Curtin University

Curtin Engineering Industry Engagement Programme

Progress Report

CRICOS Provider Code 00301J

Project	Curtin Engineering: Industry Engagement Program
Grant	Nicoleta Maynard
Report Author, Researcher	Jolanta Szymakowski
Report Date	August, 2015
Chief Investigator	Nicoleta Maynard
Ethics Approval	SMEC-39-13: 03 October 2013 to 02 October 2017
Acknowledgements:	Pavilion Partners, Academics and Students who generously agreed to be interviewed.

Notes:

- The *Curtin Engineering Industry Engagement Programme* is referred to in this document as 'the programme', 'the project' or 'CEIEP'.
- Those who participated in the programme - the people from industry, Curtin staff and Curtin engineering students – are described as 'the participants' or 'the group'.

Executive Summary

For 21 months a group of engineering academics, engineering students and representatives from six engineering companies met quarterly to improve and strengthen industry engagement in the undergraduate engineering programmes at Curtin University. The quarterly meetings were called the *Curtin Engineering Industry Engagement Programme* (CEIEP), under the leadership of Associate Professor Nicoleta Maynard. After 21 months, the group were interviewed to capture what they saw as the programmes' strengths, successes, weaknesses and suggestions for ways forward.

The group acknowledged that the meetings were worthwhile and should continue to be held. The regular meetings had developed a sense of goodwill and professionalism.

Recommendation 1: *Continue with the quarterly meetings at Curtin, preferably in the Pavilion.*

Almost unanimously the group believed the best way to develop students into engineers involved the students spending a sustained period of time in industry during their studies – a semester 'sandwich' rather than vacation work over the Christmas and New Year break.

Recommendation 2: *Consider a pilot with a small number of students being placed in industry for a semester.*

Industry noted that many graduates held unrealistic beliefs about the Perth engineering scene.

Recommendation 3: *Curtin to implement a module on understanding the Perth and WA engineering context.*

There was still confusion around the requirement for vacation work and other concepts being discussed such as Work Integrated Learning, practicums, etc.

Recommendation 4: *Curtin to clarify EA's '12 week EPP requirement' with EA, including the need for students to be paid.*

An alternative form of industry engagement, masterclasses, was suggested. A masterclass does not place as much demand on the curriculum as a 'guest lecture', but is a way for industry to engage with undergraduate students at a more serious and respectful level than a 'guest lecture'.

Recommendation 5: *Curtin to consider implementing masterclasses.*

Students sought ways for the university to actively celebrate and nurture engineering identity development over the four years of the engineering programme

Recommendation 6: *Curtin to explicitly celebrate and nurture engineering identity development.*

Finally, industry unanimously required that Curtin provide "good graduates".

Recommendation 7: *Curtin to ensure its focus in engineering education stays on ensuring "good graduates". Other university activities should not come at the cost of producing "good graduates".*

Contents

1 Introduction

Training for a profession has a number of characteristics that make it different to just general study. Training for a profession has a specific aim – graduating a person who has been rigorously verified to know the profession's skills and knowledge, whose behaviour and standards are in accord with the profession's external professional's body and who is ready to participate as a professional in the workplace. The process of educating a person so they can enter the engineering profession as an engineer thus requires educational experiences from both university and the workplace.

Over the years many models have been used to develop people into engineers. One way of looking at these models is the different ways industry and the university combine during the development process. Early models of engineer development were done completely in-house, in industry, with no university input – an apprenticeship model. Other models do include a university component, but in various ways and degrees. A permanent part time model has a student affiliated not just with a university but with an engineering company. The student spends three days a week at university, and the other two days a week in industry. The medical model has a student 100% at university for the first few years, and then is 100% placed in industry for the last few years, where the student is taught by practitioners, not university staff. Alternatively, instead of one leap from university to industry, the sandwich model has students placed in industry for one semester at a time during their studies, but always returning to university after their placement. Finally, the model at Curtin has students completely at university during their four years of study, with industry contributing at least 12 weeks' worth of exposure to professional engineering practice during the student's 96 weeks of study. These possible models of university and industry engagement are shown in Fig 1-1.

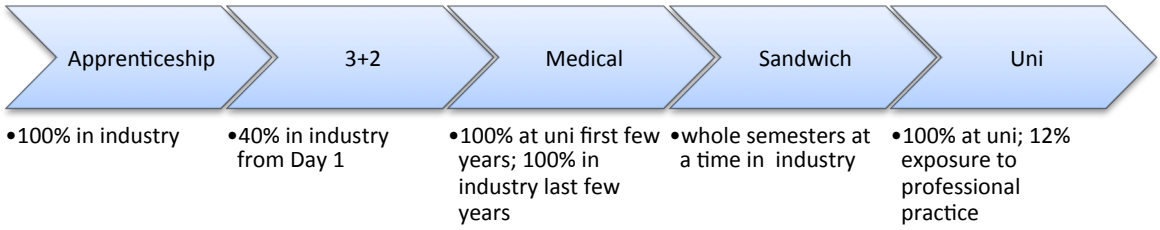


Figure 1-1 Possible ways university and industry can combine in an engineering degree.

Acting on the proposition that, no matter which model is used, improving students' engagement with engineering practice during their studies will increase graduation rates and graduate employability, the Australian Council of Engineering Deans recently commissioned a study into how universities across Australia engage with industry, promoting existing good practice across the system as a whole. The report, *Best Practice Guidelines of Effective Industry Engagement in Australian Engineering Degrees* (Male & King, 2014), showcased the different ways Australian universities engage with industry and offered 20 recommendations for engineering faculties, industry and professional bodies. The Curtin Engineering Industry Engagement Programme was established as a way to formalise and normalise industry engagement and assist academics with their use of industry engagement.

2 The Programme

The primary aim of the Curtin Engineering Industry Engagement Programme was to establish and develop a relationship between Curtin University and a select group of engineering companies, the Curtin Pavilion Partners. The relationships formed the foundation for ongoing industry engagement with the undergraduate engineering curriculum.

The Director of Engineering Education Development, Associate Professor Nicoleta Maynard, initiated contact with each Pavilion Partner (Clough, KBR, Lycopodium, Monadelphous, Rio Tinto, Thiess, Verve Energy, WesTrac, and Woodside), and invited engineers from each company to attend. Representatives from six of the nine companies attended the first and subsequent meetings. The names of the company representatives together with which meetings they attended is listed in Table 2-1.

Curtin University was represented by staff (an academic from each engineering discipline, an engineering education researcher and the WIL coordinator) and students (a representative from each engineering students club). This group of industry, staff and students met for the first time on 25 July, 2013, establishing the group and a set of priorities. Regular meetings at three monthly intervals with action points and minutes as well as continued contact outside the meetings sustained the group. The dates, times and venues for the meetings are shown in Table 2-2.

