Enhancing WIL to Place Engineering Practice at the Heart of Engineering Degrees

an Australian Council of Engineering Deans project
partnering with 12 universities
and 8 peak industry bodies
and funded by the
Australian Government Department of Industry

Robin King, Sally Male, Douglas Hargreaves
Purpose and Contexts

• Systemic improvement of industry engagement in *formative* degrees, for *all* students

• Response to government on
  – skills shortages in engineering
  – perceived shortfalls in graduate capabilities and ‘work readiness’
  – hypothesis that better industry engagement will increase student retention and in-program motivation

• Engaging with
  – *Engineers Australia* accreditation requirements for ‘exposure to engineering practice’
  – *universities’* program requirements (eg industry placements)
2 Themes

• Guidelines
• Industry –inspired projects
Theme 1 Research Questions

- What is the ideal student experience of industry engagement?
- What is current practice?
- What is the current student experience?
- How does this differ from ideal?
- What are potential benefits for other stakeholders?
- What are supporting and risk factors?
- How can engagement be improved?
Research Design

Phase 1
- Literature review
- Forum/survey/interviews with universities
- Interviews with industry

Phase 2
- Student focus groups and survey
- Industry education forums
Findings: Potential Benefits for Students

• Place theory in context to improve understanding
• Gain practical awareness
• Understand engineering business and processes
• Understand the work they might do
• Identify possible selves
• Improve motivation and learning
• Mature
• Develop professional skills
• Become leaders among peers
• Build network
• Gain graduate employment
Findings: Potential Benefits for Employers

- Visibility among students
- Opportunity to ‘interview’ students
- Opportunity to improve graduate competencies
- Opportunity to give students accurate perception of working for the employer
- Employee development
- Employee satisfaction
- Social licence
- Access to labs, equipment, research expertise
Findings: Challenges for Universities

• Time and money
• Establishing and maintaining relationships
• Lack of industry experience among academics
• Structuring engagement for student learning and industry benefits
• Insufficient placements for vacation experience or internships
• Diversity of students, programs and employers
## Outputs: Resources

<table>
<thead>
<tr>
<th>Tool for Reflecting on Effective Industry Engagement in an Engineering Program</th>
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<tbody>
<tr>
<td>Benchmark Responses to Tool for Reflecting</td>
</tr>
<tr>
<td>Best Practice Guidelines for Effective Industry Engagement in Australian Engineering Degrees</td>
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</tbody>
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<table>
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<th>University Exemplars</th>
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<tr>
<td>AMC Employer Handbook</td>
</tr>
<tr>
<td>Curtin University Design Project</td>
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<tr>
<td>ECU Engagement Handbook</td>
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<tr>
<td>QUT Work Integrated Learning Unit</td>
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<tr>
<td>RMIT Student Engineering Experience Guidebook</td>
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<tr>
<td>Swinburne IBL Responsibilities</td>
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<tr>
<td>UTS Engineering Practice Program Student Guide</td>
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<td>UWA Career Mentor Link Guide</td>
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<td>Vacation Student Buddy Training Presentation</td>
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Guidelines

Transformational change requires rethinking

• engineering as a socio-technical domain
• putting engineering practice at the heart of the curriculum
• how engineering academics can become engaged with practice
• students as ‘student engineers’ developing reflective learning practices

Recommendations for engineering faculties, industry, industry bodies and governments
Theme 2 Project Activities, 2012 -14

• Trials of ‘industry-inspired’ projects in seven faculties/schools
  – bringing practice into the middle years of the curriculum, mostly into large class core engineering units in
  – modest support (up to $22,000) for faculty/school to select and work with one or more company, develop materials, implement and evaluate

• 27 companies participated

• more than 1,000 students were involved
  – evaluations were positive
Impact and Future Directions

- Universities continuing to use resources and implement recommendations
- Engineers Australia established resources and programs to engage with education, and EA Connect to connect students and employers
- ACED supported dissemination workshops during 2015
- ACED allocated funding for development of a student e-portfolio, and other linkages with Engineers Australia
- AWPA (DoI) report on the Engineering Workforce recommended further development of project outcomes (by ACED and members)
- ACED engaged with Work Integrated Learning (WIL) initiatives being led by Universities Australia and the Office of the Chief Scientist
Recommendations for Engineering Faculties

F1  Establish and maintain industry engagement as part of faculty culture
F2  Use industry-based assignments
F3  Provide substantial opportunities to work and learn in industry
F4  Offer large numbers of industry-based final year projects
Recommendations for Engineering Faculties

F5  Use emulated work-integrated learning

F6  Encourage students to take responsibility for seeking opportunities to learn about practice

F7  Support and recognise industry engagement undertaken by student groups
Recommendations for Industry

I1  Provide regular and structured student engineer employment

I2  Provide support for engineers to engage in engineering education.

I3  Provide support for academics to experience industry.
Recommendations for Professional and Industry Bodies, and Governments

B1 Consider establishing resource centres to support industry engagement with universities.

B2 Establish a national internship scheme.

B3 Develop an e-portfolio resource for student engineers.

B4 Foster a culture of industry engagement with education.

B5 Government incentives for employers to support education.

B6 Review program accreditation guidelines.