

A FRAMEWORK TO EVALUATE WHAT WE VALUE IN SCIENCE PRACTICALS, AND WHAT WE ASSESS

Andrew Seen

Presenting Author: Andrew Seen (Andrew.Seen@utas.edu.au)
School of Natural Sciences, University of Tasmania, Launceston Tasmania 7250, Australia

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Practical work (laboratory or fieldwork) is considered a key part of undergraduate studies in the science disciplines. As practical work is often a resource intensive form of learning, requiring specialist equipment, materials, and staff, it is useful to consider how it is being used within the university setting. Bruck and Towns (2013) describe growing concerns around the justification of chemistry laboratory work and sought to describe the laboratory goals for institutions across the United States of America. They suggest there is a need to document laboratory outcomes to provide data that drives iterative cycles of curriculum improvement, greater communication of faculty around laboratory goals, and research into the student perspective (Bruck & Towns, 2013).

In Australia, the science Threshold Learning Outcomes (TLOs) were developed to describe the minimum standards of knowledge, skills and professional capabilities a tertiary science graduate should achieve (Yates, Jones, & Kelder, 2011). These have been further developed into discipline specific TLOs such as Biology, Chemistry and Physics TLOs (Australian Council of Deans of Science [ACDS], n.d.). These discipline TLOs provide a nationally recognised standard for the outcomes of learning in the sciences, including the practical components.

However, concerns have been raised that the TLOs may not be covered and/or assessed to the extent that we may expect. For example:

- A study to map the coverage of TLOs in Chemistry across a range of institutions found that some TLOs were not well covered in existing degrees (Schultz, Crow, & O'Brien, 2013).
- Development of a tool to evaluate assessment items for coverage of Chemistry TLOs found that some assessment items did not actually assess the TLOs, as claimed by their assessors (Schmid et al., 2016).
- Benchmarking of practical skills in first year Biology courses found that there was a dependence on using written practical reports as assessment items, rather than assessing the actual skills (Rayner et al., 2012).

A framework will be presented to map the coverage and assessment of practical LOs in university science courses, which when complemented with surveys to ascertain the values academics place on student development of practical skills, will enable evaluation of whether or not we assess what we value in science practical courses.

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