

DESIGNING AND BENCHMARKING WITH THE SCIENCE TLOS

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KEYWORDS: learning outcomes, benchmarking, curriculum design

ABSTRACT

The construction of the Science Threshold Learning Outcomes (TLOs) (Jones, Yates and Kelder, 2011) was a seminal moment for B Science degrees in Australia. For the first time, Australian universities agreed on the broad learning outcomes that every science graduate should achieve. This work ushered in an explosion of interest and work on the development and use of the TLOs.

The Science TLOs can be used as a guide for curriculum design in helping to set intended course learning outcomes (Biggs, 2014) and also as standards for external benchmarking as described by the Higher Education Standards Panel (HESP, 2014). We are conducting a survey of B Science co-ordinators and Faculty science leaders to reveal how the Science TLOs are being used in Australian universities. Preliminary data suggests that Faculty leaders are aware of the Science TLOs, regard them as appropriate but do not use them systematically in either design or benchmarking.

A related question is the how Faculties are using learning outcomes constructed for sub-disciplines of Science. Following publication of the Science TLOs, the Australian Learning and Teaching Council funded the establishment of discipline networks that had a mandate to interpret the Science TLOs at sub-discipline level. VIBE (biology), CUBE (biomedical science), Chemnet (chemistry) and AMSLaT (mathematical sciences) constructed sub-discipline TLO statements supported by national consultation. In parallel, the Physics Education Network constructed a TLO statement for physics and subsequently the Office for Learning and Teaching funded TLO projects in agriculture and in environmental science and sustainability. Chemistry leaders have recently launched an OLT-funded project that investigates benchmarking of learning outcomes in Chemistry and the evidence needed to underpin it.

We have begun investigation of the implementation of sub-disciplinary TLOs with a comparison of these statements. Successful alignment of discipline learning outcomes is likely to be crucial for effective benchmarking in generalist degrees such as the B Science. The comparison shows that the format and broad themes of the Science TLOs have proved remarkably stable. New learning outcomes introduced by sub-disciplines address multi-disciplinarity and integration, translation and application, appreciation of multiple perspectives, and, innovation and creativity. Sub-disciplines also introduced discipline-specific skills and knowledge and more specificity into broad themes in the Science TLOs.

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Proceedings of the Australian Conference on Science and Mathematics Education, Curtin University, Sept 30th to Oct 1st, 2015, page 37, ISBN Number 978-0-9871834-4-6.