'What is Wildlife?' The influence of research informed teaching and work-experience on Wildlife Conservation students

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Abstract

Survey-based research was conducted into how students taking a BSc degree in Wildlife Conservation perceived the term 'wildlife', what type of wildlife interested them and what sort of wildlife-related careers they would like. The relationship between these responses and their exposure to research informed teaching (research informed teaching), non-HE associated work-experience and hobbies was investigated. Results showed that students tended to perceive 'wildlife' to be charismatic fauna and their associated habitats, and that students aspired to careers involving such animals, often in exotic, overseas locations. Interests, career aspirations, and perceptions of 'wildlife' broadened with student age and progression through the degree, and this seemed to be more closely related to their work-experiences than to research informed teaching.

Introduction

Research informed teaching offers students a contemporaneous curriculum informed by research, either that generated by teaching staff themselves or developed with explicit reference to the latest research. It also seeks to help students evolve their own research skills, as well as helping them to become more efficient and effective consumers of research. In many degree programmes, research informed teaching, in combination with and work experience, form mechanisms by which students experience 'active engagement' with the real world (Slingsby 2007). Research informed teaching is thought to benefit teaching and learning through a sense of the students being taught by staff the 'cutting-edge' of their subject (Jenkins et al. 1998), and by teaching staff who are enthused by their own engagement with the subject (Biggs 2003). Students gain confidence in problem solving and gain employable and transferable skills (Yorke 1999). The varied activities associated with research informed teaching also promote 'deep learning' (Biggs 2003), and through its many shapes and forms, benefits different learning styles (Kolb 1984; Honey & Mumford 1992). This increases the likelihood that students with different learning requirements, or cultural and language barriers will have a chance to benefit.

This paper explores the role of research informed teaching in a Wildlife Conservation degree, to consider the impact that this has on students perceptions an possible career choices. Research informed teaching activities within the Wildlife Conservation degree programme at Liverpool John Moores University include student-focussed field or laboratory activities, problem-based learning and undergraduate research projects. Many of these focus on 'non-charismatic fauna' since these are accessible, abundant and have fewer legislative barriers to their collection and experimentation than more exotic fauna. Most fieldtrips and student-led research also occurs within the UK, since this is more practical and affordable. Students are also

likely to gain exposure to practical experiences in habitat conservation and species conservation though voluntary work-experience, hobbies and interests, as well as 'work-based learning' and 'sandwich year placements'. Such experiences provide students with an insight into potential career opportunities (Lloyd 1985) and foster general employment skills (Yorke 1999).

The viability of a module or degree programme can rest on its popularity. Students' views are ascertained through programme or module evaluations and the National Student Survey. However, the interests of students may compete with wider academic requirements of Higher Education, such as the aim to drive wealth creation (DfES 2003), to strengthen links with businesses (DfES 2003), and to maintain the fundamental academic standards as set down by the Quality Assurance Agency (QAA 2007). There is, therefore, the potential for conflict between the subjects that the students would like to study and the Higher Education establishment's curricula.

The BSc Wildlife Conservation degree taps into the public interest in nature, wildlife and growing environmental concerns. The course is taught by staff who actively research and publish in the fields of ecological theory, habitat conservation and restoration and who are experts in grazing animals, birds, primates, plants and microbes. Students can take modules covering wildlife and habitat survey skills, flora and fauna identification, practical data analysis and report writing, and more 'theoretical' topics in ecology, conservation and animal behaviour. Nevertheless, each year students complain that they are not learning enough about 'wildlife' or gaining practical experience with 'wildlife'. It is also worth noting that the LJMU Wildlife Conservation degree programme uses an image of the iconic giant panda on its website (LJMU 2008), which gives the impression that the degree will focus on such animals. Conversations with entry level students suggest that many are interested in such 'charismatic fauna', which predominantly includes 'attractive' or large mammals, as well as birds. They are also understandably excited by chances to study these or to get jobs overseas. Of Level One undergraduate students on the Wildlife Conservation degree for example, 62 % listed working with or studying overseas animals as one of their aims.

