

Bioscience Learning & Teaching Case Study

“Science and Society” projects as alternative Final Year research projects

Name: Dave Lewis

School / Department: Institute of Membrane and Systems Biology, Faculty of Biological Sciences

Institution: University of Leeds

Activity: Alternative, non laboratory-based, final year research projects

Student group: Subset of final year students (BSc Human Physiology; BSc Medical Sciences; BSc Neuroscience; BSc Pharmacology) enrolled on the BMSC3301 Research project in Biomedical Sciences module

Aim: To develop final year research projects where student would design and deliver interactive ethics-based “Science and Society” activities as part of the Leeds Festival of Science

Context / Background:

Financial, staff and space constraints mean that there is an increasing need for Bioscience Departments to develop alternatives to traditional wet, laboratory-based research projects for their final year students. Furthermore, since less than 20% of Bioscience graduate go onto careers in scientific research, we should be developing and offering projects more suited to the final career destinations of the majority of our graduates.

There is currently considerable public interest in scientific ethical issues. With the new “Twenty First Century Science” GCSE and AS/A2s in “Science and Society” and “Critical Thinking”, ethics is increasing being incorporated within GCSE and A-Level science curricula. However, significant numbers of teachers do not have the knowledge, confidence or time to provide this teaching.

Therefore, a decision was made to develop alternative projects where students would design and deliver ethics-based “Science and Society” activities for local school children, evaluating and writing up this exercise as their final year research project.

Example description:

Students were selected from those enrolled on the final year BMSC3301 Research Projects module. At the start of the 9 weeks allocated to the project (January), individual students were given a Brief to develop a 2 hour interactive ethics-based “Science and Society” session for local school children, to be delivered during the Leeds Festival of Science (LFoS, March). The allocated topics for 2009 were “Animal experimentation” (Key Stage 5) and “The use and abuse of human genetic information” (Key Stage 4). Students were free to chose the format of their session but it must be interactive and include a means by which both pupil and Staff experiences are evaluated and whether the intended learning outcomes are met. The sessions must also be trialled on focus groups beforehand and modified in response to any feedback received. The deadline for completion of the development and trialing of this activity was 1 week before the LFoS. Students were informed that failure to meet this deadline or if the proposed session was not of a sufficient standard, they would not be allowed to run it as part of the LFos. Instead, the Supervisor would run the session

In week one of the project, students provide their Supervisor with a Gantt chart showing timelines for the project. In the weeks leading up to the LFoS, they are advised to concentrate on researching and developing the content for their proposed session including pedagogy and the GCSE science curricula. They also have to recruit focus groups, any facilitators/helpers they would require for the session and train/provide notes for these facilitators. Weekly meetings with supervisors enable the provision of guidance as the materials/session is developed. One week before the session, students undertake a full rehearsal of the session for their Supervisor who then decides whether it is of a sufficient standard for the student to present as part of the LFoS.

The students chose different formats for their session. Both students started their sessions with an “Ice-breaker”. The student allocated the topic “Playing god; The use and abuse of human genetic information” then provided a brief introduction to individual topics followed by a facilitated discussion of case studies (appendix 1). The topics covered included genetic testing, designer babies, eugenics, personalised medicine and genome and society. In contrast, the



session on “Animal experiments, cruel or necessary?” began with two 10 minute presentations, one arguing for (delivered by the student), the other against (delivered by the Supervisor) animal experimentation. These were then followed by facilitated discussion of questions such as “45% of animals used have been made in the lab - genetically modified. Should we be using genetically modified animals?” and “Do the public support animal experiments? Should anti-vivisectionists be allowed to use whatever means necessary to stop these cruel experiments?” (appendix 2). Evaluation of both sessions was gathered by pre and post-session questionnaires on ethical viewpoints, the use of personal response systems or “Traffic light” cards and by pupil and staff end-of-session open comment feedback questionnaires.

On completion of the session, the project is written up in a similar manner to wet, lab-based projects (introduction, methods, results, discussion). Specific guidance as to what is required is provided (appendix 3). All teaching materials used during the activity (e.g. slides, facilitator notes, questionnaires) are incorporated into the appendices. The dissertation is assessed using the same criteria as per traditional lab projects, with the novelty and appropriateness of the teaching session itself being assessed, both as a component of the “productivity” mark and in the results section of the dissertation.

Results / Feedback:

Feedback from the pupils and school staff was extremely positive. Both pupils and staff enjoyed the session and would return for similar events in future Festivals of Science. As a result of attendance at these sessions, pupils’ knowledge and understanding of the topic and the underlying ethical issues has increased. Staff also felt that the content matched the curriculum and was pitched at the appropriate level. Both students found the project a challenge and far harder work than they envisaged. They also both overestimated the amount of content that could be incorporated into a 2 hour session. However, they gained particular satisfaction and enjoyment from running very successful teaching sessions. They also recognised that, in undertaking this exercise, they have developed some key transferable skills.

From a Supervisors perspective, the key to the success of these projects is the adherence to strict deadlines during the development of the activity, the monitoring of material/session development and the inclusion of significant numbers of rehearsals before the event for both the student and any helpers. Given that pupils are coming from schools specifically to attend these sessions, they are a showcase for the University; there is no second chance if things go wrong. Supervisors should therefore be prepared to step in either beforehand if the developed activity is sub-standard or during the session itself. Guidance should also be given as to what can be realistically covered in a 2 hour session

As part of the feedback, we canvassed teachers as to the topics they would like to see covered (and appropriate age groups) in subsequent years. We plan to run similar sessions next year using the same format, focusing on Key Stage 4, as there is greater demand at this Key Stage. We will also expand the range of topics covered.

These “Science and Society” projects encourage students to be enterprising and innovative. They provide an academically equivalent alternative to traditional wet, laboratory-based projects, they also result in the development of additional key transferable skills, notably science communication. They are therefore ideal alternatives for students who intend to follow non-research careers such as science communication, scientific writing or teaching. Finally, “Science and Society” sessions such as these can be a valuable tool, both in the promotion of the public understanding of science and of the Institution itself.

Further information:

These projects are not designed to cater for a large number of students, there are only a limited number of student-led activities that can be incorporated into events such as the Leeds Festival of Science. Increased numbers of students could be accommodated if the sessions are run within the Schools themselves.

Whilst running these sessions, students are acting as Ambassadors for the University. Content development requires the student to be academically able. They should also have an interest in science communication, be innovative, out-going and ideally, used to working with school pupils. In advertising these projects to students, we therefore clearly spell out that they are not an easy option and highlight the qualities/commitment required. We also restrict these projects to our higher achieving students

Contact: d.i.lewis@leeds.ac.uk; Tel: 0113 343 4233

Case study published: August 2009

Available from the UK Centre for Bioscience
www.bioscience.heacademy.ac.uk/resources/cslandt.aspx