The space between design and delivery in large-scale undergraduate research experiences

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Large-scale course-based undergraduate research experiences (LUREs) in science education are becoming increasingly common both in Australia and internationally. In the USA there are high-value grants available to support these initiatives, and as a result there are multiple nation-wide research projects that engage thousands of students per year (see e.g., http://seaphages.org). Australian educators, in contrast, deliver LUREs in an environment of more limited funding and support. How do they make these programs work in a resource-limited environment? More specifically, what is the space between the initial design and the delivered curriculum for LUREs in Australia? This knowledge is important, because it allows potential new implementers of LUREs to better consider what a LURE can and cannot offer to their educational program. To address these questions we performed an environmental scan of LUREs in Australia using published literature, conference proceedings, online descriptions of programs, and personal communications from colleagues. We identified 21 LUREs that had been delivered more than once in Australia with a mean enrolment number of 249 ± 355 students (cohort size range 10-1400 students). We used the Beckman and Hensel (2009) continua for undergraduate research experiences to categorise the curriculum and ethos of each of these programs. Categorisations were member checked with the implementers of these LUREs whenever possible. Features of the programs that we had used to categorise them as LUREs were common (e.g., intergration in the undergraduate curriculum, collaborative work, and student, process-centred learning objectives). Other areas, such as the selection of the research question, the originality of the results to the field of research, and the modes of assessment, varied from one LURE to the next. One LURE model does not fit all students and all contexts, but are the differences in these models due to design choices by the implementers or do they occur because of hurdles that the implementers encountered? We are currently surveying and interviewing the LURE implementers about their curricula and design ethos. In particular, we ask about the spaces between their envisioned and enacted curricula and probe for the reasons behind these differences. The results will give us a clearer picture of the subtleties involved in fitting undergraduate research into an already crowded tertiary science curriculum and help educators decide which compromises they are willing to make as they deliver large-scale, course-based research experiences to undergraduates.

Beckman & Hensel (2009) Making explicit the implicit: defining undergraduate research. *CUR Quarterly, 29(4),* 40-44.