Table 2-1 Pavilion Partner representation and attendance at meetings

Pavilion Partners	Meetings attended	Attended	
Woodside	1, 2, 5, 6, 7	Neil Kavanagh Dave Harwood Simon Hehir	
Clough	1, 3, 4, 5, 7	Richard Werren Gary Bowtell Trent Watters	
KBR	1, 2, 3, 4, 5	Ken Hall Murray Broadbent Anthony Bowman Andrew Howie Adrian Bird Antony Boden	
Rio Tinto	1, 2, 4, 5, 6, 7	Santi Pal Roland Cocksedge	
Verve Energy	-		
Lycopodium	1, 2, 3, 4, 5, 6, 7	Peter de Leo Jacques Parent	
WesTrac	-		
Monadelphous	-	Rob Allen	
Thiess	1, 2, 3, 4, 5, 7	Louis Nel Stephen Urquhart	Thiess became part of Leightons, then CIMIC

Table 2-2 Industry Engagement Group meetings dates, times and venues

Meeting Number	Date	Time	Venue	Notes
1	25 July 2013	8:30 am	KBR	Common priorities identified: 1) Group Projects with industry input a) Multidisciplinary b) Hands on c) Include project engineering, management, financial, commercialisation etc. d) Life-cycle approach 2) Mentoring and Reverse-Mentoring 3) Research Projects 4) Vacation Work Opportunities
2	20 September 2013	8:30 am	Curtin	Common priorities: How and Who
3	13 December 2013	3 pm	Curtin	Review and ways forward
4	21 March 2014	2 pm	Lycopodium	Updates and ways forward
5	2 July 2014	2 pm	Curtin	Student Clubs presentations
	no September mtg			
6	24 November 2014	3 pm	Curtin	Review, Live Building, Celebration
7	20 March 2015	8:30 am	Curtin	Evaluation, Student Professional Practice feedback

Work began on systematically implementing the common set of priorities after the first meeting. Firstly, students and academics identified units where it was felt a **group project** with industry input would be useful. Unit outlines for these units were sent to industry, and industry responded with a number of suggested group projects. Many of these projects were ones that had been a challenge in industry, and for which industry had developed a solution. Industry presented to the academics not just the project problem but the final solution. Industry was very interested to see any alternative solutions that students developed. Some academics introduced the provided industry projects into their units, with others implementing them at a later semester.

The second priority was around **mentoring**. Rather than create a new mentoring program, the infrastructure and processes in Curtin's existing mentoring programme were used but expanded. Curtin's existing mentoring programme, NEXT STEP mentoring, limited mentors to Curtin alumni. The NEXT STEP mentoring managers extended the opportunity to mentor to all staff employed with the Engineering Pavilion partners, Curtin alumni or not. Students were invited to participate in the expanded NEXT STEP mentoring programme through Curtin's usual channels.

Although **research projects** were identified as the third priority, industry was not in a position to progress this agreed priority at this time.

The fourth priority was **vacation work** opportunities. The cyclical, boom-bust nature of engineering work in the WA environment was raised. The requirement to pay students for vacation work was also discussed and clarified. Consequently, one pavilion partner took on a number of vacation students

when they initially were not intending to because it was clarified that the students did not need to be paid.

In addition, industry staff were invited to and gave talks, sat on panels, judged competitions and participated at Curtin's Open Day. Students secured subject prizes from industry. A spirit of goodwill was created and sustained the group.

A review of the Curtin Engineering Industry Engagement Programme was undertaken after seven quarterly meetings. Group members (industry, academia and students) were individually interviewed to gather their thoughts around programme successes, failures, suggestions and going forward.

2.1 Programme Achievements

Programme participants were asked which elements of the Programme were successful. Common across the three groups of participants (industry, academia and students) were aspects such as the regularity of the meetings, the commitment to action and to change direction when required, and a willingness of spirit on all sides. The successes are noted in Table 2-3.

Table 2-3 Summary of Programme Achievements

Industry (I)	Academia (A)	Students (S)
• Reasonable consistent representation from the companies • Student voice • Regularity: Focus on action, action points, following up and ensuring progress. • A demonstrable willingness to provide opportunities • Asking industry how they want to contribute rather that the university directing what the engagement would be • Feedback from the students on what they were doing • Knowing there is one contact for engagement with industry for engineering Curtin – Nicoleta • In person rather than virtual meetings • Resolving that students do not need to be paid	• Regularity • Enthusiasm • Student voice • Actually happened • Actually got an industry project • Willingness to offer EPP • Consistency of people • Good conversations	• The initial and continuing presence of industry. • Some initiatives have been implemented, e.g. industry projects • Streamline contacts and connections with industry • Finding out from other students clubs with possible greater coordination • Key players all present with a willingness of spirit to get things done

I think one of the points that makes it successful is we've had reasonably consistent representation from the companies … having consistent representation has been helpful, and that's unique … the fact that you've managed to get more or less the same people every time is one of the reasons that it's going to work. I think having the students come in and out rather than it just me--which I think was a point of difference from [other university committee meetings], seemed to be all academics, all industry without getting a student voice involved .. So I think that's a good thing [that] we've had students there every time for different reasons - that's the important thing (I)

the alignment is clear, but moving if something is not working or something seems to be complete or we've taken it to the maximum extent, she's [Nicoleta] dropping it and moving on to something else. (I)

So from my end, the fact that you regularly meet and people will say "You can do this online, you can do that online" and it's all wonderful, but unless you meet face to face it doesn't work (I)

I turned up because I wanted to be there. .. when you started to see what was trying to be done, I could see merit in it (I)

It was good to get their viewpoint on what the [student] societies do but also what the students saw as their expectations and needs from their educational experience (A)

one thing that made them successful was that they actually happened at all. You know, actually getting industry, academics and students together in one place to talk about making links, I think that in itself is a great thing … there's been some tangible outcomes … We had three things. There was a design project, research projects and a project which could be used for heat transfer, teaching heat transfer. The heat transfer [project] was something quite new and different so that was great. they actually provided an industry based kind of problem and solution for heat exchanger, and that's I think impossible to get really as an academic.. Another thing that might have come out of that but [one company] has offered to help find exposure to a professional practice for selected students. They can't really offer vac work outside of their normal students that they take on but they were saying they were willing to take on a few students and kind of give them sessions about safety and give them problems to work on. So, there's willingness to do it. (A)

a number of companies had projects and it seemed they followed through with an active involvement, but what made it successful I think is it was quite an open environment when it started the engagement and really allowed the onus to be pushed onto industry to say "What do you want out of the university engagement?" rather than the university trying to get claws into the industry … having the student bodies there, there were a number of students I think, was really vital so they [the companies] could see and talk to the students directly, to make sure, sense check what they were going to do was appropriate. So I think it had all the right stakeholders in the meeting for those that could actually tackle these projects. (S)

that they [industry] actually showed up. So the fact that you've got these industry people showing up means that they obviously see some value in it. Their time costs something and it's a not a little amount either and they're the sort of people [who are] quite valuable people to their company. So, I mean, if they seem something in it, there's obviously some merit in it. (S)

the things that made the meetings successful were where we got feedback from students on what they were doing, because that was the learning for the industry person. … because engineering now isn't what engineering was when I was at university. The other thing is that they're also talking in disciplines that either some of them didn't even exist, mechatronics-type aspects just didn't exist, or they're disciplines that

aren't mine... so hearing back from the students what they're doing, and hearing back from them what they thought of the vacation programs, and what their understanding is of companies and why they would or wouldn't work for a company, that's really valuable ... (I)