Faced with such expectations, there seems to be a growing trend among university environmental science departments to run field trips to overseas locations, such as the arctic or tropics, to see charismatic organisms like polar bears, sharks and apes in their natural habitat (McGuiness & Simm 2005). Universities appear to be competing with one another to recruit a limited number of students to wildlife conservation, environmental science and related degrees, by providing visits to exotic locations (Smith 2004; McGuiness & Simm 2005). For example Biology and Geography departments at the Universities of Sussex, Hull and Kent offer trips to Ecuador, Tobago and the Amazon, respectively. Yet, Higher Education in the UK is committed to widening-participation. Target groups include those from poorer socio-economic backgrounds, those with caring responsibilities, international students, and students with disabilities (DDA 1995; SENDA 2001). Hence, it is likely that some students will find such overseas field trips problematic (Nairn 2003 cited in McGuiness & Simm 2005).

There is clearly some mismatch between what students perceive as 'wildlife', the subjects of the modules taught and the expertise and interests of the teaching staff. While any well-balanced degree programme in wildlife conservation must include theories, research and practice relevant to large or attractive mammals, effective wildlife conservation encompasses all types of biodiversity, interrelationships, relevant habitats

and ecosystems (Jacobson 2005). This necessitates an understanding of the ecology of a range of microbes, plants and animals, impacts of environmental change (e.g. climate change and pollution) and relevant legislation. Secondly, graduate employment within the UK environmental consultancy sector, the predominant employer of Wildlife Conservation graduates, requires skills in 'non-charismatic' environments and organisms, such as water quality, air quality, plant and invertebrate surveys, as well as knowledge of mammal and bird surveys. In a review of job adverts for Environmental Consultancy posts, these skills were specified in 90% of cases (END 2008). Careers with the most popular, often exotic, fauna are highly competitive and extremely limited. Therefore, graduates need to be equipped with relevant skills for local plants, animals, microbes and habitats. Of UK Environmental Science students who graduated in 2007 (n=1,760) only 2.2% were employed overseas by early 2008, and of those employed in the UK, only 15% worked in an area related to science, research or conservation (Prospects 2008). Finally, and most importantly, it is not environmentally sustainable to take students to exotic locations for fieldwork with pandas, apes, tropical birds and reef sharks. Environmental departments need to ask themselves whether it is ethical to run such fieldtrips, while at the same time, teaching about the impacts of climate change on these animals and their habitats.

Given the widespread opportunities for Wildlife Conservation students to partake in research informed teaching or work-experience with non 'charismatic mega-fauna' and in local habitats, we can ask if such activities lead to a broadening of students' interests, career aspirations and perceptions of wildlife? Do such experiences align students' interests and career goals more closely with employment opportunities? This study examines the differences in perceptions of the term 'wildlife' and career aspirations among students on each level of the Wildlife Conservation degree programme, and seeks to ask if research informed teaching and work-experience activities can be linked with differing perceptions and aspirations.

Method and Research Design

Two-part questionnaires were made available to all Wildlife Conservation students at all levels on the programme, with the exception of those students away from university awaiting deferral or referral attempts for Level 3. Part A of the questionnaire used open questions to assess students' perceptions of wildlife and their career aspirations. This questioning style allowed freedom of comment, rather than to restrict the respondent to predetermined categories (Cohen et al. 2000). However, Part B sought to ascertain their experience of research informed teaching. Given that the term 'research-informed-teaching' is likely to be unfamiliar to the participants, it was necessary to assess their exposure to research informed teaching through closed, categorical, tick-box questions. Exposure to other wildlife experiences, such as through work-experience, hobbies and sandwich years were also categorised in this format.

Respondents were asked to complete Part A before Part B to avoid the categories on Part B influencing Part A answers. Part B categories were in random order to reduce bias which might influence responses through implied hierarchy. All questionnaires were provided with a participant information sheet stating the voluntary and anonymous nature of the questionnaire and the fact that the students could withdraw from taking part at any time.

