Research skill development in practical course work: a cost benefit view

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Recent views of undergraduate teaching have suggested that teaching and research are inextricably linked (Brew, 2006). Brew argues that this goes beyond the lab-based practical component of many courses and a more integrated form of student engagement with research is to involve them with academics in inclusive communities of scholars. However, integration of a true research experience into undergraduate science curricula has often been viewed as impractical because of large class sizes or limited resources. In addition, since a large proportion of students will not progress to careers in research, one needs to be clear that the methodology for incorporating a research component is not unduly biased towards the comparatively small number who will. In this sense, the practical component should be aligned with desired graduate attributes, and truly serve the needs of all stakeholders.

The School of Molecular and Biomedical Science at the University of Adelaide was formed by the amalgamation of four pre-existing departments (Physiology, Microbiology and Immunology, Biochemistry, and Genetics). Each had their own approach to the integration of the practical research experience into the undergraduate curriculum, and these have mostly persisted in the School structure for third year undergraduate students. These range from students being placed in groups of 2 - 4 in a research laboratory and conducting an open-ended research project (Physiology) to working in a lab-based closed ended practical in a group of approximately 40, with supervision by a senior academic (Microbiology and Immunology). Biochemistry runs a hybrid model with a research-based practical for 80 students in groups of 8-10 held in a teaching laboratory. These various practicals generally run one afternoon per week, with other research related tasks interspersed.

The cost of running such practicals varies around $250 to $300 per student, but the calculation is complicated by the need to include the direct costs (*e.g.* lab supplies) as well as indirect (*e.g.* imposition on academic and/or laboratory head time for supervision). The relative proportion of these varies according to the approach taken. The different approaches appear to produce different recruitment rates into Honours and PhD programs (being highest for Physiology), but there may be other confounding factors at play. Surveys of the students exposed to the different approaches also reveal different alignments with graduate attributes of the different approaches.

Brew A. (2006) *Research and teaching: Beyond the divide*. Basingstoke, UK: Palgrave Macmillan.