

Students as partners: Extracurricular opportunities to enhance student learning in the Biosciences

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Background:

The substantial benefits to be gained by, and from, students, working in partnership with academic staff or their fellow students, to create knowledge and enhance both their own and their peers learning experiences cannot be underestimated (Healey *et al.*, 2014; HEFCE & NUS, 2014). Collaborative educational partnerships enhance student motivation and engagement, promote learning and enable students to develop key employability skills. For staff, they can draw on the skills and experiences of students to promote change and enhancement of their own learning and teaching practices and, in turn, their students educational experiences (Cook-Sather *et al.*, 2014).

My educational philosophy has four key elements:

- Give my students ownership and responsibility for their learning.
- Enable them to create knowledge in areas of interest to themselves.
- Provide them with the tools and skills to become independent learners, able to acquire and apply knowledge to different situations.
- Develop well-rounded, workplace-ready graduates

Collaborative educational partnerships are an ideal tool to implement this philosophy into my educational practices.

Reasons for introducing this method:

Within the taught curriculum, I've developed ground-breaking teaching interventions including on animal experimentation, bio-ethics and non-traditional final year research projects (Lewis 2012a, b; Lewis 2013). Enquiry-based, active learning and partnerships feature significantly in these interventions. However, the "*Working towards your future*" report recommended that universities also offer extracurricular opportunities for students to contribute to the development of their education (NUS & CBI, 2011). I therefore created three novel knowledge-creation partnership opportunities, outside of the taught curriculum, for my students:

i. Educational Research Internships

Recognising that the student body is a vast, valuable and largely untapped resource, I established an innovative, extra-curricular, educational research internships scheme for Level 4 and 5 students (30 p.a.; Lewis, 2013a). Each intern undertakes 75 hours of paid work, fitted around their academic studies or in the vacation, working in partnership with academic staff on on-going curriculum development or pedagogical research projects including the collation of an online collection of OERs on animal experimentation (Lewis, 2014a), student-created guidance on the use of the e-learning resource development software, Xerte (Lewis *et al.*, 2015a), or the evaluation of public engagement opportunities within STEM undergraduate curricula (Lewis *et al.*, 2014a).

ii. Pop-up Science

Building on the success of my internships scheme, I introduced collaborative partnerships into my other activities. Uniquely, I combine my student education activities with substantial and insightful public engagement work which actively engages wider Society with science and its ethical implications. I am passionate about public engagement, my students are aware of this and I regularly received requests from them to participate in these activities. To enable them to share my experiences and my enjoyment of engaging the public with science, I established *Pop-up Science* (Spurring *et al.*, 2014), a unique, student-led, extra-curricular public engagement volunteer scheme where students work in teams to create and deliver activities at local community fetes, family fun days and agricultural shows. Students

with and without public engagement experience team up, working in partnership to create and deliver an event; the experienced students providing training and mentoring for their partners in the process.

iii. Ethics discussion group

At the request of, and in partnership with, a Level 6 student, I established MSEDG (Medical and Scientific Ethics Discussion Group), a student-led, extracurricular ethics discussion group (Baptiste, 2014).

Meeting once a month and facilitated by this student, students from across the Faculty discuss topical bioethical issues e.g. "3-person IVF" or "The right to die".

Lecturer's perspective:

Students have the background and experience of being a student, something I haven't been for many years. If I want to enhance my students' learning journey and educational experiences, I have to actively involve them, not just getting them to provide feedback, but as full collaborative partners. They are best placed to advise on student interest. They understand their own and their peers learning needs and the support they require. They can contribute perspectives or skills (e.g. IT) that I don't possess. Interns are invaluable and largely untapped resource which I utilise to the full to enhance my learning and teaching practices.