Questionnaires were selected over other data collection methods because they are known to limit bias arising from interaction between participant and researcher, such as feeling the

need to give academically-correct answers in front of a tutor (McNeill & Chapman 2005). Questionnaires allowed students to provide answers which would not be attributable to the individual (Cohen et al. 2000), and gave the participants the opportunity to answer the questions in their own time, reducing feelings of pressure. Questionnaires were returned anonymously to a sealed box. The use of focus groups was decided against because focus groups remove anonymity, and since this study aimed to seek the perceptions of the individual, the potential influence of confident, dominant groups members on the responses of others was avoided (Bell 2005; McNeill & Chapman 2005). Hayes (2000; cited in Bell 2005) has noted that ethnic minorities, and women in particular, may not make their views felt within some groups. Students may also feel compelled to attend interviews or focus groups hosted by their tutor. It cannot be known, however, if individual respondents consulted each other over their answers. The consistent format of questionnaires ensured that all participants received the same information, and as such this method ensured a standardised experience between subjects (McNeill & Chapman 2005) than interviews or focus-groups, where sessions may differ. To this end, effort was made to ensure that the language used on the questionnaire was plain, unambiguous, and avoided jargon, that the layout was clear, and that leading questions were avoided. Cohen et al. (2000) noted that ambiguity cannot be avoided completely but can be minimised by using precise categories.

The occurrence of responses was categorised using content analysis (see Bell 1999; Silverman 2006) by assigning the words used to answer questions in Part A to one of the four categories:

1) **Charismatic** fauna, such as mammals and birds.
2) **Non-charismatic** fauna, such as reptiles and invertebrates.
3) **Other** organisms, such as plants, microbes and fungi.
4) **Environments**, such as habitats and ecosystems.

Responses to Part B were assigned to the same four groups, using the same criteria. Responses to questions involving forms of research informed teaching formed the 'in university' questions and covered awareness of lecturers' research topic, exposure to relevant case-studies in teaching, and students' practical activities in the field or laboratory. A tick in any of these sections was considered to indicate some exposure to research informed teaching. Since students perception of wildlife and career aspirations are also influenced by work-experience or hobbies, a section of 'in your own time' questions sought to gain responses about other relevant experiences. Responses were categorised using the same method across the whole section. An additional section was provided for Level 3 students to investigate the influence of specific LJMU programmes to promote student-led work and research skills, such as the work-based learning and honours project, on their perceptions and career aspirations.

Differences in the proportion of students giving at least one response within each of the four categories, in each section (research informed teaching, work-experience/hobbies or Level 3) was compared amongst levels and ages using the Kruskall Wallis test and analysis of variance with Games-Howell post-hoc test. The association between students' categorised free text answers in Part A, with their exposure to research informed teaching and work-experience or hobbies in Part B, was analysed using Chi-square with Cramer's V coefficient of association (Φ).

Spearman's correlation coefficient was also employed to investigate relationships between the breadth of categories selected in Part A with the breadth of experiences indicated in response to Part B questions. Results significant to the $p<0.1$ level are interpreted. All data analysis was carried out using SPSS version 13.0.

Results

Thirty-three percent (14 of 43) students attending the Wildlife Conservation degree responded. Seven students were in the 18-21 age group, 3 in the 22-25 and 4 in the 30+ group, and 6, 4 and 4 students were at Levels 1, 2 and 3 respectively.

Perception of wildlife, interests and career aspirations

There was great variety in words, images and terms suggested by respondents (Table 1). As well as listing mammals, birds and habitats, some respondents referred to the intangible such as 'inspiring', 'green' and 'freedom'.