2.2 Programme Misses

In contrast to programme successes, Programme participants were asked which elements of the Programme could have been done better. Common across the three groups of participants (Industry, Academia and Students) was a recognition of the current and cyclical nature of the Perth engineering market. Other responses are listed in Table 2-4.

Table 2-4 Summary of Programme Misses

Industry (I)	Academia (A)	Students (S)
• Mentoring • Greater diversity • follow up post the meeting as quickly as possible – missed opportunity • Others at Curtin engaging in parallel with the same company • State of the market (downturn)	• Resistance / not enough uptake by academics • Broader range of companies • State of the market (downturn)	• actual change to the degree or structure of the degree - To structure the degree to support work readiness • mentoring • offered design projects not implemented in units • State of the market (downturn)

2.3 Programme Suggestions

Semi structured interviews allow for the conversation between interviewer and the interviewed to extend beyond the interview protocol, and over the course of the interviews a number of suggestions were offered. Industry tended to make practical and direct suggestions; academia's suggestions were around influencing culture, and students focused on improving their study experiences. The suggestions are summarised below.

2.3.1 Industry

Industry's suggestions were grouped around four themes: Vacation Work, Mentoring, Exposure to Professional Practice (EPP) in the curriculum, and Meeting Details.

2.3.1.1 Vacation Work

- Request the engineering peak body (Engineers Australia) to issue a clarifying statement on the requirement for 12 weeks' vacation work;
- Request the engineering peak body (Engineers Australia) to issue a clarifying statement on the requirement for payment for the 12 weeks' vacation work
- If vacation work is not available, then undertake activities that round the engineer.

2.3.1.2 Mentoring

Mentoring has become the default, catch all phrase for any kind of professional interaction between a newer and experienced person where the experienced person counsels newer people. Many engineering companies run formal mentoring programmes for their new engineering staff, and perhaps what was

being sought at the undergraduate level at Curtin was more "meet an engineer" rather than a formal mentoring programme. Nonetheless, industry was willing to participate in Curtin's mentoring programme:

> mentoring was a big, big thing. Mentoring came up in the first meeting as absolutely critical, well, within the second meeting it was basically said, "Well, we have a mentoring program. There's a lot of mentors available, it's just a matter of making the connection." And then the whole thing disappeared. So in a way that was successful; something was identified, it was demonstrated as not being a problem, and then we moved on. (I)

2.3.1.3 EPP in the curriculum

Suggestions about types and ways to implement exposure to professional practice (EPP) include:

- **Track a Project**: Throughout a student's final year of study, track a project in industry. For example, if the project were an airport extension, each week arrange for someone involved with the project to give a short presentation (or a masterclass) about an aspect of the project. One week, it could be someone talking about risk management, another contracting details, a third, dealing with subcontractors, etc.
- **Unit Outlines**: Industry was presented with a set of unit outlines early in the Programme. Revisit the examination of unit outlines, to enable industry to offer suggestions about what could be included or deemphasized in the units.
  Secondly, industry suggested that they could be given an understanding where the syllabus is changing ahead of the changes to perhaps engage in discussion with that syllabus.
  Thirdly, industry noted a greater need for students to develop contracting skills.
- **Workshop Day**: Rearrange the curriculum so that the week is four days of normal lectures, but the fifth day is 'workshop day':

  > Be afraid. We are going to put you under pressure, you are going to have to learn stuff.-run a series of experience-based workshop kind of environments where you don't necessarily, or you don't walk in, sit down, because walking in and sitting down and taking notes is not going to get it in here, [pointing to brain] maybe you get people saying, OK, so this is what I want you to look for in understanding from this workshop that we're doing, this role-playing that we're doing, this is your role, this is your role, this is your role. Right, go, and at the end, you debrief, what did you learn? What worked, what didn't work, and it wouldn't be too hard to think about how you could. Because you need to structure it, because I think we put people in placements and even when they do vacation work, it is very easy for them to slide… (I)

- **Early and frequent EPP**: Industry needs to engage with students earlier (than the arrows on the model indicate) so they reset their expectations to understand what is important and what isn't. (see also the new module below).
- **Assessing EPP**: When industry does provide guest speakers, speakers perceive an aura of laxness from the students. To encourage the students to absorb and take the presentation more seriously, assess the students on the presentation.
- **New module - Perth as a boom and bust town**: Students are graduating with unrealistic expectations of both their job prospects upon graduating and what their jobs will entail. Industry

suggests the creation of a new module of learning to provide specific context about the Perth, the West Australian job market and the economic realities of life.

- **Meet the undergrads**: As well as industry coming to the Pavilion to set up displays, invite students to come to industry – the foyer of their buildings in town – to set up displays about their projects and their work for a day. Industry would then invite their staff to engage with the students as they enter / leave the building.
- **Masterclasses**: Industry staff present at industry conferences. The option is there to invite these same presenters to give their presentations to engineering students.

2.3.1.4 The meetings

- **Supply and demand**: Have the difficult and open discussion about the university supplying engineering graduates when demand for them in Perth is not high.
- **Open up the forum**: to other companies in the engineering market.
  The Curtin Business School was acknowledged as being particularly effective in engaging with industry, and to possibly consider their approach.

> there were visions of if we could all do certain things and we can't do the same, and that's why I say widen the industry for them that you can do different things for different people (I)

- **Post Meeting follow ups**: Ensure actions are followed up after the meeting as quickly as possible.
- **Roster Student feedback over the year**: Allocate a different sector of the student groups to each meeting e.g., Q1 electrical, instrumentation; Q2 mechanical; Q3 civil and environmental, etc.
- **Early notice of activities**: Industry needs to set budgets for the financial year some 14 months before hand, so provide early notice of when industry people will be required (to allow for allocation into their budgets).
- **Single point of contact**: Maintain a single point of contact for Curtin Engineering industry engagement (Nicoleta)

> one of the key areas is just having a connection there. Say if I need to talk to Curtin University, who do I go to? I go to Nicoleta - how do you make it more successful? More of that! (I)

- **Catering**: no need for lavish catering.
- **Venue**: Keep the meetings at The Pavilion. Industry appreciates not having to organise the meetings.

