Australian Council of Engineering Deans Inc.

Tool for Reflecting on Effective Industry Engagement in an Engineering Program

A reflective tool developed as part of the project 'Enhancing Industry Engagement in Engineering Degrees' led by the Australian Council of Engineering Deans with a grant from the Australian Government through the National Resources Sector Workforce Strategy

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The answers to these questions are intended to assist program leaders to identify strengths and weaknesses of the industry engagement in their engineering programs. The questions are based on the themes in the Best Practice Guidelines for Industry Engagement in Australian Engineering Degrees (see http://arneia.edu.au/resource/59)

Please reflect on only one major formative engineering program at a time. Collated, de-identified responses from university partners on the national project are available as a benchmark.

About the institution where the program is offered

Q1 The institution at which the program is offered

_____

Q2 Group to which the institution is aligned

- ❍ Australian Technology Network
- ❍ Group of Eight
- ❍ Metropolitan non-aligned
- ❍ Innovative Research Universities
- ❍ Regional
- ❍ Other _____

Q3 Years engineering has been offered at the institution

- ❍ 0-9
- ❍ 10-49
- ❍ 50+
- ❍ Don't know

About the major program on which you will reflect, e.g. Bachelor of Engineering (civil)

Q4 Engineering discipline of the program

- ❍ aeronautical
- ❍ chemical
- ❍ civil/structural
- ❍ electrical/electronic/computer systems
- ❍ environmental
- ❍ maritime
- ❍ mechanical/mechatronic
- ❍ mining
- ❍ petroleum / oil and gas
- ❍ software
- ❍ systems
- ❍ other _____

Q5 Level of the program

- ❍ Bachelor
- ❍ Masters
- ❍ Other _____

Q6 Years the program has been offered (including previous programs in the same discipline with different structures)

- ❍ 0-9
- ❍ 10-49
- ❍ 50+

Q7 Number of students completing the program in 2013

- ❍ 0-49
- ❍ 50-199
- ❍ 200+

Q8 Main enrolment type

- ❍ on campus
- ❍ external
- ❍ other _____

Q9 Main form of work-based learning in the program.

- ❍ 12 weeks of relevant employment
- ❍ one one-semester or two-semester internship
- ❍ two semester-long internships
- ❍ industry-based projects where students visit a workplace
- ❍ other workplace learning _____
- ❍ other work-based learning not in a workplace _____

Q10 Your position with respect to the program

- ❍ Program leader
- ❍ Academic who has taught in the program for at least 3 years
- ❍ Associate Dean (Teaching & Learning)
- ❍ Other _____

About industry engagement

Please rate the following statements regarding the one major engineering program identified above by ticking one response in each row.

	Hardly at all 1	2	3	4	*Extensively* 5
Q11 Curriculum Theme 1a. Curriculum design is informed by present and prospective engineering practice.	❍	❍	❍	❍	❍
Sample indicators (optional)					
Q12 Industry engagement in the program design and delivery is proactively managed.	❍	❍	❍	❍	❍
Q13 The academic team who teaches the program engages with engineering practice.	❍	❍	❍	❍	❍
Q14 Engineers with industry experience are teaching in the program.	❍	❍	❍	❍	❍
Q15 Industry consultation processes related to the program involve diverse industry members.	❍	❍	❍	❍	❍
Q16 Industry consultation includes a focus on big-picture curriculum issues.	❍	❍	❍	❍	❍
Q17 Industry representatives are involved in activities beyond industry advisory boards.	❍	❍	❍	❍	❍
Q18 Comments from industry are reviewed for potential action.	❍	❍	❍	❍	❍
Q19 Students are exposed to academics' research.	❍	❍	❍	❍	❍

	Hardly at all 1	2	3	4	*Extensively* 5
Q20 Curriculum Theme 1b. Curriculum delivery includes a range of experiences of engineering practice, positioning theory in its application contexts, by using industry-based examples and projects; and by site visits and guest lectures or similar.	❍	❍	❍	❍	❍
Sample indicators (optional)					
Q21 Industry based assignments are used in units.	❍	❍	❍	❍	❍
Q22 Students complete the required workplace experience (possibly in research workplaces) before finishing their coursework.	❍	❍	❍	❍	❍
Q23 Students undertake industry-based final year projects.	❍	❍	❍	❍	❍
Q24 Students engage in emulated work integrated learning (e.g. virtual processing plants, miniature plants, manufacturing facilities).	❍	❍	❍	❍	❍
Q25 Students use contemporary standard industry tools.	❍	❍	❍	❍	❍
Q26 Students are encouraged and supported to take opportunities to learn about practice (e.g. to visit sites, attend seminars at Engineers Australia, interview engineers, meet with an industry-based mentor).	❍	❍	❍	❍	❍
Q27 Students are supported to engage with industry through student societies and competitions (e.g. IEEE student branches, motorsports).	❍	❍	❍	❍	❍

