Learning in lectures: transforming teaching through interaction and engagement

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This case study has been developed from data gathered through observations of the teaching component; interviews with the tutor; and focus groups and questionnaires with students from the current and previous cohort.

Background

Life on Earth is a core module for first year students (SQF7) at Edinburgh Napier University (ENU). It is taught for 9 different biological sciences degrees and introduces students to evolution, genetics and ecology. Over 65% of ENU students are first generation and many are international (English as a second language), mature or without standard qualifications. Achieving active engagement of students and a deep learning environment that is both challenging and supportive is difficult, and especially so with such diverse, large groups in a crowded first year timetable. The topic of evolution can make it even more so. The lecturer in this case study has made it look easy - and fun.

Techniques used in Life on Earth have been developed over 12 years, informed by action research, evaluation and reflection. They are designed to engage students and enhance learning through interactive activities. The lecturer teaches and interacts with a large (100+) group of students in a creative and enthusiastic way. He maintains an open learning environment to encourage high levels of student engagement and makes the content relevant to individual learners. He develops student confidence and essential study skills through a mix of carefully selected interactive teaching methods. All the teaching strategies used are evidence-based and each serves a different purpose: stretching student learning (Bonus Questions Box and 'Darwin's Bar'); encouraging interactive, low-risk participation and learning (personal response systems and 'Interactive Windows'); developing group work skills and an understanding of academic criteria (peer-developed criteria and poster assignment); providing content support forums (Biology Plus sessions); clarifying student understanding using the VLE for fast feedback ('Boot Grit' comments box); peer review of note taking (an enhanced module handbook and 'note swaps' in lectures) and peer marking (revision questions); and reflecting on understanding ('Thought Stone' summaries/one minute papers).

The lecturer uses assessments to encourage deep learning and a joy of learning for its own sake. During the panel group interview the students shared they had become motivated to learn additional material for their own understanding by doing the supplemental readings. They expressed their desire to not disappoint the lecturer by being fully prepared for lectures and by learning the required and supplemental materials.

Reasons for introducing this teaching method

The increasing size and diversity of the class was making teaching adapted to the needs of individuals more difficult, and the lecturer became aware that his assumptions about prior student learning and learning styles were often wrong. Whilst the lecturer uses a range of different methods (such as one-to-one interviews and on-line discussion fora) where possible in smaller classes, the teaching of this large module is 'locked in' to a traditional timetable, hence techniques have been adopted that allow student engagement, peer support and learning tailored to the individual within the constraints of lecture and tutorial slots (supported by the VLE). The lecturer began with small changes consistent with a large lecture format and slowly incorporated (over a twelve year period) additional teaching methods to increase student activity, engagement, and deeper learning.

Lecturer perspective

The lecturer's desire to encourage deep learning has reshaped his teaching, informed his action research on his practice and led to consistently excellent student evaluations and demonstrably

improved student learning. He believes that learning comes through arguing, discussing, challenging and being challenging – a personal construction of understanding in a social setting. A traditional passive lecture rarely encourages this, hence his focus on refining techniques that allow it within the constraints of a standard first year time-table.

Student perspective
This was collected through completed surveys from 76 students and a panel discussion of 7 students. Students were very supportive of being taught evolution through the different interactive lectures. The large majority (67 out of 76) of students found the delivery of the lectures through a variety of interactive methods to be the most useful element in their learning of the module content. Specific interactive methods, such as class discussions, problem solving and 'Thought Stones', were identified as particularly useful. Interestingly students perceived their level of understanding to be increased even though they were presented with less content during the lectures. Students on the panel repeatedly said they felt they 'owed it to the lecturer' to learn the material because they did not want to let him down. A genuine and safe learning community was observed during the lecture visit and discussed during the panel session. Students view the lecture more as a discussion group, where their input and contributions are valued, than as a formal lecture.

Issues
The lecturer initially had concerns that adopting interactive methods might reduce the amount of content delivered in lectures. Whilst this is true, he believes it is more than compensated for by the increased engagement of students with the material and the additional learning that is stimulated beyond the classroom. A small minority of students (17/76) reported that the notes taken were not in depth enough although students also said they felt they had learned enough to pass the module. This could be a product of the expectations generated by experiences in more traditional lectures.

Benefits
Students appreciate the lecturer's dedication, enthusiasm, and willingness to lecture with interactive methods. Three different evaluation methods have been used by the lecturer during the module: 1) student feedback, 2) controlled tests on the effects of teaching methods on assessment performance, and 3) controlled tests on the effects of different methods on note-taking and information recording. Applied pedagogical research conducted by the lecturer supports his claims of increased student understanding, recall and learning (Huxham, 2005), and improved note taking skills (submitted work). He has also examined the best ways to construct student peer groups (Huxham and Land, 2000), to give feedback to students (Huxham, 2007) and to collect it from them (Huxham *et al*, 2008). Therefore the lecturer has gone beyond changing his own practice and has become engaged in serious research about the implemented changes. He is eager to research, publish and share his pedagogical work with interested practitioners leading to broader impacts on student learning.

Reflections
The learning and teaching practices within the case study could easily be integrated into one's own teaching. The variety of techniques shared here could be chosen and implemented either on an as need basis addressing particular learning outcomes or as a suite of activities to bring about larger module reforms. Most importantly it will be necessary to understand the impact of these changes, small or large, on student learning.

References
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