



The University of Newcastle's solution to the dwindling number of Science and Engineering students: Enlarge the pool

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Over the last decade there has been a well-documented reduction in enrolments in the science and engineering courses at the secondary tertiary levels of education. People have speculated about the causes of this disturbing international trend, however, up until now, no one has been successful in turning it around.

The University of Newcastle has developed two programs that, rather than trying to attract some of the small number of potential students to Newcastle, actually aims to increase the overall size of the pool of suitably qualified and enthused people. The initiatives are known as the *SMART* (Science, Mathematics And Real Technology) *program* and *The Science and Technology Challenge*. SMART is aimed mainly at infants and primary school age students. It uses interactive demonstration-based and multimedia science shows to inspire and engage young minds. *The Science Show Off!* Competition, a spin-off of the SMART program, provides a forum for school students to present their own science show to large public audiences. The Science and Engineering Challenge is a competitive workshop-style event for year 9 and 10 high school students. Teams are challenged to apply knowledge together with their own experience, creativity, teamwork and analytical skills to resolving realistic engineering and science problems.

There is a growing body of evidence that the programs are contributing to an increased enrolment in high school and university science courses. The University of Newcastle, for example, experienced 150 per cent increase in enrolments in Science degrees over the past two years and an increase in the University Admission Index for a Science degree from 67.5 to 70.1.

This poster overviews the rationale and structure of the programs, and how they both support and enhance the teaching of science. Initial research finding and plans for the future will also be presented.

Group projects in ecology foster a deep learning approach

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A third year offering in ecology at The University of Newcastle involved students working in small collaborative groups. Groups designed, conducted, interpreted and presented field-based projects addressing current ecological issues for local environmental management agencies. Communication and group/peer interaction was facilitated during the projects via face-to-face meetings, fieldwork, online group discussion forums and electronic file exchange facilities. Presentation of research findings was achieved via posters at a one-day symposium and an online virtual conference. Assessment of group projects was achieved via both inter and intra group peer assessment.

The activity has been designed based on Ramsden's (1999) principles of a student-centred approach to learning which aims to create a learning context which fosters a 'deep-approach' to learning. Indicators of a deep approach to student learning include an intention to understand, focusing on the concepts applicable to solving problems, empowerment of students to take an active and independent role in their own learning experiences, relating previous knowledge to new knowledge and an internal or intrinsic motivational emphasis.

Student feedback via a questionnaire and a series of open-ended written responses suggested that when provided with an appropriate face-to-face and electronic collaborative learning environment, student experiences reflect characteristics of a deep learning approach.

References

Ramsden, P. (1999) *Learning to Teach in Higher Education*. London: Routledge Press.