> it's easier for me to get to Curtin than it is for me to get down to the other end of Adelaide Terrace. So I like the idea, it's in the building, it's being sponsored and I think that that just makes it easier. I think people are more relaxed about it as well. (I)

2.3.2 Academia

Engineering academics were acutely aware of the challenges in the current university environment, and their suggestions were around changing the cultures - outward to industry, outwards to the university, and inwards to other engineering academics.

2.3.2.1 Culture of obligation for Industry Involvement

The willingness of industry to participate in student development is compromised by factors such as IP, the cyclical nature of projects, the remoteness of work sites and the necessarily limited view of the profession offered by engineering consultancies. Nonetheless, establishing a culture in Perth of "You run an engineering company, you're expected to participate in student development – that's just how it goes" was suggested.

> whether it is a contract or whatever it is, that every year they will take ten students or five student. And there should be some sort of [automatic] mechanism in place [in] their human resources and from the university maybe one department can handle those things and they can liaise or communicate with all these people, update every year. This is the time, these students we have. They have to take it. (A)

Another suggestion concerned those engineers from industry that already regularly participate with Curtin Engineering. It was suggested a list of the members on the different engineering school's Industrial Advisory Boards be compiled and compared to ensure they weren't being overcommitted, and to see where gaps could be filled with new volunteers.

The second part of the culture of obligation for Industry Involvement was focussed inwards to other engineering academics. Mirroring industry, a vision where engineering academics just as a matter of course are involved with industry engagement was suggested. This might require making explicit to engineering academics the benefits of industry engagement in their teaching, promoting awareness of Nicoleta's Curtin Engineering Industry Engagement Programme, and making it easy for the academics to get involved.

> Our country was different because the university has direct connection with companies and they have this kind of contract, so every year they have to take those students, so usually the company doesn't pay anything, but the university pays something to get the students to the field and also university send two academic staff with the students. The staff and students stay together about a month or two months in the industry. And it is already documented between the industry [and university]. (A)

The introduction of undergraduate masterclasses was suggested by another academic. Masterclasses are a way of packaging presentations from industry with greater dignity and respect. Masterclasses tend to be extracurricular or cocurricular, which provides a way for engineering academics to not have to change their unit too much.

It was also suggested that, in recognition of the current economic climate in Perth, retired or unemployed engineers could be hired to tutor, present masterclasses or guest lectures.

2.3.2.2 Culture of industry readiness rather than research readiness

A second series of suggestions concerned changing the broader culture of Curtin University around industry engagement. The university was described as having a research focus rather than a teaching or even industry focus, and one suggestion was to use this forum to modify the university's culture to swing back from essentially an 'only research matters' culture.

> they say to us, "Just give us good graduates," I think there's a message here, that industry needs to make it to the upper levels of our university management and say, "Look, you're pushing for this research but what we believe is going to suffer is the quality of graduates. So, you're not delivering the right product to us" (A)

Another aspect around the broader culture of Curtin University around university engagement was university support for a culture of obligation for Industry Involvement. Academics noted the difficulty in securing work placements for their students (especially their international students) and suggested the university takes a greater role in this. Students already pay annual guild fees, and it was suggested that those fees be tapped into to pay for a full time student placement officer. This role exists in other parts of the university and at other universities.

A higher layer to creating a culture at Curtin University that values industry engagement was one where the university forged high level links with industry. As a number of academics noted, when they were students themselves the universities established formal partnerships with industry which created a culture of industry taking students making work placements straightforward. Citing experience in Bangladesh, a group of students would undertake a work placement for a few months at a time, with one or two academics accompanying the students. The academics also experienced the industry work place. The university had established the formal relationship, completed all the relevant paperwork and made it easy for industry.

Finally, it was suggested that academics bring the latest research findings and trends to industry since once in industry many engineers are unlikely to read academic research journals.

2.3.3 Students

During the course of the interviews, students offered suggestions around three areas: design projects, the Curtin engineering culture and the mentoring programme. Firstly, while students appreciated the opportunity to work on industry based projects, students expressed a desire to work on multi-professional as well as multi-disciplinary design projects, more accurately mirroring the engineering workplace. Secondly, students noted that Curtin devoted much activity and effort in encouraging people to studying engineering, but the Curtin effort stopped once enrolled. There's a certain engineering vibe or character that is evident when engineers gather together as an engineering community (more than just a 'geek' culture) and students expressed a desire to have opportunities for this engineering community to be celebrated and nurtured throughout their studies at Curtin. For example, an annual 'Curtin Engineering Day' could showcase Curtin engineering students' achievements, host activities that nurtured students' ongoing engineering professional identities, celebrate the engineering profession and what it means to be an engineer and add atmosphere and enrich the students' typical study semester.

Finally students commented on the mentoring programme. The comments revealed that students valued in-house (organised by the School of Engineering) activities more than activities run and organised by the greater university. The greater university initiatives were seen as being somewhat generic and theoretical and not really relevant to engineering students. Placing an engineering

mentoring programme under the greater Curtin University Mentoring scheme, in the student's eyes, removed the immediacy of contact with industry and devalued the programme.

> something that came up in the Industry Partner's Meeting was the idea of perhaps a multi-disciplined or project--more projects given by industry to--which is a really good idea; just the idea of actually practically working on something that these companies may offer, then potentially a multidisciplinary environment, which is not something that's really ever possible around here. I'm not saying it should be either because it's weird to grade all the different engineers together but just the idea of more of that sort of project-type thing across the degrees (S)

3 Key Findings

3.1 Vacation Work, Exposure to Professional Practice, Work Integrated Learning, Practicum, Internships and Vocational Placements

A key aspect to emerge from the interviews was the muddied understandings around the 12 weeks 'vacation work' that students were required to undertake during their studies (see Table 3-1 for a list of terminology around vacation work.) Engineers Australia, in their accreditation document "G02 Accreditation Criteria Guidelines" does not use the term 'vacation work' and instead talks about integrating professional practice exposure over the fours of the standard engineering degree (Engineers Australia, 2008), and 'strongly advocates' (p. 18) at least 12 weeks of such or similar experience as a requirement before granting an engineering qualification. EA makes explicit that work experience in industry which is not formally assessed is in addition to the exposure to professional practice that has been embedded into the course.

