Hello and welcome!
The webinar will commence at 11 am (Bris time)

Please use the audio setup wizard to check your headset’s audio and mic levels.
Today’s audience

Poll question
What discipline are you from?
a) Natural and Physical Sciences
b) Technology
c) Engineering
d) Mathematics
e) Other
**Introduction**

**Dr Daniel Edwards** is a Principal Research Fellow, leading the Tertiary Education research program at the Australian Council for Educational Research.

**Professor John Rice** is Executive Director of the Australian Council of Deans of Science (ACDS) and an Honorary Professor in the School of Mathematics and Statistics at The University of Sydney.
Work Integrated Learning in the sciences: a national snapshot of current practice and future directions

Daniel Edwards
ACEN Webinar

Australian Council for Educational Research
Presentation Outline

• Project overview and objectives
• Defining WIL
• Including WIL in curriculum – models
• WIL participation in Science, Ag and ICT
• Growing WIL
• Thoughts for the future
Project Overview

• Project for the Office of Chief Scientist
• Involved exploring WIL in practice in Australian universities with a focus on Sciences, ICT and Agriculture fields, but also including some engineering.
• Literature reviews (general, engineering, international)
• Collection of primary data:
  – Visits to all universities, interviews with more than 120 academics, WIL coordinators (Aug-Nov 2014)
  – Recruitment via Deans, visits and interviews
Overview – Data collection

- Interviews based on a ~90 min semi-structured schedule. Undertaken individually and in groups (often multi-disciplinary)
- Broad coverage of interviews:
  - the types of WIL being undertaken
  - motivations of students
  - how engagement with industry takes place
  - current costs and funding sources
  - administration of WIL
  - key aspects of ‘good WIL’
  - plans for expansion (and impediments)
Project Objectives

1. To describe the level and type of Work Integrated Learning (WIL) in STEM, with an emphasis on the non-engineering disciplines.
2. Describe how the WIL programs in STEM faculties are funded.
3. Describe the ways in which WIL is administered in STEM faculties in universities – the organisational structures, strategies, and the scalability of initiatives.
4. Describe the integration of STEM Work Integrated Learning into the STEM curriculum.
5. Describe and assess the quality and impact of existing WIL in STEM faculties.
6. To describe and analyse international best practice in STEM WIL and how it relates to the Australian context.
Project context

• **Demand from:**
  – Industry (‘we want work-ready grads’)
  – Government (‘we need to justify funding and plug skills shortages’)
  – Students (‘we want to secure relevant employment’)

• **Benefits in:**
  – Improving job prospects
  – Building confidence in workplace abilities of students
  – Enhancing the ‘soft skills’
Project context

• Demand from:
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• Benefits in:
  – Improving job prospects
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  – Enhancing the ‘soft skills’
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<tr>
<th>Value propositions for universities</th>
<th>Value proposition for students</th>
<th>Value propositions for industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can be a source of significant competitive advantage. It enables universities to differentiate themselves, potentially attracting a greater share of student enrolments.</td>
<td>Facilitates transition from study to work by developing discipline specific, general and career skills.</td>
<td>Offers a means for identifying and recruiting new staff.</td>
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<tr>
<td>Leads to improved learning and employment outcomes for students.</td>
<td>Leads to improved student engagement, completion and retention.</td>
<td>Provides a resource to undertake business related projects, and offers fresh ideas.</td>
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<tr>
<td>Offers a means of preparing students for the real world, and equipping with some of the generic skills desired by employers.</td>
<td>Improves the student’s confidence in the workplace.</td>
<td>Leads to opportunities to play a role in developing curriculum to develop workers for the future.</td>
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<tr>
<td>Leads to stronger industry-university partnerships – flow on to other benefits.</td>
<td>Leads to the formation of industry connections and networks.</td>
<td>Offers an avenue to engage with wider community as a means of contributing as a ‘good corporate citizen’</td>
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<td>Leads to better employment outcomes</td>
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Work Integrated Learning involves:

• Integrating theory with the practice of work
• Engagement with industry and community partners
• Planned, authentic activities
• Purposeful links to curriculum and specifically designed assessment
### ‘Working Typology’…

