

Group eposters – an enjoyable tool to engage first year undergraduates

Background

When we launched the *Biological Sciences Review*, in 1988, my aim was to ensure that every volume contained engaging material about plants. My objective was to convey to readers – A level students and their teachers, that plant science is a fascinating discipline. One way that I have generated this material has been to identify high quality work about plants in undergraduate assignments (e.g. Sheffield & Cotter, 1999; Miller, 2004; Ridgway & Sheffield, 2010; Miller, 2011). In helping to rework these accounts for the ca.15,000 *BSR* subscribers, I have combined the provision of well-researched material with enhancement of the employability of these students.

Plant Science graduates are described as an 'endangered species' (Jones, 2010). A 5-year study showed that a single concerted effort at the start of undergraduate study can have a lasting effect on the attitudes of students towards plant science (Levesley *et al.*, 2012). For the past four years I have therefore set ca. 300 first year undergraduates a group eposter on a plant as part of their coursework for my Biodiversity unit, and the best have been published (Winstanley *et al.*, 2009; Abdulrazeg *et al.*, 2010; Johnson *et al.*, 2011; Peacham *et al.*, 2012). This case study explains and evaluates the eposter in light of data from student surveys and a focus group.

Reasons for introducing this teaching method

The main reason was to enthuse the students about plant science – known to be one of the least popular science subjects at school in Europe and the USA (Jenkins & Pell, 2006; Sjøberg & Schreiner, 2010). Only 2-6 of the ca. 300 students who take my unit every year are Plant Scientists. The remaining students are studying Biology (ca. 90), Zoology (ca. 45), Biomedical Sciences (ca. 30) and variable numbers of Anatomical Sciences, Cell Biology, Developmental Biology, Genetics, Life Sciences, Microbiology, Neuroscience, Pharmacology, Physiology. Some of these students can choose to take units that deal with plants in second and final year and have the option of transferring to Plant Science.

Additional reasons included my desire to encourage first year, first semester University students to adopt a deep approach to learning (Marton & Saljo, 1976) by getting them actively engaged in obtaining and processing information (Kirkwood & Price, 2008). I also wanted to develop an enjoyable way to introduce them to skills that will be of utility both in their studies and as graduates. These include teamwork, leadership, project management, independent research, time management, working to a brief, working to a deadline, negotiation, peer review and reacting to feedback. eposters are a well established tool at scientific meetings and evaluations have provided strong evidence that they are effective in terms of both enhancing interest (e.g. Powell-Tuck *et al.*, 2002) and providing valuable educational resources (e.g. Link, 2006).

A final reason for introducing the eposter was to allow all students to carry out research that would relate to their degree. Our first year students study a core of units that are considered essential for all biologists and some have only one or two units that are wholly relevant to their discipline. Programme-level feedback has indicated that students in specialized programmes value activities that allow them to relate their learning to their chosen discipline. One of the parameters set for the poster is therefore that the chosen plant must be relevant to any specialized degree discipline of members of the group. I construct groups that include one or more students from specialized programmes so as to maximize the knowledge and breadth gained.

Lecturer's perspective

My concept of teaching is the facilitation of learning, so I very much enjoy the student centred approach of the eposter. The eposter format has evolved over the years in light of student feedback and educational literature (e.g. Kirkwood & Price, 2008), with increasing guidance provided for provision of peer review and refinement of marking criteria, which students clearly appreciate; e.g. *"The peer assessment was a useful tool within the eposter because it gave me valuable constructive criticism. I feel the rigorous marking criteria were useful because it has exposed me to the scrutiny that scientific publications undergo, and so from now on I feel I will be more aware of inaccuracies within my work. And overall it was a fun experience :)"* (student, 2012).

This is the students' first exposure to peer review and formal group work, and while they clearly gain from this, they also find teamwork challenging. e.g. *"The best activity of the eposter was the peer review because it was really interesting to find out about plants that we do not cover in the course content. Despite being a stressful experience at times due to lack of communication between group members, it was an enjoyable activity which made this unit stand out from other modules and has inspired me to choose a plant science related module next year."* (student, 2012)

I find it hugely enjoyable to read and mark the eposters and often enter into extended correspondence with students when they have received my feedback and we discuss/critique the literature they have accessed. Some of the key skills students acquire are evidenced in the following: *"I enjoyed this exercise as it forced me to think of just the most relevant and interesting points about my chosen plant, this enabled me to later produce work which cut out most of the trivial information on the subject and helped with becoming harsh about cutting out unnecessary research in my research internship. I also learned a great deal about teamwork ."* (student, 2011)

Students' perspective and changed behaviour

Student views are included in the podcast, and obtained yearly via Unit Surveys (the 'overall excellence' score for the 2012 delivery was again highest of all first year, first semester units surveyed). This January I also surveyed the past three years of students who took this unit to invite their views on the eposter 'for an educational paper' and obtained a 43% response rate (the quotes herein are free text comments added at the end of the survey).