Students use the term 'vacation work' when talking about EA's exposure to professional practice, and have done so for generations. Students see vacation work as real work – a real engineering job for which they apply, do real engineering work and are paid. It is an opportunity them to show their abilities and be useful to industry. Similarly, when industry uses the term vacation work, they are also thinking about real engineering jobs and hiring the students to do real engineering work, for which the students would be paid. Students are reluctant to apply for vacation work in the early years of their studies as they do not feel that they could contribute or be useful on the job: "we're just so unsure of what's going on that we wouldn't be much use … to a company".

Students also believe that they are unable to graduate unless they complete 12 weeks of vacation work (engineering work experience) (Curtin University, 2014), although the Courses handbook restates this as 12 weeks or equivalent of exposure to professional practice, which can be met through appropriate work experience. However, EA only 'strongly advocates' completion of 12 weeks professional practice as a prerequisite to graduation.

The term 'Work Integrated Learning' (WIL) is also being used in conversations around exposure to professional practice. WIL is a strategy for universities to develop graduate attributes and employability skills in their graduates, addressing a concern that universities are providing students with strong knowledge base but "without the ability to intelligently apply that knowledge in the work setting"

(Precision Consultancy, 2007, p. 2) Work-Integrated Learning is thus "an educational approach that aims to give opportunities to students to practice professional or disciplinary skills, to apply theoretical knowledge to real problems or to experience the real world of work" (Ferns, Russell, Smith, & Cretchley, 2014). Within the WIL framework, an activity is WIL if it is integrated into the curriculum complete with teaching, learning and assessments, without which students cannot graduate, and for which students are not paid.

Table 3-1 Vacation Work and other terms

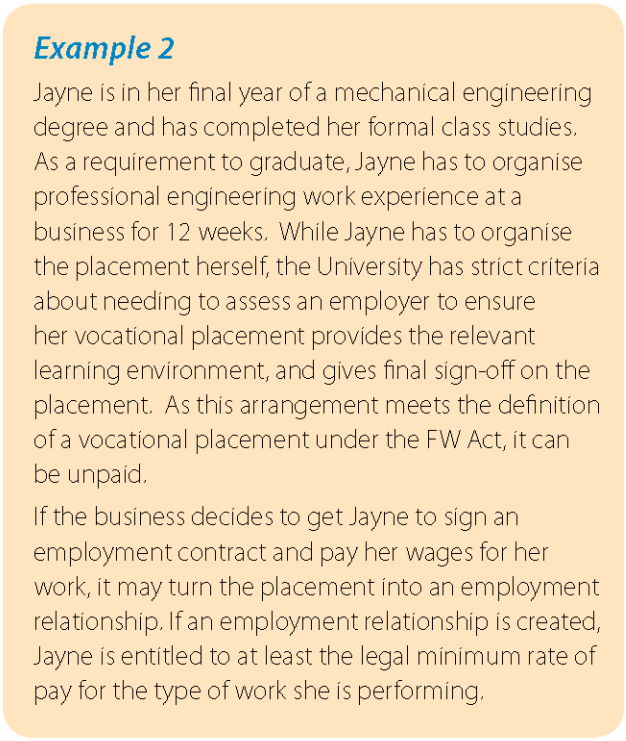
	What is it?	Paid?	Mandatory to graduate?	Notes
Vacation Work	Job	yes	Yes (university); No (EA)	Students see it as a way to showcase themselves.
Exposure to Professional Practice	Exposure	n/a	Yes	Should be built into the 4 year curriculum
WIL	Learning	No	Yes	
Practicum	Practical experience	Doesn't need to be	Yes	
Internship	Job	No, if the student is gaining the main benefit from the arrangement; Yes, if the company is gaining the main benefit from the relationship as it involves significant productive work to be performed by the interns for the company	No	
Vocational Placement	Learning	No	Yes	Defined by the Fair Work Act

Practicums are "field placements in environments which offer students the opportunity to obtain work experience and demonstrate professional competencies in a structured environment" (Curtin University, 2015b). Student teachers and nurses integrate practicums with their studies, with guidelines, reflections and practicum outcome criteria structured by the university.

Internships tend to not be organised or structured by the university but are an opportunity for someone to work for a business to gain experience in a particular occupation or industry. Internships can be either paid or unpaid, depending on who benefits in the internship relationship.

The Fair Work Act uses term 'vocational placements' to describe "a formal work experience arrangement that is part of an education or training course" (Fair Work Ombudsman, 2014a, 2014b). Vocational placements are learning exercises rather than work, and if four conditions are met, then hosts are not

required to pay students entitlements under the Fair Work Act. However, "a host may elect to provide payment(s) at their discretion and under no obligation" (Fair Work Ombudsman, 2014b). Coincidentally, example 2 on the Fair Work Ombudsman's Vocational Placements Fact Sheet considers just the case of an engineering student looking for their 12 weeks work experience, and concludes that under the Fair Work Act, the student does not need to be paid.



Example 2

Jayne is in her final year of a mechanical engineering degree and has completed her formal class studies. As a requirement to graduate, Jayne has to organise professional engineering work experience at a business for 12 weeks. While Jayne has to organise the placement herself, the University has strict criteria about needing to assess an employer to ensure her vocational placement provides the relevant learning environment, and gives final sign-off on the placement. As this arrangement meets the definition of a vocational placement under the FW Act, it can be unpaid.

If the business decides to get Jayne to sign an employment contract and pay her wages for her work, it may turn the placement into an employment relationship. If an employment relationship is created, Jayne is entitled to at least the legal minimum rate of pay for the type of work she is performing.

Figure 3-1 Example from Fair Work Ombudsman's Vocational Placements Fact Sheet

The work experience concept that has been previously called 'vacation work' has evolved. Rather than a 'real job' where a student can showcase their abilities to a potential employer, the pendulum has swung to it being a learning experience where a student has exposure to the workplace without it necessarily being an employment relationship. However, this doesn't preclude the employer from paying a bonus or honorary contribution at the end of the vocational placement.

3.2 Understanding the Perth Context

One of the suggestions from industry was around realigning the expectations of engineering students by making explicit the genuine reality of engineering in Perth and Western Australia (WA). The first important aspect of the Perth and WA engineering picture is the low baseline level of engineering activity. In Perth and WA, the demand for engineers mostly comes from projects – a time limited activity, with a fixed beginning and end.

Compare this with other professions such as teaching or nursing. There is a steady, continuous baseline of teaching and nursing activity throughout the entire year, which makes it easier for teaching and nursing students to secure a vocational placement.

