

Short Communication

Enhancing Student Employability through Ethics-based Outreach Activities and Open Educational Resources

David I Lewis

Institute of Membrane and Systems Biology and Interdisciplinary Ethics Applied Centre of Excellence in Teaching and Learning, University of Leeds.

Date received: 04/10/2011

Date accepted: 15/12/2011

Keywords: employability, final year projects, internships, ethics, open educational resources

This communication reports on how science communication final year undergraduate research projects and educational internships can be utilised to provide opportunities for students to develop and utilise key employability skills. In the current difficult economic climate, the report “*Working towards your future: Making the most of your time in higher education*”, jointly produced by the Confederation of British Industry and the National Union of Students (CBI and NUS, 2011), recommended that universities increase the employability of their graduates by providing opportunities, both within and outside of the taught curriculum, for their students to develop key employability skills. This communication discusses how the Faculty of Biological Sciences at the University of Leeds has used ethics-themed final year science communication projects and undergraduate educational internships in order to provide opportunities for students both to develop, and have evidence of, utilising these key skills.

With the increase in student numbers, coupled with reductions in staff and resources, many bioscience faculties are finding it increasingly more difficult to provide wet, laboratory-based final year projects for all their students (Cowie, 2005). Also, less than 20 percent of Biological Sciences graduates will go onto careers in scientific research and therefore many bioscience faculties and departments are developing alternative final year projects (Luck, 2008). These include science communication projects, which more closely match the career destinations of the majority of graduates and also result in student development of key employability skills required by employers (CBI, 2011).

Before 2006, discussion of ethical issues in sciences was confined to the Religious Studies and Philosophy GCSE and GCE curricula. After 2006, the incorporation of topical ethical issues into all mainstream science GCSE and GCE curricula marked a switch in emphasis from the acquisition of scientific knowledge to its application (i.e. “how science works”; QCA 2006a & b). Despite this, teachers typically only have one session to teach both ethical issues and the underlying science. There are also few resources available to underpin the classes. Personal communications with teachers has revealed that they would welcome both assistance with this type of teaching and also access to open educational resources (e.g. case studies, video clips) that they can incorporate into their lessons. To address these needs, the “*Science and Society*” project was developed, where undergraduate students create and deliver ethics-themed teaching sessions for local secondary school pupils, evaluating and reporting on this exercise as their final-year research project (Lewis, 2009; Lewis and Steen, 2010).

Students develop an interactive teaching session on an ethics topic within the GCSE and GCE curriculum. It must be curriculum enhancing and therefore students are encouraged to include current topical or controversial issues (e.g. the deliberate creation through genetic selection/IVF of a deaf child for a deaf couple; stem cell therapies) into their lesson. Topics for these sessions have included: Olympianism and fair play, whether the Olympic values have any place

in the modern world; genetic selection and designer babies; the issues surrounding the use of animals in scientific research (see Bioethics Briefing for resources; UK Centre for Bioscience, 2011). These sessions are delivered either at the University as part of its National Science Week / Leeds Festival of Science activities or part of a carousel of science and society projects that tours around secondary schools and sixth form colleges in the West Yorkshire region. Students incorporate ways of evaluating the effectiveness of their lesson and therefore questionnaires or audience response handsets are used to gather pupil's ethical opinions and values at the beginning and end of the session; questionnaires are also used to gather feedback on the lesson from both pupils and their teachers. These projects are written up in the same format as traditional wet laboratory projects; the introduction covers the educational background and pedagogy, the methods are how the students created, delivered and evaluated the sessions, with these student and staff evaluations forming the results. These results are then discussed with reference to the pertinent educational literature in the discussion (Lewis and Steen, 2010). The resultant dissertations are also assessed using the same marking schemes as those used to assess wet laboratory-based research project dissertations (Faculty of Biological Sciences, 2011).

Feedback on these activities from the undergraduate students, participating schools and examiners has been excellent. All students ($n=17$) recognised how they have grown in confidence and maturity over the course of the project, the improvement in their science communication skills, their time/project management and the benefits of development and applicability of these skills to their future careers. Schools were extremely appreciative of all of the aforementioned ethics sessions, in particular, highlighting the superb quality of individual sessions and the commitment and enthusiasm of the students. Feedback included:

"Excellent, preparation the students put in was impressive"

"Personally observed one student teach; her pace, pitch and resources were all superb"

"Love to host again next year, because of the great impression this year's cohort made"

We have been returning to the same schools for four years. Internal and external examiners have confirmed that these projects are academically equivalent to traditional laboratory projects, with an external examiner commenting that one dissertation was "a truly exceptional project, a delight to read".

