

# ENHANCING ASSESSMENT PRACTICES AND TEACHING DELIVERY IN HONORS RESEARCH PROJECTS

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## ABSTRACT

A teaching excellence project initiated by the authors aims to enhance student engagement and outcomes in the Bachelor of Civil and Construction Engineering cap-stone research units; Civil Engineering Research Project 1 and 2, is reported here. The aim will be achieved through the enhancement of teaching, assessment and scholarship of teaching and learning. The aim will assist with the continued improvement of the Units as articulated in the School Plan (for unit satisfaction rates to exceed 80%). The project is currently underway with implementation of significant changes in Project 1 and Project 2 units in semester 1, 2015 (February – July) with faculty and student preliminary feedback indicating enhancement of teaching and learning, and collegial relationships.

## KEYWORDS

Research projects, competencies, learning outcomes, problem solving, professional accreditation, work integrated learning, Standards: 5, 7, 8, 9, and 11.

## OBJECTIVES

### ***Teaching Excellence Project Aims***

The project aims to enhance student engagement and outcomes in the Bachelor of Civil and Construction Engineering cap-stone research units; Civil Engineering Research Project 1 and 2. The aim will be achieved through the enhancement of teaching, assessment and scholarship of teaching and learning. The aim will assist with the continued improvement of the Units as articulated in the School Plan (for unit satisfaction rates to exceed 80%). The aim is to ensure continuing accreditation of the Degree course by Engineers Australia which demands graduates are capable of “application of systematic approaches to the conduct and management of engineering projects” and a range of professional and personal attributes (Engineers Australia, 2013, 2). These attributes relate to students’ English language capabilities and graduate competencies of both Curtin University and Engineers Australia. The aim will assist with the demonstrated alignment of the course with Australian Qualifications framework level 8 which stipulates graduates of a Bachelor Honors Degree demonstrate the ability “to plan and execute project work and/or a piece of research and scholarship with some independence.” (Australian Qualifications Framework Council, 2013, 16). Not least, the project aims align with CDIO Standards (CDIO, 2004) for the provision of authentic, integrated, active, engaged engineering project-based learning with assessment focusing on interpersonal and discipline skills; and supporting enhanced faculty competence (CDIO, 2004).

### **Approach**

The approach will be dual-fold with strategies targeting teaching and evaluation enhancements. The teaching enhancements will be via the development of engaging and personalized teaching delivery in research methodology and theses writing. This will be implemented through targeted modules in research methodology and professional Engineering English resources. The evaluation enhancement will be undertaken through professional development of supervisory academic staff and development of evaluation rubrics to ensure consistency of assessment and bench marking of theses. Innovation in assessment will be undertaken to ensure industry engagement and participation in the process and lay the foundation for future work integrated learning options for the research units. Scholarship of Teaching & Learning will be undertaken for exploration of current engineering education pedagogy regarding research projects and allow for dissemination of findings from the Project.

### **CURRENT STATUS**

The project is currently underway with implementation of significant changes in Project 1 and Project 2 units in semester 1, 2015 (February – July). Table 1 summarizes the initiatives, their current status of implementation, and feedback where received.

Table 1 Teaching Excellence Project Activities Status

Activity	Brief Description and Outcomes	Current Status
Map of Current State	<ul style="list-style-type: none"><li>• The current state of instruction and assessment of learning outcomes including English language and application of engineering research skills and leadership in Civil and Construction units completed.</li><li>• Areas of deficiency were identified as language instruction, research methods instruction, and compliance with research ethics and intellectual property legal compliance.</li><li>• Areas of interdisciplinary strength were identified in reflective practice, literature reviews and entrepreneurial outcomes based projects.</li></ul>	Completed in concurrence with off-shore campus Establishment of ongoing off-shore collegial collaborating and consultation
Summarise current education pedagogy	<ul style="list-style-type: none"><li>• Research current education pedagogy for the enhancement of English language engagement and proficiency, and application of engineering research skills in order to improve graduate written and verbal communication in professional and lay contexts and improve graduate research capabilities.</li><li>• Prepare summary document to create framework for changes.</li></ul>	Completed
Staff Engagement	<ul style="list-style-type: none"><li>• Input into proposed changes and implementation strategies.</li></ul>	Ongoing
New Unit Outlines Published	<ul style="list-style-type: none"><li>• Process unit change forms for curriculum and assessment changes.</li><li>• Required for implementation of changes to assessment and teaching delivery mode in Semester 1 2015.</li></ul>	Completed
New Assessment Rubrics	<ul style="list-style-type: none"><li>• Benchmarking of rubrics with other disciplines and within engineering disciplines.</li><li>• Development of marking rubrics and descriptors for assessment tasks.</li></ul>	Completed and implemented for assessments conducted to date

New Templates for Intellectual Property Agreements	<ul style="list-style-type: none"> <li>Developed templates for Intellectual Property (IP) agreement and memorandums of understanding where IP agreements not applicable for industry engaged and supported projects.</li> <li>This outcome was not anticipated at planning stage of the project and arose from the review.</li> <li>Endorsement by Head of department and Dean for distribution and uptake for Faculty of Engineering</li> </ul>	Completed in collaboration with Office for Research and Development, Work Integrated Learning team and Legal and Compliance
Modules for Online Teaching	<ul style="list-style-type: none"> <li>Curriculum development for teaching delivery on research methods, ethics, statistics, reflective practice, report writing and oral communication skills completed</li> <li>Implemented via lectures, workshops, integrated learning support from university Learning Centre and cross-discipline faculty</li> <li>Online teaching not initiated to date</li> </ul>	Completed curriculum development Initiated online assessment and feedback Enhanced online resources Increased online delivery - in planning for 2017
Staff Professional Development Day	<ul style="list-style-type: none"> <li>Staff development on supervision and mentoring of research students</li> <li>Induction to changes and implementation strategies</li> </ul>	In planning for Semester 2
Survey Data for Review and Revision for enhancement	<ul style="list-style-type: none"> <li>Prepare survey for students and staff</li> <li>Monitor, assess and disseminate feedback and performance data from students and staff.</li> </ul>	Informal feedback received, waiting first round of implementation and university student satisfaction survey

## OPEN QUESTIONS for FUTURE WORK

What strategies have been useful for positive engagement of faculty to curriculum reinvigoration and rubric based assessment and feedback?

What do you do to ensure student research projects are authentic, manageable and moderated effectively, transparently and equitably?

How do you assess final-year or cap-stone research and/or design projects?

How do you balance the demands of assessing communication skills and discipline specific skills, along with research skills?

How could this initiative be better implemented in future refinements of the cap-stone projects?

How could this initiative be better aligned and enhanced from the CDIO Syllabus?

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