Using a Likert scale, strongly agree to strongly disagree, 62% of students responding one and two years after doing the poster agreed or strongly agreed (hereafter described as agreed) that 'As a consequence of doing the Biodiversity eposter exercise I became more interested in plants/plant science' and more than one in three of those respondents agreed that 'As a consequence of doing the eposter exercise I included one of more units covering plants/plant science in my subsequent education'.

67% agreed that 'While doing the research for my eposter, I developed a broader appreciation of the scope of my degree programme'. 85% agreed that 'The eposter exercise taught me things that I was able to apply to my next teamwork exercise'. 64% agreed 'The skills I developed while researching the eposter material were valuable to me in my subsequent education'. 3% agreed that 'As a consequence of doing the Biodiversity eposter exercise on a plant I changed my degree programme to Plant Science', and students said *"It gave me a wider insight and interest in plant sciences and I am now writing my dissertation on a plant science subject!"* (student, 2011); *"After doing research on carnivorous plants, there was certainly no way I could ever say they weren't fascinating!"* (student, 2012), and *"I now work at Rothamsted Research thanks to how interesting I found it!"* (student, 2010).

Issues

All the data are post-hoc and I lack a control group.

Although timed to start when my lectures on plants have finished, the draft eposters can be marred by inaccurate information as students and their peers cannot accurately judge the veracity of their sources.

Although survey questions related to the eposter and its effects it is possible that my lectures on plants in the unit also had some effect.

Every year 1-4 students fail to engage with the eposter task, which is disappointing for the rest of the group (but they can learn valuable early career lessons, e.g. in resolving conflict). My enquiries routinely reveal that such students do not fail to understand how to engage with or complete the task, but are content to lose the marks.

Benefits

The eposter introduces students to group work when the outcome does not impact on their final university grades, and so allows them to find the best way to interact. The structure allows students to achieve the aims, while providing opportunities for them to be creative and innovative, and clearly does improve many students' perspective on plants. Over the past two years, 46 students who were not required to do so chose to take a plant sciences unit in second year.

Reflections

This exercise is applicable to any discipline, and could provide the means to inspire learners about a variety of topics, or be used as training for group work for any subject. It does not require a VLE and could easily be adapted for face to face interactions and the production of physical posters. Gentle encouragement to engage might then be needed for first year students (as their lack of participation would not be obvious to the instructor), but the outcome provides a suite of skills of value in their future education and in the graduate world of work.

Publications

- Abdulrazeg, O., Moens, H., Narey, A., Packham, A., Trimarco, L. (2010). The death apple. *Biological Sciences Review* 22 (4) 42.
- Jenkins E.W., Pell R.G. (2006). The Relevance of Science Education Project (ROSE) in England: A Summary of Findings. (Leeds, UK: Centre for Studies in Science and Mathematics Education, University of Leeds)
- Johnson, A., Ma, C., Khwaja, H., Machin, K., Keenan, M., Joyce, W. (2011). Duped! *Biological Sciences Review* 23 (4) 42.
- Jones, S. <http://www.telegraph.co.uk/science/steve-jones/8001565/Where-have-all-the-British-botanists-gone-just-when-we-need-them.html>
- Kirkwood, A & Price, L (2008). Assessment and student learning: a fundamental relationship and the role of information and communication technologies. *Open Learning* 23: 5-16.
- Levesley, A., Jopson, J. & Knight, C. (2012). The Gatsby plant science summer school: inspiring the next generation. *Plant Cell* 24 (4) 1306-1315.
- Link, K. M. (2006). Electronic education exhibits and scientific posters: a brief review of an evolving feature of the annual meeting. *Radiographics* 26 1263-1265.
- Marton, F. & Saljo, R (1976). On qualitative differences in learning 1. Outcome and process. *British Journal of Educational Psychology* 46:4-11.
- Miller, J. (2004). Controlling Kariba weed. *Biological Sciences Review* 17 (2) 39-41.
- Miller, M. (2011). *Utricularia*: nature's fastest carnivorous plant. *Biological Sciences Review* 24 (1)18-22.
- Peacham, T., Pidliswyj, J., Price, E., Pritchard, R., Rack, S., Rahal, J. (2012) The biggest cactus in the world. *Biological Sciences Review* 24 (4) 42.
- Powell-Tuck, J., Leach, S. & McCready, L. (2002) Electronic poster presentations in BAPEN. *Clinical Nutrition* 21 (3) 261-263.
- Ridgway A, & Sheffield E. (2010). Pitcher plants. *Biological Sciences Review* 22 (4) 26-30.
- Sheffield, E. & Cotter, F. (1999). The maidenhair tree. *Biological Sciences Review* 12 (2)13-16.
- Sjøberg S. & Schreiner C. (2010). The Rose Project. Overview and Key Findings. (Oslo, Norway: University of Oslo).
- Winstanley, C., Formby, S., Rowland, S., Twist, S, Morar, S., McSweeney, S., Woods, S. (2009). Ghost orchid. *Biological Sciences Review* 21 (4) 42.