To capitalise on the excellent resources that the students have developed and to address the shortage of ethics-based teaching materials within the GCSE and GCE curricula there has been a further, emergent outcome from this work. Since 2010, we have been recruiting first and second year students as educational interns. Educational internships provide an opportunity for students to develop employability skills outside of the taught curriculum (CBI and NUS, 2011). The remit of these ethics internships is for the students to search open educational resource (OERs) repositories and other websites for OERs and learning objects on ethics topics within the GCSE and GCE curricula which they then evaluate. Links to individual resources, intern evaluations of these, and suggested uses within the curriculum are then incorporated into an "*Ethics in Schools*" wiki which will shortly be made available to schools. Future interns will repurpose the resources developed by "Science and Society" project students into OERs suitable for use in schools; links to which will also be incorporated into the "*Ethics in Schools*" wiki.

Both the *Science and Society* final year projects and the educational internships provide the opportunity to develop key employability skills required by graduate recruiters (CBI, 2011) They encourage students to be enterprising, innovative and to develop key non-research based transferable skills.

“Challenging”

“Communicating and engaging with children, thinking diversely and reasoning- transferable into medical career”,

“Confidence, leadership, able to speak clearly and explain rather difficult concepts in simple terms”

They are a valuable tool in developing partnerships with local schools, promoting departments or faculties and encouraging school pupils to consider careers in the biosciences.

Acknowledgements

The development of science and society projects was funded by the award of a University of Leeds Teaching Fellowship to the author. The development of student educational internships was funded by a University of Leeds Academic Development Award and funding from the Leeds for Life Foundation. The support of these organisations is gratefully acknowledged.

Communicating author: Dr D.I. Lewis, Institute of Membrane and Systems Biology, Faculty of Biological Sciences, University of Leeds. Email: d.i.lewis@leeds.ac.uk, Tel: 0113 343 4233

References

Confederation of British Industry (2011) *Building for growth: Business priorities for education and skills*. Available at: www.cbi.org.uk/pdf/education&skillssurvey2011.pdf (accessed 04/10/2011)

Confederation of British Industry and National Union of Students (2011) *Working towards your future: Making the most of your time in higher education*. Available at: www.cbi.org.uk/pdf/cbi-nus-employability-report.pdf (accessed 04/10/2011)

Cowie, R.J. (2005) *A Snapshot of Final Year Project Practice in UK Bioscience Departments*. Available at: www.bioscience.heacademy.ac.uk/ftp/SIG/projectsurvey.pdf (accessed 04/10/2011)

Faculty of Biological Sciences (2011) *Code of practice on assessment 2011-12*. Available at: www.fbs.leeds.ac.uk/undergradschool/documents/copa.pdf (accessed 04/10/2011)

Lewis, D.I. (2009) “Science and Society” projects as alternative Final Year research projects. Available at: <http://www.bioscience.heacademy.ac.uk/ftp/casestudies/lewis.pdf> (accessed 04/10/2011)

Lewis, D.I. and Steen, C. (2010) “Science & Society” projects. An academically equivalent alternative to wet, laboratory-based final year research projects. Available at: <http://www.bioscience.heacademy.ac.uk/ftp/events/newcas130510/lewis.pdf> (accessed 04/10/2011)

Luck, M. (2008) Student research projects. *Guidance on practice in the Biosciences*. Available at: www.bioscience.heacademy.ac.uk/ftp/TeachingGuides/studentresearch/studentresearch_web.pdf (accessed 04/10/2011)

Qualifications and Curriculum Authority (2006a) *National Curriculum GCSE criteria for science*. Available at http://webarchive.nationalarchives.gov.uk/20110223175304/http://www.ofqual.gov.uk/files/11881_gcse_science_criteria_apr05.pdf (accessed 04/10/2011)

Qualifications and Curriculum Authority (2006b) *National Curriculum AS and A Level subject criteria for science*. Available at: http://webarchive.nationalarchives.gov.uk/20110223175304/http://www.ofqual.gov.uk/files/qca-06-2864_science.pdf (accessed 04/10/2011)

UK Centre for Bioscience (2011) *Bioethics Briefing*. Available at: www.bioscience.heacademy.ac.uk/ftp/resources/briefing/ethicsbrief.pdf (accessed 04/10/2011)