Similarly, Pop-up Science is an opportunity to share my passion for public engagement with my students. It is extremely rewarding watching them develop as science communicators, learning the art of effective communication to different audiences or using different media. Initially they struggle, but with mentoring and encouragement from their fellow volunteers, they soon learn this key skill, inspiring both their audience and themselves:

"A challenge making complex tasks simple, a rewarding experience"
(Biology student, 2014)

"I gained so much from the day. I came away feeling enthused, passionate and appreciated how much I enjoyed my degree"
(Neuroscience student, 2014)

They draw on their bioscience knowledge and wide range of personal experiences to create innovative ways of communicating science to lay audiences, for example, using a game of Chinese whispers to explain how nerves conduct. I learn a substantial amount from them, significantly enhancing my own activities by incorporating their ideas and practices into my own.

Being young and not the archetypal image of a scientist, students also make excellent role models. Running activities at community fetes and fun-days enables them to reach out and inspire hard-to-reach communities and those that don't normally engage with science.

"You wouldn't think a stall like this could get the kids so inspired and interested. I had to practically drag him away"
(Parent, Spring Time Live, 2014)

The exceptional feedback they receive from the public and the enjoyment they get personally from these activities develops their passion for public engagement and inspires them to deliver more.

I am my Faculty's "Ethics Champion", responsible for the delivery of bioethics education across all its degree programmes. MSEDG provides a unique, extracurricular opportunity for me to engage my students with topical ethical issues in their discipline. The benefit of my not being present is that they are not intimidated and become more engaged; they are comfortable voicing their opinions and debating the issues.

"More relaxed, can speak your mind, ask stupid questions. No pressure from an academic"
(Medical Sciences student, 2014)

Student's perspective:

Student appreciation of the value of these interventions, in enhancing their educational experience and in acquiring key skills, is reflected in the exceptional demand for them: educational research internships are typically eight-times oversubscribed; there were 39 applications for pop-up science in 2014-15. Many return for a second internship or continue to participate in pop-up science in subsequent years.

I want students to learn from their experiences, not to forget them, and to implement this learning into future activities. I therefore require all participants to reflect on their experiences, their learning journey and the skills gained in personal blogs and case studies (Gibbs, 1988). These reflective accounts clearly show that these interventions promote active learning and inspire students to be involved with their education and that of others:

"I am honestly surprised with the amount that I am learning."
(Neuroscience student, 2013)

"Felt rewarded when children were inspired and excited by the science we were explaining. I've developed a new found interest in the science behind it"
(Zoology student, 2014)

They recognise the key skills they are developing, the opportunity to gain valuable work experience, and the benefit of these interventions and their participation in them to their future employability:

"Brilliant experience that taught me a variety of skills. Internships set you apart from other students"
(Biology student, 2013).

"Should be integral part of all degree programmes"
(Medical Sciences student, 2014)

Participation in these schemes is recorded on students HEAR transcripts, which provide tangible outputs students can showcase to employers at interview. They are also named as co-authors on any outputs including co-presenting at conferences and workshops (*see dissemination section*), further enhancing their education, skills development and CVs.

Issues:

- *Funding:* There is limited external funding available for educational initiatives. Each internship carries a stipend of £300 whilst Pop-up science incurs travel, fete registration and consumable costs. The internships scheme was initially funded by the Leeds for Life Foundation. Now they are requested in pedagogical research grant applications or funded through colleagues University Student Education Fellowships. However, a longer-term source of funding is required. Pop-up science was established with the prize money from my Physiological Society's Otto Hutter Teaching Prize. The Faculty, recognising the benefits, now provides £3000 p.a. towards its costs.
- *Selection:* Internships and pop-up science are heavily oversubscribed. Due to capacity constraints, I am not able to offer these opportunities to all students that apply. However, given that selection is based on personal statement rather than academic profile, those students who these schemes seek to benefit, i.e. those committed to enhancing their employability or education, will gain a place by virtue of them writing more compelling applications.

Benefits:

These interventions generate substantial benefits for all involved. For students, they enable them to contribute to academic communities where they are co-producers of knowledge, to enrich their own learning journey by broadening their education and experiences, the opportunity to develop key skills, and, through providing training or mentoring to their peers, the skills of others, ultimately to become more well-rounded workplace-ready graduates. They significantly enhance student employability.