Other countries have chosen to ensure a high level of baseline engineering activity. The Indian Government, for example, has initiated a series of national policies, including the National Manufacturing Policy and the National Skill Development Initiative, to ensure a high level of skills development and provide gainful employment opportunities for its people. In particular, building on its stated strong engineering base, some industries have been identified as having strategic significance, and it is proposed to build capabilities in sectors such as: aerospace, shipping, IT hardware and electronics, telecommunication equipment, defence equipment, and solar energy. In particular, the Indian Government encourages universities to engage with industry:

> 1.17 Manufacturing management will be given a focused attention as it will facilitate improvement of productivity, quality and competitiveness of manufacturing enterprise. Industry will be encouraged to collaborate with higher educational institutions to develop curricula for grooming graduate engineers and supervisory managers for various facets of manufacturing. (Department of Industrial Policy and Promotion, 2011, p. 6)

The Indian Government has chosen to ensure a high baseline level of engineering activity as a matter of policy. This includes building manufacturing infrastructure and procuring items locally rather than outsourcing manufacturing and purchasing.

In contrast, Australia has no national policies to build or support local manufacturing. Indeed the Australian public sector has been systemically de-engineered through structural change in favour of outsourcing (Engineers Australia, 2014). The Australian baseline for engineering activity is thus low. However, engineering activity picks up substantially when a project is announced. Engineers are required for projects such as the Gorgon Project, the North Rankin Redevelopment Project or the Roy Hill Project. Unfortunately, much of the engineering in these projects is also outsourced (Association of Professional Engineers Australia, 2015; MacTiernan, 2015), a fact of life in today's engineering business models.

When many projects are underway, WA is in a 'boom'; when projects are completed, delayed or on hold, WA is in a 'bust'. When in a 'bust' engineering graduates would be expected to travel overseas for work, or, if intending to stay locally, to not be too upset to work out of engineering as a barista or in hospitality, for example, until new projects come on board.

Influencing national policy is clearly not something that Curtin staff can rapidly achieve. This falls more appropriately at the feet of the engineering peak body, Engineers Australia and the professionals peak body, Professionals Australia.

The second aspect of realigning student expectations for a Perth and WA context is around the market and commercial realities. The commercial reality is that money - budgets and contracts - are primary drivers in Perth and WA engineering workplaces. As one experienced industry representative noted, "if you don't think dollars matter, work for a company that goes broke and then you find out …"

Engineering workplaces use an engineering model that outsources engineering activities to low cost centres (typically overseas), keeping in sharp focus shareholder value, and expect engineers to engage with clients to win revenues.

Students will only appreciate the nuances of Australian engineering cultures once they have been immersed in an engineering workplace for a while. Nonetheless, industry has identified in graduates an area that needs addressing – realigning student expectations. Students will also need to appreciate that engineering cultures overseas are different to Australian engineering cultures, especially if the engineering company they are working for is owned overseas e.g., American, South African or Norwegian. Those companies will reflect values and ethics of their parent country.

3.3 "Good Graduates"

When asked what the university can do for industry, the unanimous and unambiguous response was to provide "good graduates". While industry did not expand upon what was a "good graduate" compared to say, a satisfactory graduate, they did highlight the importance of (i) being able to write a report, (ii) being able to think, (iii) effective people skills and (iv) effective communication skills. Graduates are typically expected to present to their colleagues in the first few weeks or months of starting work, and "to be able to articulate really in succinct ways and get the message home quickly" was very important. Further, graduates needed to understand that the vigorous debate of ideas that happens around the engineering table is just part of the process, and not to take personally criticism of what has been said.

Academics noted that producing good graduates does take time and resources. Both academics and industry were concerned that the university's recent focus on research outputs should not come at the expense of producing "good graduates".

3.4 Maintaining the Relationship

All three groups in the programme – industry, academic and students – commented on the goodwill and professional nature of the relationships developed within the group. An appropriate balance of respect and contribution had been maintained. Industry pointed out that face to face meetings facilitated the best results, and that 'virtual' meetings would be unsuccessful.

The regularity and frequency (quarterly) of the meetings also contributed to the success of the meetings.

3.5 Ideal EPP through sustained work placements

When considering their *ideal* way to develop students into engineers, industry, staff and students overwhelmingly stated that engineering students should experience a sustained period of time in industry – at least a semester at a time. This differs from vacation work, which is also for a sustained period of time – nominally 12 weeks – but was typically scheduled during summer vacation, which includes Christmas and New Year. Industry noted that most workplaces shut down between Christmas

and Australia Day, so finding meaningful work for students during the summer vacation period was a challenge.

Far more meaningful work for the student and better results for industry would be achieved by arranging for students to spend a semester at a time in industry. Industry and staff who had experienced this semester long placement during their own studies overseas spoke very highly of the power of the experience to effectively shape engineering identity and skills development. A semester long or six month placement in industry makes the course a 'sandwich course' (since the student is at university before and after the work placement); students could enrol in a 'thin sandwich' course (one semester in industry) or a 'thick sandwich' course (two semesters in industry).

The almost unanimous suggestion of arranging for students to undergo a semester at a time in industry, *not* during the summer vacation, is a very strong finding. It is thus recommended that Curtin Engineering explores implementing a sandwich engineering curriculum, perhaps as a trial first with a small number of students. For a typical engineering student, a semester in industry would add six months to the completion of their degree. However, this might not be as disadvantageous as it first seems – engineering degrees at UWA take students five years to complete without any in-semester industry placements, so a student graduating from Curtin after 4½ years but with a semester of industry experience offers industry a far more rounded and developed graduate engineer –possibly even a "good engineer".

3.6 Nurturing and Celebrating the Developing Engineer – not just a student

Following from the explicit community building focus of the engineering foundation year, students expressed as sense of flatness about their later studies. Activities that maintained a sense of excitement and a growing sense of belonging to the engineering community were sought in students' later years. While students were able to organise activities themselves, events carried greater validation or authority when the events were also organised by the university or the faculty.

Students recognised the need to develop engineering skills and knowledge. However, they sought greater curricular opportunities to develop an identity as a professional engineer.

Appendix 1: Exposure to Professional Practice (Engineers Australia G02 §3.2.5)

Extract from Engineers Australia Accreditation Guidelines: Requirements for Exposure to Professional Practice to be built into an Australian accredited engineering degrees (Engineers Australia, 2008, pp. 17-18))

Exposure to professional engineering practice is a key element in differentiating a professional engineering degree from an applied science degree. Although the status of Chartered Professional Engineer requires a substantial period of experiential formation in industry after graduation, it is clearly unsatisfactory for the student's perceptions of engineering to develop, over the first four critical years, in complete isolation from the realities of practice. There is obvious benefit in ensuring that at least an element of professional formation is interwoven with the academic curriculum, to provide a balanced perspective and relate academic preparation to career expectations.

Professional practice exposure must be considered as an integral learning activity within the educational design process and make a significant and deliberate contribution to the delivery of educational outcomes. The objectives associated with each major episode of exposure need to be clearly understood by all constituencies and documented as a formal learning activity within a designated academic unit. There must be defined contributions from these activities to the specific learning outcomes of academic units and in turn to the educational outcomes of the program as a whole.