Question 1- Perception of 'wildlife'		**Question 2** - wildlife interests	**Question 4** - wildlife related careers
Africa	Laws	Animal behaviour	Abroad
Alien species	Leopard	Birds	Conservation/Conserving
Amazon	Lion	Ecology	Consultancy
Anglesey	Mammals	Fish	Countryside ranger
Animals	Mega-fauna	Flowers	Data
Beauty	Nature	Greek wildlife	Education
Birds of prey	Outdoors	Insects	England
British wildlife	Plants	Keeping nature records	Exotic locations
Butterflies	Protection	Kenya	Field officer
Conservation	Rehabilitation	Leopard	Fieldtrips
Countryside	Reintroductions	Mammals	Foreign country
Elephant	Research	Mega-fauna	Nature reserve
Endangered	Reserves	Native/British species	Outside
Environment	Rhino	Orangutans	Plants
Fauna	Rivers	Population dynamics	Rehabilitation
Flora	Ruthless	Primates	Research
Flowers	Safari	Trees	Safari park ranger
Forest	Sea	Vegetation	Species re-introduction
Green	Sunlight	Whales	Surveys
Grey squirrels	Tiger	Wild animals	Travel/Travelling
Guillemots	Trees		Trees
Habitats	Untamed		U.K.
Hedgerows	Views		Warden
Hills	Wild terrain		Wild animal
Invertebrates			
Landscape			

Table 1 Free text responses in Part A listing all nouns used to describe wildlife (question 1), wildlife interests (question 2) and career aspirations (question 4).

Of all respondents (n=14) answers to the question about perceptions, 86% listed charismatic fauna, such as mammals and birds, and 86% used words associated with the wider environment, such as habitats, hedgerows and rivers (Figure 1). Fewer mentioned non-charismatic fauna, such as invertebrates or reptiles, and other types of wildlife, such as plants and fungi.

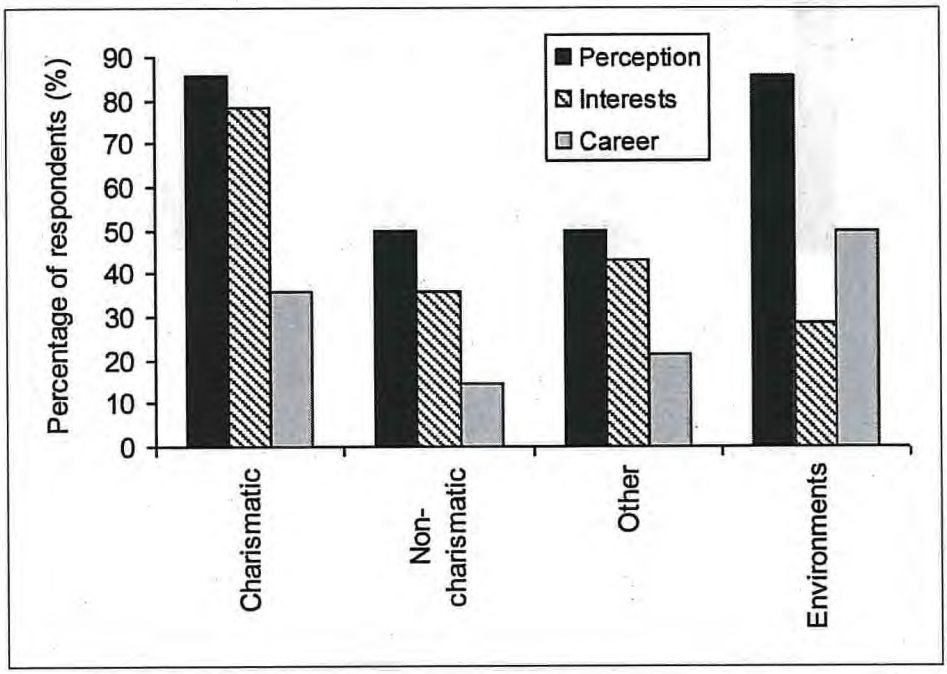

Figure 1 Percentage of respondents using one or more words, assigned to one of the four categories in answer to question 1 (perception), question 2 (interests) and question 4 (career aspirations).

In addition, 7% mentioned an overseas country or continent in response to their perception of 'wildlife', 14% declared an interest in exotic wildlife and 43% said they would like a wildlife-related career overseas. All respondents said they would like a career related to their degree.