"Invaluable, help students stand out in a highly competitive employment environment"
(Medical Sciences student, 2014)

For academic staff, they greatly facilitate their student education and public engagement activities. Students bring knowledge, skills and a different perspective leading to change in professional practices and enhancement of colleagues educational and engagement activities. For the public, Pop-up Science is an opportunity to engage with research in the Biosciences, to discuss with students both the science and underlying ethical issues.

Reflections:

The substantial benefits to all parties clearly demonstrate the extraordinary value of developing partnerships between students and staff or fellow students in order to enhance the student educational experience. Further, they need not be restricted to within the taught curriculum, but can be effective across the entire spectrum of activities within Higher Education.

Dissemination:

These interventions or their outputs were disseminated in the following publications, workshops or conferences (***student** authors; †**student** co-presenters):

- Lewis DI, ***Byrne A**, ***Choppin C**, ***Davies D**, ***Watkins C**, Chakrabarty S, McBurney S, Volz V, Wilshaw S. (2015a) Creating Xerte e-learning resources: An easy to use student guide. *JORUM* (*submitted*)
- Lewis DI, ***Byrne A**, ***Davies D** (2015b) Enhancing Graduate Employability: Developing Digital Resources Final Year Projects. Durham Blackboard Users Conference.
http://community.dur.ac.uk/lt.team/conference/wp-content/uploads/2015ConferenceBooklet_FINAL.pdf
- *†**Baptiste S** (2014) MSEDG, a student-led ethics discussion group. University of Leeds Student Engagement Showcase. <https://www.facebook.com/StudentEngagementLeeds?fref=ts> and <http://ow.ly/i/7Gqb7>
- Lewis DI (2014a) ETRIS: Facilitating research and training in in-vivo pharmacology. *Pharmacology Matters* 7(3), 26.
http://www.bps.ac.uk/SpringboardWebApp/userfiles/bps/file/Publications/Pharmacology_Matters/December2014_WEB.pdf
- Lewis DI (2014b) Embedding public engagement with research into the curriculum. *H3 symposium: Public Engagement as a Pathway to Impact*, Physiological Society.
- Lewis DI (2014c) Pop-up science: Using students to engage young people with science. *Queens Gender Initiative Conference*, Queens University Belfast.
- Lewis DI, ***Gutoreva A**, ***Carlisle L**, ***Hughes E**, ***Black L** (2014a) Enhancing employability and building bridges: Public engagement opportunities within STEM undergraduate degree programmes. *Proc Physiol Soc* 31, C75. <http://www.physoc.org/proceedings/abstract/Proc%20Physiol%20Soc%2031C75>
- Lewis, DI, *†**Burke A**, *†**Choppin C** (2014b) Students as producers of knowledge: Digital (Xerte) Resources Final Year research projects. Workshop, University of Lincoln.
<http://makingdigitalhistory.co.uk/projects/xerte-talking-students-producing-interactive-learning-resources/life-sciences-workshop-24th-june-2014/>
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http://www.lts.leeds.ac.uk/Student_Education_Bulletin/documents/SEB9_saved_for_web.pdf

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- Lewis DI, Pickles A, *Ash S, Strangward J (2013) Educating the next generation of in-vivo scientists: The undergraduate in-vivo training initiative. *Proc Brit Pharmacol Soc* **11**(3), 207P
<http://pa2online.org/abstracts/vol11issue3abst207p.pdf>
- Lewis DI & *Ormslow D (2013) Educational internships: Extra-curricular opportunities to enhance graduate employability. HEA *Engaging students in Bioscience Education* workshop, Newcastle.
http://scotland.heacademy.ac.uk/events/detail/2013/09_May_HEA_STEM_Biosciences_Newcastle
- Lewis DI & *Hogton F (2012) Engaging young people with ethical issues in scientific research: Young people's perceptions of the use of animals in research in the UK. *Proc Brit Pharmacol Soc* **10**(4), 207P.
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