There should be a formalised tracking, monitoring and assessment of the learning outcomes associated with professional practice exposure. This may for example be through a journal or portfolio system where students record and reflect on their experiences against the targeted graduate capabilities set for the program.

Professional engineering practice exposure must include some of the following:

- use of staff with industry experience,
- practical experience in an engineering environment outside the teaching establishment,
- mandatory exposure to lectures on professional ethics and conduct,
- use of guest presenters,
- industry visits and inspections,
- an industry based final year project,
- industry research for feasibility studies,
- study of industry policies, processes, practices and benchmarks,
- interviewing engineering professionals,
- industry based investigatory assignments,
- direct industry input of data and advice to problem solving, projects and evaluation tasks,
- electronic links with practising professionals, and
- case studies

It is considered that there is no real substitute for first-hand experience in an engineering-practice environment, outside the educational institution. Engineers Australia strongly advocates that all engineering schools include a minimum of 12 weeks of such experience (or a satisfactory alternative) as a requirement for the granting of qualifications, in addition to the other elements suggested, and make strenuous effort to assist all students to gain placements of suitable quality. However it is recognised that this may not always be possible.

> The requirement for accreditation is that programs incorporate a mix of the above elements, and others – perhaps offering a variety of opportunities to different students – to a total that can reasonably be seen as equivalent to at least 12 weeks of full time exposure to professional practice in terms of the learning outcomes provided. In the same way as for other modes of learning, submitted documentation must explain how the various dimensions of professional practice exposure contribute to the overall educational design.
>
> Where practice exposure is incorporated within the four-year equivalent curriculum, it must embody assessable requirements comparable with other curriculum elements that attract similar credit. *Where it consists of work experience in industry, not otherwise formally assessed, it should be counted in addition to the four year academic requirement.*

Further, Curtin University requires 12 weeks of engineering work experience during the summer breaks in order to graduate ((Curtin University, 2014). The Courses Handbook description is slightly different:

> **Specific Course Completion Details**: To satisfy requirements, students must complete at least 12 weeks or equivalent of exposure to professional practice. This requirement can be met by appropriate work experience. Students must demonstrate that they have met these requirements by using a formal log book to record their professional experiences during the period of their degree study. (Curtin University, 2015a)

Appendix 2: Methods, sample and procedure

The purpose of this qualitative study is to explore the experiences of people from industry, academic and the student body who were involved in the Curtin Engineering Industry Engagement Programme. The experiences included reflections on what worked and what didn't work as well as suggestions for the programme and industry engagement in general. Graduate programmes and the ideal way to develop people into engineers were also explored.

This research asked programme participants to describe their experiences and thoughts. A basic interpretive methodology (Merriam, 2002) captures people's experiences without necessarily developing a theory or identifying the essence of a phenomenon. Data was collected though one-on-one interviews with programme participants. An interview protocol was developed and tested (Appendix 3: Interview Protocol). The interviews were 20 to 58 minutes long. All interviews were audio recorded. The audio recordings were transcribed by a professional transcriptionist and the transcripts were logged into NVivo qualitative data analysis software (QSR International Pty Ltd, 2014). The verbatim hardcopy transcripts were analysed manually, firstly using structural coding against the interview questions, followed up by an iterative processes of open and axial coding (Corbin & Strauss, 2008; Saldaña, 2012). NVivo was used to electronically link codes to the data and to identify patterns across participants and to group codes into categories.

Ethics approval for research with human subjects was sought and approval granted. The Chief Investigator, Nicoleta Maynard is the Director of Engineering Education Development, and the researcher, Jolanta Szymakowski, is an independent researcher employed for the project. The Human Research Ethics Approval Letter forms Appendix 5. The Participant Information Form is in Appendix 6, and the Participant Consent Form is in Appendix 7.

Sample

A different sampling strategy for each of the three groups of programme participants – industry, academic staff and students – was implemented. For industry, every industry representative was interviewed, even if they were no longer working for the pavilion partner company or had now taken on a new role in the company. For academic staff, the strategy was to ensure at least one person from each discipline area was interviewed. For students, representatives from the three major student clubs were sought.

The following numbers of people were interviewed:

- 6 people from industry
- 5 academic staff (representing, chemical, mechanical, petroleum and electrical)
- 5 students from three student clubs

Procedure

Data was collected through semi-structured face-to-face interviews over a two month period, April 2015 to June 2015. The face-to-face methodology was chosen to facilitate the development of interviewee rapport, allowing time for interviewee's considered reflection and to indicate to the interviewee that the interview and interviewee were important enough to be done in person.

Interviews for all respondents ranged from 20 minutes to 58 minutes.

Interview protocols were presented to each person at the time of interview. The same interview protocol was given to all three groups.

Sixteen interviews were conducted resulting in 9½ hours of recordings. The interviews were transcribed resulting in 176 A4pages of typed transcripts.

Appendix 3: Interview Protocol

Interview Protocol

Industry Engagement in Engineering Education at Curtin University

1. Setting the Scene – the big picture

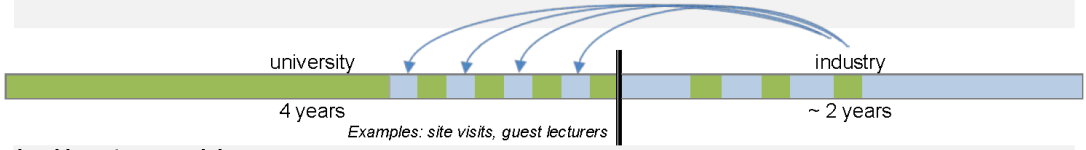
Looking at how industry and university combine to develop people into professional engineers.

- There are different models –
  - The apprenticeship model, where someone would join a company and be fully trained by them;
  - 2 + 3 model: Uni Melb GSE, or part time architecture courses (2 days at work, 3 days at uni)
  - Medical model – where last two years or so fully at a hospital, in the workplace, on site.
  - Canada / Griffith – whole semester in industry
- Have you had experience with these other models? .....
- In an ideal world, if we were starting from scratch, what do you think would be the ideal way to educate an engineer? .....

2. Setting the Scene – Australian 4 year model

- In Australia the typical process to become a professional engineer is a two stage process – stage 1 involves being a student at a university – and stage 2 is in industry, moving beyond being a graduate engineer.

  During stage 1, *the university is the custodian of these aspiring engineers until they enter industry.*
- Current model picture – a 4 year block at unit with some input from industry



Looking at our model:

1. Does this model roughly capture the picture of university / industry contribution [in WA]? .....
2. In your view, **how important** are the contributions industry make to the 4 year undergraduate degree? **Why**? ...

3. The Curtin Programme

Narrowing the focus further to you and your company's involvement with Curtin University though Nicoleta's regular meetings, in particular: We have met 7 times, over 18 months, mostly quarterly.