Changing perceptions during the degree or according to age

Words, images and terms describing perceptions from the 30+ group fell into a greater range of categories than from students in the 18-21 age group ($p<0.01$). There were no significant differences ($p<0.1$) in the allocation of words, images and terms to each separate categories describing perception or interest between age groups however.

A greater proportion of Level 1 students and 18-21 students described their career aspirations as involving charismatic fauna than Level 2 students and students in the 30+ age group (both $p<0.1$) (Figures 2+3). The oldest students were more likely to say they wanted to work with 'environments' than the youngest group ($p<0.01$). Also the Level 1 and 18-21 year old students were significantly more likely to want a career overseas ($p<0.01$ and $p<0.05$ respectively) than Level 3 and older students (30+).

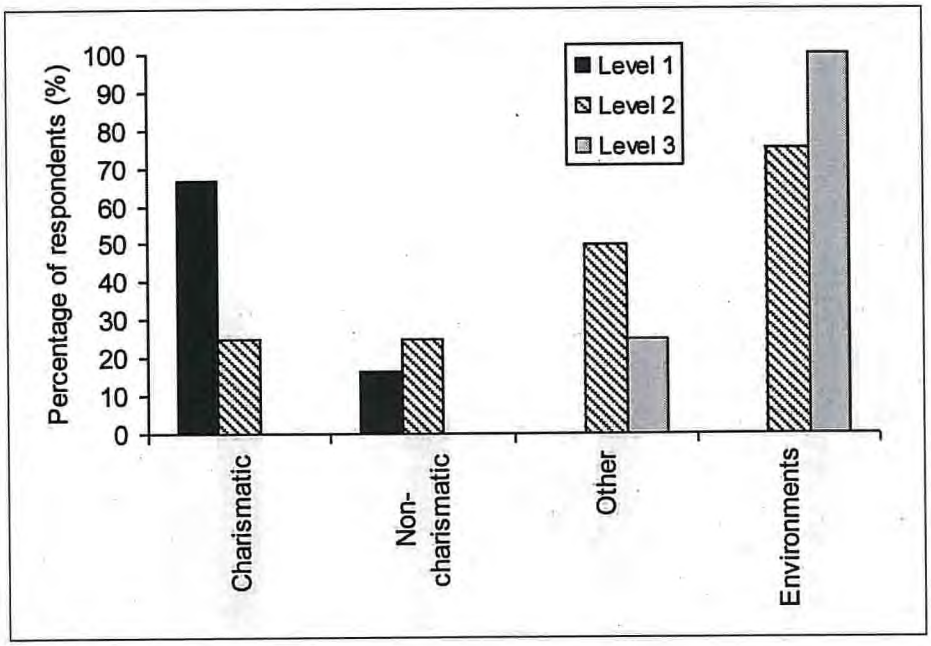

Figure 2 Proportion of respondents at each Level declaring to want a career involving wildlife, categorised according to one of the four categories.