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tbody>
<tr>
<td>On campus simulations</td>
<td>Activities integrated into courses/units that are specifically designed to simulate a work environment. Often designed in consultation with industry.</td>
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<tr>
<td>On campus projects</td>
<td>Long (usually at least one semester) industry sponsored projects. Conducted on campus rather than in industry. The industry partner is presented with a ‘solution’, report, and/or presentation at the conclusion of the project. Usually undertaken by a team of students.</td>
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<tr>
<td>Short term placements or internships</td>
<td>Planned experiences in industry, off campus for up to 5 weeks.</td>
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<tr>
<td>Medium term placements or internships</td>
<td>Planned experiences in industry, off campus for between 6 and 11 weeks.</td>
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<tr>
<td>Long term placements or internships</td>
<td>Planned experiences in industry, off campus for 12 weeks or more.</td>
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<td>Your current focus</td>
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<tr>
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<td>On Campus Industry Projects</td>
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<td>Long Term Placements</td>
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<td>(twelve weeks or more)</td>
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<tr>
<td>Other types</td>
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</table>
Including WIL in curriculum

Poll question
At what stage should WIL be included?

a) First year
b) Second year
c) Only final year(s)
Including WIL in curriculum

Trust ‘transfer will happen’ approach

1st Year

Final Year

Discipline specific theory

• Stereotypical, traditional approach
• Based on assumption students need to have strong grasp of theory before any consideration of application in workforce
• Practical knowledge will come later through research or work
Including WIL in curriculum

Linear ‘Theory to practice’ approach

1st Year

- Industry examples included in units
- Field trips, guest lectures
- Case studies
- Short projects with real-world orientation

Final Year

Capstone

- Projects with industry client
- Industry-based work or research placement

Discipline specific theory and practical skills

• Typical approach to applying WIL
• Course still has theory as the foundation, but some effort made to ‘bolt-on’ WIL.
• Mostly, WIL comes later in the course in a capstone year placement or project.
Including WIL in curriculum

Industry Oriented Course

- Industry based projects including placements &/or team projects
- Simulated work environments
- Industry inspired problems
- Explicit units in ‘skills for this field’ including problem solving, communication
- Guest lecturers, networking events, field trips
- ‘Day-one’ approach to industry immersion
- Experiential learning plays a key role
- No assumption of required theoretical knowledge prior to tackling a ‘problem’

Units on ‘how to get a job in this field’, based on applying for placements etc.

Focus on what it means to work in this field

Contextualised learning from the start. Learning theory through real problems

Industry input into design and evaluation
WIL participation: Science, ICT, Ag

On Campus Activities

- Almost every degree program in the sciences and ICT incorporates to an extent some campus based work focused activities.
- *Guest lectures* were by far the most common ‘on campus’ activity mentioned by academics (although there is general consensus that these are not strictly ‘WIL’).
- *Simulations* more ‘WIL’-like, but less common.
- Actually measuring the extent to which these kinds of activities are covered in each institution and course is difficult, mainly because of the different ways, and the ad hoc nature in which they are undertaken.
Industry Projects

• Typically involve undertaking a team based activity for a ‘real world’ industry client.

• Centred on solving a problem, creating something, undertaking applied research, monitoring an issue, or being engaged in a consultation process.

• Predominantly undertaken on campus with ongoing liaison with industry sponsor.

• Commonly run for a whole semester.
Industry Projects by proportion of student participants for each university by discipline.

ICT: Activities identified in 25 unis – most were compulsory for UG students.

Science: Activities identified in 17 unis – mostly lower % student participants.

Ag and Enviro: 10 unis, most 50% or lower

NR = Non-response – data unavaliable
Placements/internships

- ‘Purest’ form of WIL (or at least its most recognised/associated activity)

- Vary:
  - in length
  - in support offered to students/industry
  - in format (i.e. intensive, spread etc)
  - in the way in which they are acquired (student responsibility, academic responsibility)
  - in application in curriculum and assessment
WIL participation: Science, ICT, Ag

Placements/Internships by proportion of student participants for each university by discipline.

ICT: Activities identified in 23 unis – most participated in by quarter or fewer students.

Science: Activities identified in 20 unis – tend to have very low % student participants.

Ag and Enviro: 16 unis.
### Placements/Internships by timeframe

<table>
<thead>
<tr>
<th></th>
<th>Short Term Placements (less than 6 weeks)</th>
<th>Medium Term Placements (6 to 12 weeks)</th>
<th>Long Term Placements (more than 12 weeks)</th>
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<tbody>
<tr>
<td>Nat &amp; Phys Sciences</td>
<td>80%</td>
<td>50%</td>
<td>40%</td>
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<td>40%</td>
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<td>4%</td>
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<td>Agri/Env Sciences</td>
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Estimated proportion of students involved in WIL activities during undergraduate degree, by broad discipline (%)

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<td>Industry Projects</td>
<td>14.5</td>
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<td>19.5</td>
<td>15.2</td>
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<td>17.5</td>
<td>12.2</td>
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Note: Estimates of student numbers for calculating participation rates are based on 2013 commencement data supplied by Commonwealth Department of Education.

