently and that the benefits also influence broader A-level achievement in biology exams. In view of the post-pandemic 'catch up' discourse, this list points to field visits as an effective way for students to 'catch up' on skills and assessment and to improve their overall A-level achievement. Additionally, our list, specifically the second and third group of reasons, indicates the post-pandemic value of field visits in relation to individuals' well-being and social needs. We know that the pandemic has resulted in social losses for students (and teachers), and that students have lacked opportunities to experience anything beyond a very restricted geographical area. Obviously, residential field trips provide opportunities for urban students to expand their geographic boundaries coming out of the pandemic. Our list also highlights that these visits build resilience by helping students to 'get out of their comfort zone' and strengthen connections among peers and between staff and students. Chiming with the Winks *et al.* (2020) finding that challenges in new environments can yield transformative moments, and in light of the significant losses and the potential learning gap reported post-pandemic, it seems that residential field visits are more valuable than ever, particularly for 'urban' A-level biology students from low socio-economic areas with limited access to such experiences.

Yet, in response to young people's call for an improved environmental education, in a post-pandemic world perhaps these field visits could work harder. Beyond the list of reasons and their post-pandemic affordances, this research also points to ways in which field visits could be made more valuable for students in urban settings,

with multiple enhancements related to nature. Indeed, we believe that ‘nature’ could be central to schools’ commitment to field visits. Therefore, we conclude with three interconnected ‘nature-based’ recommendations for urban schools to consider when designing residential field visits for their students:

- First, we recommend that greater emphasis be placed on supporting students to notice, appreciate and understand nature throughout the learning journey, including in students’ local, urban settings.
- Second, and working hand in hand with fostering student appreciation of urban nature, we recommend highlighting and learning about nature-related careers, including drawing attention to the wide variety of ‘urban’ nature-related careers. When students’ reasons for studying sciences are most often to pursue health science courses and careers, residential field visit ‘learning journeys’ are rare opportunities to highlight the multitude

of ecology- and nature-related careers that are available, and to inspire students to pursue them.

- Third, and relatedly, we recommend fostering richer connections between the field centre and the student context. Incorporating student backgrounds into field centre experiences could also foster a sense of belonging in non-urban settings or careers, and legitimise the ecological value of their local, urban green space. With teachers and field centre staff working together and sharing knowledge about the contrasting contexts prior to the visit taking place, including the diverse cultures, communities and surrounding habitats, inner-urban students could develop a sense that they have a stake in a rural ecology centre and in nature.

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