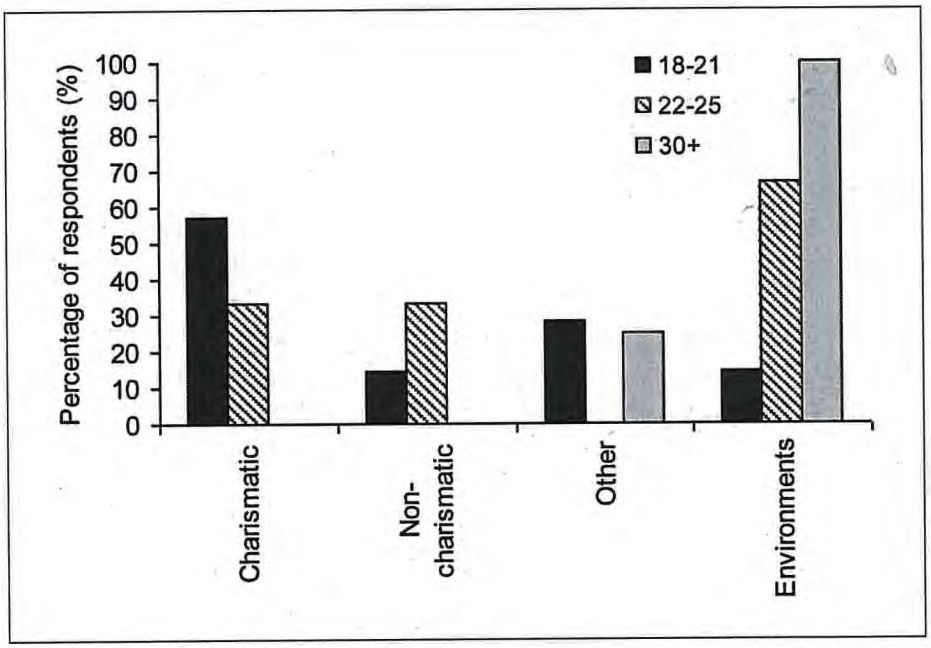

Figure 3 Proportion of respondents at each age class declaring to want a career involving wildlife, categorised according to one of the four categories.

Does research informed teaching influence student perception of wildlife and careers open to them?

There was a significantly greater breath to the fieldwork or laboratory experiences of students at Level 3 in comparison to Level 2 students ($p<0.1$).

Chi-square analysis indicated that there was no significant ($p<0.1$) relationship between the categories of the student perceptions, interests or career aspirations and their exposure to the various categories of research informed teaching, however. There was also no significant relationship between breadth of categories selected under the perception, interest and career aspirations and breadth of categories selected under the research informed teaching experiences.

Does work-experience influence student perception of wildlife and careers open to them?

Students in the 30+ age category were more likely to have had work-experience in a wider range of the categories ($p<0.1$) than students in the 18-21 category. Also, Level 3 students were more likely to have had work-experience with 'other' forms of wildlife, such as plants or microbes, than Level 1 students ($p<0.1$), and those in the oldest age category were more likely to have had work-experience and hobbies involving 'other' wildlife and 'environments' than those in the 18-21 category (all $p<0.1$).

There was a significant positive relationship between those that had work-experience with 'environments' and those that perceived ($\Phi = 0.548$, $p<0.05$), were interested in ($\Phi = 0.471$, $p<0.1$), and desired a career ($\Phi = 0.745$, $p<0.01$) with, 'environments'. Also, those students who had work-experience with charismatic fauna tended to declare an interest in charismatic fauna ($\Phi = 0.044$, $p<0.1$).

Discussion

The interpretations of the outcomes of this study are limited by the number of respondents. The total cohort size (43) is relatively small and the study would benefit from being widen-out to encompass students on similar Wildlife Conservation, Nature Conservation and Biodiversity Management degrees at other universities. A comparison between the perceptions of students on these courses with the general public would also enable the influence of non-academic information, such as from the mass media and hobbies, on perceptions of 'wildlife' to be investigated. Given the small sample size there are dangers in extrapolating the specific results beyond the cohort of students on this degree programme. The statistically significant differences in breadth of perception and career aspirations according to student age, and the relationship of this to work-experience, may highlight issues worthy of investigation in other subject areas.

What are students' perception of wildlife and wildlife conservation careers?

The perception of a subject by a student shapes their motivation, level of understanding and career aspirations, and a mismatch between perception and actual subject content can lead to dissatisfaction with the degree (Hill 1995; Ramsden 1997). In this study, when asked to list their perceptions of 'wildlife', the majority of respondents referred to both charismatic fauna and wider environments, though a desire for a career associated with the wider environment was common. This dichotomy reflects a focus on charismatic fauna in their habitat; such as lions in the savannah or birds in the forest; whilst overlooking other organisms, such as insects, reptiles, plants and fungi. Teaching and learning within the Wildlife Conservation programme may need to focus more on the importance of these latter organisms, and the interdependence between the charismatic fauna and other flora

and fauna, to ensure a deeper understanding of wildlife conservation and prevent dissatisfaction with degree content. Indeed, Hunter and Rinner (2004) found public engagement with biodiversity projects to be greater when they had been exposed to the importance and relevance of general biodiversity. This highlights the importance of introducing the relevance of inter-connected subject areas in order to ensure that understanding is not limited by lack of awareness of the wider context of the degree subject (Ramsden 1997).