Note: Table contains estimated enrolment proportions and numbers for WIL programs identified in the WIL ACER/OCS project – missing data and non-responses are not included. Outcomes are indicative only.
Growing WIL

What are some challenges to growing WIL?
Growing WIL

Impediments to expansion

• A lack of value placed on WIL and resistance to commit to WIL activities [cost and recognition]

• A lack of processes/infrastructure to develop WIL activities

• Difficulty attracting employers to participate in WIL activities [esp, but not limited to ‘non-vocational’ degrees]

• A need for restructuring of curriculum to encompass greater engagement of WIL.
Industry engagement

• Embedding interaction with industry – small steps…multiple opportunities for interaction…

• King & Male 2014: ‘As well as providing opportunities for students to undertake work placements, arguably there need to be more occasions for authentic engineering practice to be brought into the classroom’

• FLEXIBILITY
Recognising Good WIL

Good WIL:

- is clearly linked to theoretical aspects of courses, *ideally* providing an ‘ah-ha’ moment to the student when the practical and theoretical merge;
- has strong engagement with industry;
- has well articulated expectations of both students and industry partners;
- has clear induction processes at the beginning and facilitated opportunities for reflection on experiences at the end - for both students and industry;
- has well established processes for logistics and support of students and industry;
- has support from leadership and dedication from academic staff.
Thoughts for the future

• *Improve empirical evidence* about WIL (embed basics in national surveys – allows a range of opportunities for objective promotion of benefits)

• Recognise the *value of industry projects* – efficient, and proven to be valuable [Keogh, Sterling and Venables (2007) in ICT]

• *A central online hub* for universities, employers and students with support for promotion and maintenance.
ACER’s **Report** for the Office of Chief Scientist can be downloaded here:

http://research.acer.edu.au/cgi/viewcontent.cgi?article=1046&context=higher_education
ACDS
WIL in Science Leadership Project

National project to develop work-integrated learning in Faculties of Science

Professor John Rice
Executive Director
Australian Council of Deans of Science

Funded by the Office of the Chief Scientist

Thanks to Professor Ian Chubb, Dr Roslyn Prinsley, Professor Stephen Walker,
Deans of Science
Project context

• Demand from:
  – Industry (‘we want work-ready grads’)
  – Government (‘we need to justify funding and plug skills shortages’)
  – Students (‘we want to secure relevant employment’)

• Benefits in:
  – Improving job prospects
  – Building confidence in workplace abilities of students
  – Enhancing the ‘soft skills’
Broader Context

- Jobs of the future
- Entrepreneurship
- Innovation Economy
- Translational Research
### WIL participation: Science, ICT, Ag

**Estimated** proportion of students involved in WIL activities during undergraduate degree, by broad discipline (%)

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Science Context

- Generalist degree
- No professional focus
- Multiplicity of tacit professional roles

Discovery
Research
Teaching
WIL
Benchmarks for WIL in Science Faculties

- Co-ordinated senior leadership
- Clear point of contact for industry engagement
- Explicit models for engagement with industry
- Processes to embed WIL within courses
- Recognition and credit for WIL for students and staff
WIL in Science National Forum

Melbourne, December 11, 2015

- **National network** for WIL leaders
- **Showcase** work-integrated learning
- **Organizational structures** to support WIL
But this is just the start…

ACDS Teaching and Learning Centre: www.acds-tlcc.edu.au

Work Integrated Learning in Science

Prof Liz Johnson, Director ACDS TL Centre
Leadership for WIL

• National leadership **network**
  – Ongoing peer-to-peer learning
  – National consensus

• **Build capacity**: resources and mentoring
  – Build understanding of WIL
  – Share standards and course structures

• **Action** to foster WIL: lighthouse projects
  – Industry relationships
  – Alignment with university
Growing WIL in Science

- Regional action
  - Local leaders
  - Local workshops
  - Local context
  - Local industry

- Extending the work (OLT proposal)
  - Collaboration
  - Building resources
  - Student voice
  - Building capability in WIL teams

- Led by ACDS TL Centre Director, Prof Liz Johnson
Thankyou

Professor John Rice
Executive Director
Australian Council of Deans of Science
The webinar recording and presentation will be available from:

http://acen.edu.au/webinars/

Your feedback is appreciated:
- Survey link has been added to the chat.
WIL 2020
Pushing the Boundaries

Pre-conference Workshops • September 28 • Macquarie University
Research Symposium • September 28 • University of Western Sydney