

DO UNDERGRADUATE RESEARCH EXPERIENCES INFLUENCE STUDENT UNDERSTANDING OF THE UNCERTAINTIES INHERENT IN SCIENTIFIC KNOWLEDGE?

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ABSTRACT

Uncertainty is an inescapable facet of life and as our world becomes more complex, the levels of uncertainty also rise. This is the so-called supercomplex world as described by Barnett (2007), a world in which science based disciplines are well placed to deal with these complexities. However, it is hard to argue that current science education pedagogies are preparing our future graduates to become effective advocates for science in this most certainly, uncertain world. Previous studies of graduate students by Perry in the 1960s and Schommer in the 1990s provided evidence that as students progress they start to see knowledge as less deterministic, more uncertain and complex as well as crossing thresholds of understanding (Ross et al., 2010). Recently an OLT project grant was awarded to the Australian National University, University of Western Sydney and Canberra University with the title "Teaching Research; Evaluation and Assessment Strategies for Undergraduate Research Experiences" (TREASURE). This project evaluated student thinking around research experiences in both a final semester capstone unit as well as independent research units. Over 60 students kept a reflective blog of their learning in these research experiences. It was encouraging to observe that the entire cohort demonstrated appropriate usage of standard scientific research processes. However, few of the students in the capstone unit were able to extend their understanding to encompass the concept that science knowledge and processes can be uncertain, complex and indeterminate. This is of concern in the context of the newly articulated Threshold Learning Outcomes in Science (TLOs) "*Demonstrate a coherent understanding of biomedical science by articulating the methods of science and explaining why current scientific knowledge is both contestable and testable by further inquiry.*" This observation suggests that we may be overestimating our expectations of the level of learning engendered by the current undergraduate research experiences. This in turn raises the question of whether we are satisfied that many of our graduates do not attain this threshold standard? Perhaps the time has come to develop a formal pedagogy of uncertainty.

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