



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

Undergraduate research within an Australian research-intensive university.

Dr Paula Myatt and Dr Kirsten Zimbardi, The University of Queensland, Brisbane, Australia

Introduction

- The Boyer Commission Report (1998) advocated the benefits of Undergraduate Research Experiences (UREs) through engaging students in authentic and experiential learning.
- The education literature continues to report on the ways students engage with research and the benefits they gain.
- This poster describes UREs within the context of an Australian research-intensive university, and reviews the key findings from a large scale project examining URE diversity.
- The project report provides evidence supporting the diversity of UREs available to students at a research-intensive university.
- The diverse models available for engaging students in research experiences are characterised through four examples.

Institutional Context

The University of Queensland (UQ) was established in 1910 and is one of Australia's premier research institutions offering a comprehensive education within a research-intensive context. UQ consistently ranks in the top 3 Australian universities in research income. UQ has a total undergraduate student enrolment of over 40,000 (32,000 full-time equivalent (FTE)) from 128 countries; including 6,800 FTE postgraduate students. UQ offers a diverse range of undergraduate degrees, the largest being the 3 year Bachelor of Arts & the 4 year Bachelor of Engineering programs, each enrolls more than 1,000 first year students per year. UQ employs more than 2600 FTE academic staff.



Excellence in research at UQ: renowned researchers, cutting-edge technology and world class facilities.

Undergraduate Research at UQ

In 2009 a large research project characterised the diversity of URE activities available across UQ. A broad definition of URE was used, informed by Jenkins and Healey (2010) and Beckman and Hensel (2009). The study focussed on URE models which *actively* engaged undergraduate students with the research of their discipline, and excluded models in which students were more *passive* (less engaged). The study developed detailed descriptions of 77 URE activities, and brief descriptions of an additional 58, ranging from archaeology to dentistry, from science to social work and from engineering to journalism (see the full report by Farrand-Zimbardi, van der Burg and Myatt at: espace.library.uq.edu.au/view/UQ:212669).

The study illustrated the diversity of ways in which academics engage students in research and, importantly, also engaged academic staff in explicit conversations about the nature of undergraduate research. Beckman and Hensel (2009) called for institutions to engage in explicit conversations on the diversity of ways in which undergraduate students could be involved in research within each individual institutional context. This study has enabled individual academics to understand more clearly *the diversity of possible ways to engage students in undergraduate research*, as well as allowed *the development of a detailed resource of URE models*, aims, characteristics and student benefits across a wide range of disciplines.



First year students doing research – Archaeology (left) & Advanced Study Program in Science (right).

References

- Beckman M, Hensel N. (2009) Making explicit the implicit: defining undergraduate research. *CUR Quarterly*. 29(4): 40-44.
- Boyer Commission on Educating Undergraduates in the Research University. (1998) *Reinventing Undergraduate Education: A Blueprint for America's Research Universities*. Stony Brook: State University of New York at Stony Brook. Available at: naples.cc.sunysb.edu/Pres/boyer.nsf/.
- Farrand-Zimbardi K, van der Burg NMD, Myatt P. (2010) *Undergraduate Students' Research Experiences: Bridging the gap between teaching and research in a research-intensive university*. Report for The University of Queensland Strategic Teaching and Learning Grants Scheme. Available at: espace.library.uq.edu.au/view/UQ:212669.
- Jenkins A, Healey M. Undergraduate research and international initiatives to link teaching and research. *CUR Quarterly*. 2010; 30(3): 36-42.

NB This poster is an abridged version of a *CUR Quarterly* (2011) paper in review.

Examples representing the diversity of URE models at UQ

Undergraduate Research in 1st Year Chemistry (CASPiE)

Outcome-centred, all students, faculty initiated, curriculum-based, collaborative, original to the discipline (new knowledge), discipline-based

Active student learning occurs in chemistry through a close collaboration with the Purdue University Centre for Authentic Science Practice in Education (CASPiE). The CASPiE model provides students with an opportunity to design experiments and collect data, contributing to the real research of a scientist. The student benefits include increased engagement, gains in research and communication skills, and ability to identify and solve experimental problems. By linking the practicals to the work of a scientist, this model enables students to see the relevance of their work to current research, and gain confidence in their ability to contribute to the development of knowledge in their discipline.

Undergraduate Science Students' Experience of Research (USSER)

Student-centred, all students, informal co-curricula, individual, multi-disciplinary

The USSER Network is a co-curricular program open to all undergraduate science students, which welcomes students into the research culture of UQ through a combination of informal lunches, tours and laboratory placements. Evaluations of the USSER Network indicate that students gain an increased understanding of what a career in research entails, begin to realise the diversity of research being conducted at UQ, make connections with UQ researchers and gain valuable insights into future research-based career paths.



USSER Network students talking science with scientists!!

Advanced Study Program in Science (ASPinS)

Student-centred, elite students, faculty initiated, curriculum-based, individual, multi-disciplinary, 3 year integrated model, laboratory-based

ASPinS is an enrichment program for science students targeting motivated, high-achieving students with a passion for science. ASPinS includes three integrated courses that help students to develop a scholarly community of like-minded peers, and facilitate the entry of high achieving students into the scientific community from early in their science degree. Through seminars, research projects and an annual conference, students develop personal and professional research skills, a broad understanding of current scientific research and a rich network of connections with research groups. Students are well informed to make decisions regarding a career in science research.

Archaeology – discovery, doing and advanced research

Student-centred, all students, faculty initiated and student initiated, curriculum-based, collaborative, original to the student, discipline-based, 3 year scaffolded progression into research

The archaeology program provides students with a scaffolded progression of courses incorporating research activities with gradually increasing complexity and authenticity. The students move from current archaeological research (Discovering Archaeology), to a 'seeded' archaeological site designed for them (Doing Archaeology), to a third year course (Advanced Research in Archaeology) in which they develop, conduct and communicate the findings of their own research. This design acknowledges the role of research within the professional practice of the discipline, and the assessment (reports, research papers and seminars) emphasises the research culture, allowing students to develop and demonstrate essential research skills.