

# 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

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# 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)

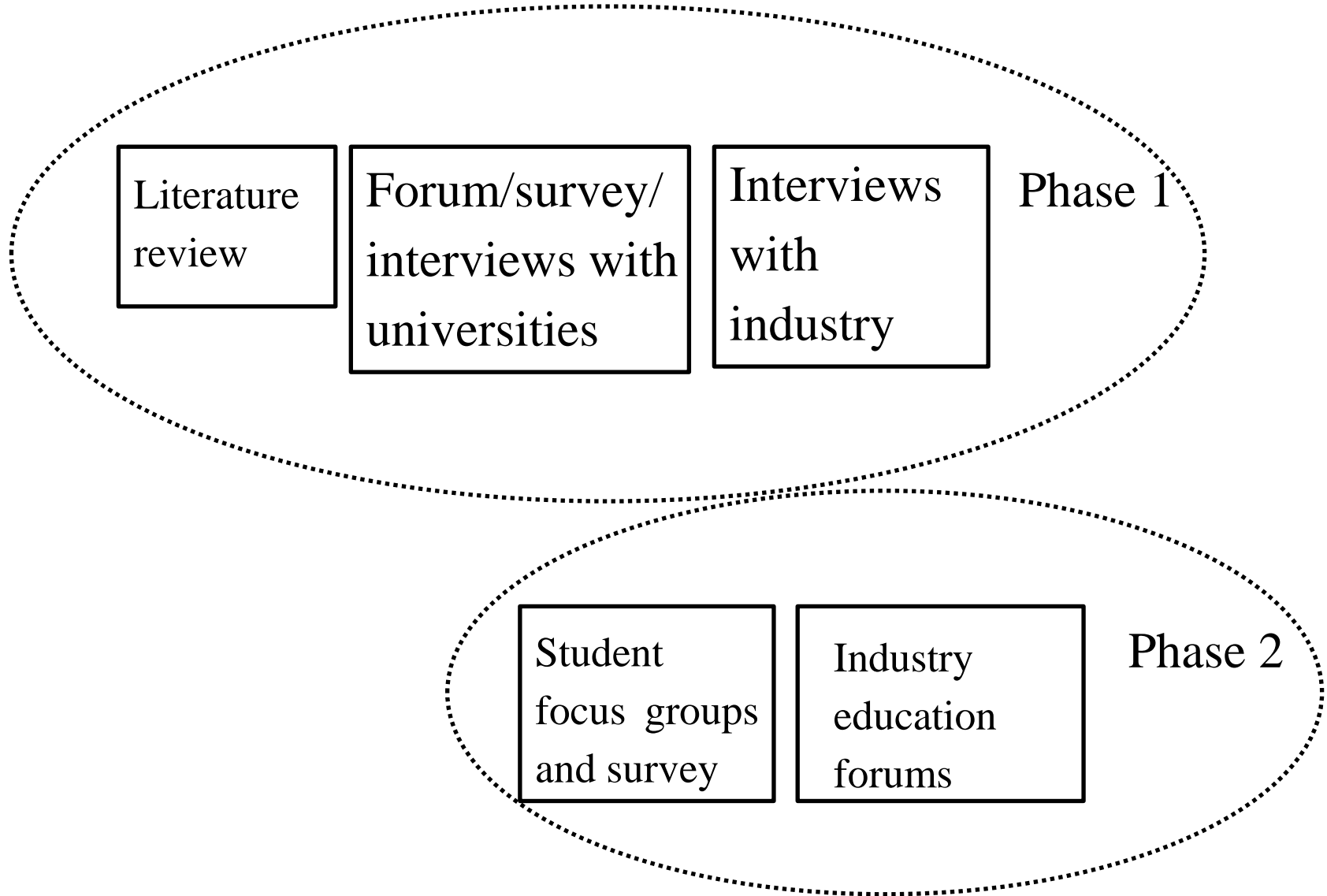
# 2 Themes

- 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



# 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

**Tool for Reflecting on Effective Industry Engagement in an Engineering Program**

**Benchmark Responses to Tool for Reflecting**

**Best Practice Guidelines for Effective Industry Engagement in Australian Engineering Degrees**

# Outputs: Resources

## University Exemplars

**AMC Employer Handbook**

**Curtin University Design Project**

**ECU Engagement Handbook**

**QUT Work Integrated Learning Unit**

**RMIT Student Engineering Experience Guidebook**

**Swinburne IBL Responsibilities**

**UTS Engineering Practice Program Student Guide**

**UWA Career Mentor Link Guide**

# Outputs: Resources

**Employer Exemplars**

**Student Engineering Induction Guide**

**Vacation Student Buddy Training Presentation**

# 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

- Guidelines available at <http://arneia.edu.au/resource/59>. Links to other resources can be found in the guidelines.
- 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.