	Hardly at all 1	2	3	4	*Extensively* 5
Q28 Curriculum Theme 1c. Authentic and substantive challenges requiring contextual understanding ensure students develop judgement, significant technical expertise, teamwork, initiative, and sound practice under mentoring and monitored arrangements involving professional engineers.	❍	❍	❍	❍	❍
Sample indicators (optional)					
Q29 Substantial industry-based team assignments engaging industry members as supervisors and mentors are used in units.	❍	❍	❍	❍	❍
Q30 During relevant work experience, students are given substantial responsibility.	❍	❍	❍	❍	❍
Q31 During relevant work experience, students are supervised by engineers.	❍	❍	❍	❍	❍
Q32 Students undertaking industry-based final year projects have industry supervision.	❍	❍	❍	❍	❍

	Hardly at all 1	2	3	4	*Extensively* 5
Q33 Curriculum Theme 1d. Socio-technical dimensions of the curriculum demonstrate the integrated nature of engineering practice where technology and people interact and engineering knowledge and skills are combined with others' professional and generic skills.	❍	❍	❍	❍	❍
Sample indicators (optional)					
Q34 Students consider socio-technical dimensions of problems and solutions including sustainability and social, environmental and financial issues in engineering problems.	❍	❍	❍	❍	❍
Q35 Students interact with each other to work on problems.	❍	❍	❍	❍	❍
Q36 Student teams include non-engineering students.	❍	❍	❍	❍	❍
Q37 Student teams interact with engineers.	❍	❍	❍	❍	❍
Q38 Student teams interact with non-engineers.	❍	❍	❍	❍	❍

	Hardly at all 1	2	3	4	*Extensively* 5
Q39 Curriculum Theme 1e. Work-based learning (e.g. the workplace experience requirement) is integrated in the curriculum and assessed.	❍	❍	❍	❍	❍
Sample indicators (optional)					
Q40 Students are guided towards suitable workplace experience.	❍	❍	❍	❍	❍
Q41 Students have formal preparation for their workplace experience.	❍	❍	❍	❍	❍
Q42 Students communicate with an academic mentor while they are in the workplace.	❍	❍	❍	❍	❍
Q43 Students reflect on their learning in the workplace, during and after the experience.	❍	❍	❍	❍	❍
Q44 Students share their reflections on learning in the workplace with other students.	❍	❍	❍	❍	❍
Q45 Students' learning in the workplace is assessed (e.g. by graded assessment of learning demonstrated in their reflections).	❍	❍	❍	❍	❍

	Hardly at all 1	2	3	4	*Extensively* 5
Q46 Curriculum Theme 1f. Curriculum design and delivery are undertaken by academics recruited and rewarded by processes that acknowledge industry experience and engagement.	❍	❍	❍	❍	❍
Sample indicators (optional)					
Q47 Engineering educators are supported in establishing relationships with industry for the purpose of enhancing teaching.	❍	❍	❍	❍	❍
Q48 Engineering educators are supported in gaining industry experience (e.g. sabbatical in industry).	❍	❍	❍	❍	❍
Q49 Engineering educators are supported in exposing students to practice (e.g. with resources for site visits or guest speakers).	❍	❍	❍	❍	❍
Q50 Engineering educators have performance indicators linked to exposing students to engineering practice by engaging with industry.	❍	❍	❍	❍	❍

	Hardly at all 1	2	3	4	*Extensively* 5
Q51 Curriculum Theme 1g. Students track the development of their capabilities and their prospective futures as engineers.	❍	❍	❍	❍	❍
Q52 Curriculum Theme 2c. By graduation, students have understanding of possible future roles as engineers.	❍	❍	❍	❍	❍
Q53 Curriculum Theme 2c. (continued) By graduation, students have confidence in achieving possible future roles as engineers.	❍	❍	❍	❍	❍
Sample indicators (optional)					
Q54 Students are guided in developing skills to reflect on their performance and development.	❍	❍	❍	❍	❍
Q55 Students reflect on their development towards Engineers Australia Stage 1 or 2 competency standards holistically throughout the engineering program.	❍	❍	❍	❍	❍
Q56 Students' reflections are assessed.	❍	❍	❍	❍	❍
Q57 Convenient resources are available to students to manage their reflections throughout the program (e.g. eportfolios).	❍	❍	❍	❍	❍

Other resources

Further information about the project at http://arneia.edu.au/resource/59 includes:

- university and industry partners;
- benchmark responses to this reflection tool;
- best practice guidelines for effective industry engagement in Australian engineering degrees;
- good practice exemplars for engineering faculties;
- good practice exemplars for employers.

Project support and inquiries

The project is led by the Australian Council of Engineering Deans and funded by the (former) Australian Government Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education as a project of the National Resources Sector Workforce Strategy.

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