The frequent mention of exotic locations in association with the career aspirations question in Part A was unexpected and unprompted, and no 'exotic' or 'overseas' boxes were provided in the Part B questions. McGuiness and Simm (2005) have noted the growing trend for students to expect to be taken to exotic locations on their courses. The preference of the 18-21 age group for this suggests a declining influence of local wildlife experiences and might be explained by an increase in the influence of TV or foreign holidays. The wider perceptions regarding wildlife in the oldest age category and the declining emphasis on charismatic fauna and 'overseas' words with age and level of the degree indicates an influence of both age and academic experience in association with degree progression.

Does research informed teaching influence student perception of wildlife and careers open to them?

While research informed teaching is thought to aid students confidence (Yorke 1999), promote 'deep learning' (Biggs 2003), and align the subject with the 'real world' (Slingsby 2007) there was no statistical relationship between students' perception, interests and career aspirations and the categories of research informed teaching experienced. While student perception of wildlife did seem to broaden with progression through the degree it could not be statically attributed to the range of wildlife research informed teaching subjects. There are several reasons why research informed teaching might not enhance understanding. Elton (2001) found that students sometimes felt that research active staff distorted the curriculum to their interests. This again reflects the mismatch between student course perception and the realities of the academic and applied employment areas, and of the need to teach subject context. Student-led research informed teaching activities may be more effective in developing broad understanding, rather than the passive research-led or research-orientated forms (Griffiths 2004). Secondly, students may not always understand the relevance of the research informed teaching activities to their degree programme. Indeed there is sometimes a tendency for students to see each activity, especially those that are assessed, as a stand-alone unit. Again this supports the need for alignment of student perceptions with the wider content and context of a subject.

Does work-experience influence student perception of wildlife and careers open to them?

Work-experience did seem to influence the respondents' perceptions of wildlife, their interests and career aspirations. Since this category asked for non-university associated work-experience, the activities carried out by the students were likely to be self-directed or at least, reflect their own existing interests, as opposed to the research informed teaching activities into which the students may be guided by teaching staff. As a result a stronger correlation between students' own work-experiences and their interests can be expected. The importance of self-directed work-experience in aiding student subject perception and associated career aspirations does not conflict with the aspirations of higher education, indeed, as Ramsden (1997) notes, there is a tradition of promoting autonomy and self reliance in higher

education. Relevant work experience can be aligned to, and used to inform, course content through formal links with universities. Indeed the use of potential employers and academic staff to teach a module aimed at addressing employability of geography students was found to be effective in illustrating the range of careers open to them as well as enhancing transferable skills (Maguire & Guyer 2004).

Taking this issue forwards

Aligning student perception, interests and career aspiration with the realities of the subject will enhance degree satisfaction (Hill 1995), deepen subject knowledge and promote employability. Within this subject area these results indicate that the perception of 'wildlife', and of the careers open to them, is largely constrained charismatic fauna and their habitats. The vast array of fauna and flora, other than mammals and birds, and careers associated with these, are largely overlooked, despite these presenting many employment opportunities. Work-experience appears to be more influential in shaping perceptions, interests and career opportunities and suggests that work-related activities, such as sandwich years or work-based learning, may be more effective than research informed teaching activities, in broadening understanding. Perhaps this is because work-experience always actively involves the student, while many research informed teaching activities are teacher-led. As Healey (2005) argues, when it comes to research informed teaching for example, students are likely to benefit most by being actively involved. Further promotion of sandwich years, work-based learning, student-led research and 'real-world' extended problem-solving may be the most effective way to broaden students understanding of wildlife conservation and of the careers available to them. More interaction between higher education and organisations such as The Natural History Museum, Botanical Societies, Ecological Societies, NGOs, Government and University Research groups would illustrate the breadth of subjects within Wildlife Conservation and of the careers open to graduates.

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