3. **Success**: From your viewpoint, what elements of these regular meetings were *successful*?
   What made them successful?
4. **Could do better**: What *didn't work*?
   Why did they not work?
   Are there some things that we want to keep working on, but perhaps with a different approach?
   What things do want to stop working on?
5. Was the balance between *talking* and *action* about right?
6. **Priorities**: Did we get the priorities right? Should the priorities now change? If so, what next?
7. **Format – quarterly meetings**. Should we keep doing this in this format?
8. Is the *relationship* between Curtin and industry [your company] the right balance of respect, and contribution?
9. Who else from industry should we invite?
10. What can the university do for industry?
11. Are there other ways that you would like to contribute?

Appendix 4: Recommendations from *Best Practice Guidelines for Effective Industry Engagement in Australian Engineering Degrees*

Recommendations for Engineering Faculties

F1. All engineering faculties will establish and maintain effective industry engagement as part of faculty culture in which:

> **F1a.** All engineering faculties will establish people, processes, and resources to ensure strong relationships with industry
>
> **F1b.** All engineering faculties will provide structural and developmental support for academics to engage with industry
>
> **F1c.** All engineering faculties will engage engineers with industry experience in facilitating learning
>
> **F1d.** Industry consultation will be structured and transparent

F2. All engineering programs will use industry-based assignments

F3. All student engineers will have substantial opportunities to work and learn in industry

F4. High percentages of students will have opportunities to undertake industry-based final year (capstone) projects

F5. Emulated work integrated learning will be developed as an example of effective industry engagement

F6. Students will be encouraged to take responsibility for seeking opportunities to learn about engineering practice

F7. Engineering faculties will support and recognise industry engagement

Recommendations for Industry

I1. Organisations should provide regular and structured student engineer employment

I2. Engineering employers should provide support for their engineers to engage with engineering education

I3. Engineering employers should provide support for academics to experience industry

Recommendations for Professional and Industry Bodies, and Governments

B1. Industry bodies, universities, student societies, and the Australasian Association for Engineering Education, should consider establishing a resource centre to support industry engagement with universities

B2. Government, professional bodies, and engineering faculties should consider establishing a joint internship scheme

B3. Engineers Australia should consider developing an e-portfolio resource for student engineers

B4. Industry bodies should establish and support industry engagement with education

B5. Government incentives should be considered

B6. Engineers Australia's Accreditation Board should review the accreditation guidelines with respect to exposure to engineering practice (Male & King, 2014)

Appendix 5: Human Research Ethics Approval

Curtin University

Memorandum

To	Jolanta Szymakowski, Nicoleta Maynard, Engineering Operations
From	Pauline Howat, Administrator, Human Research Ethics Science and Mathematics Education Centre
Subject	Protocol Approval **SMEC-39-13**
Date	3 October 2013
Copy	SMEC

Office of Research and Development

Human Research Ethics Committee

Telephone 9266 2784
Facsimile 9266 3793
Email hrec@curtin.edu.au

Thank you for your "Form C Application for Approval of Research with Low Risk (Ethical Requirements)" for the project titled *"Industry Engagement in Engineering Education at Curtin University"*. On behalf of the Human Research Ethics Committee, I am authorised to inform you that the project is approved.

Approval of this project is for a period of 4 years **3rd October 2013** to **2nd October 2017**.

Your approval has the following conditions:

(i) Annual progress reports on the project must be submitted to the Ethics Office.

(ii) It is your responsibility, as the researcher, to meet the conditions outlined above and to retain the necessary records demonstrating that these have been completed.

The approval number for your project is **SMEC-39-13**. Please quote this number in any future correspondence. If at any time during the approval term changes/amendments occur, or if a serious or unexpected adverse event occurs, please advise me immediately.

Pauline

PAULINE HOWAT
Administrator
Human Research Ethics
Science and Mathematics Education Centre

Please Note: The following standard statement must be included in the information sheet to participants:
This study has been approved under Curtin University's process for lower-risk Studies (Approval Number xxxx). This process complies with the National Statement on Ethical Conduct in Human Research (Chapter 5.1.7 and Chapters 5.1.18-5.1.21). For further information on this study contact the researchers named above or the Curtin University Human Research Ethics Committee. c/- Office of Research and Development, Curtin University, GPO Box U1987, Perth 6845 or by telephoning 9266 9223 or by emailing hrec@curtin.edu.au.

J:\SAE\SMEC\office\ETHICS\Ethics Approval Letter 2013\Szymakowski-2.docx

CRICOS Provider Code 00301J

Appendix 6: Participant Information Form

Curtin University

Office of the Dean of Engineering

GPO Box U1987
Perth Western Australia 6845

Telephone +61 8 9266 4538
Facsimile +61 8 9266 2681
Email jolanta.szymakowski@curtin.edu.au
Web curtin.edu.au

13 September 2013

Industry Engagement in Engineering Education at Curtin University

PARTICIPANT INFORMATION SHEET

The Project team: who are we?: Associate Professor Nicoleta Maynard and Ms Jolanta Szymakowski.

Who will conduct the research? Ms Jolanta Szymakowski, a research assistant, has been hired for the project. She will arrange to meet with staff and students for discussions.

How will participants be recruited? Engineering students will be invited to participate through in-class announcements (with teachers' prior permission) and by email. Engineering staff will be invited by telephone, or email. Engineers from companies with which Curtin has a partnership will be invited by telephone and email. E-mail lists will not be accessed directly by the researchers.

What happens to the data? Interviews, focus groups and workshops will be audio recorded. Notes from the observations, interviews and focus groups will be analysed, along with the transcripts from the audio recordings. These notes, recordings, and transcripts are the property of the researchers. Recordings will be stored securely and will not be accessible to teaching staff.

Is the anonymity of participants protected? All data are anonymous, that is, no data released to other people will enable you to be identified either during the research or in resulting publications or presentations. No audio recordings will be released to teaching staff or anyone else.

Can you withdraw from the project? You are free at any time to withdraw consent to further participation without prejudice in any way. You need give no reason or justification for such a decision. In such cases, your records are destroyed, unless otherwise agreed by you.

What are the risks and inconveniences of the project? There is no health risk involved and the only inconveniences are volunteering your time for either an interview or participation in a focus group or workshop. If you are a student, your participation or choice not to participate in this research will not influence your participation in your course or your grades.

What are the long term outcomes? This research project will investigate how the Curtin engineering programmes engage with the engineering industry and help make the industry part of the engineering programme a much better experience for staff, students and industry. Your participation is therefore highly valued.

Approval to conduct this research has been provided by Curtin University, in accordance with its ethics review and approval procedures (Approval Number **SMEC-39-13**). Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting the Curtin University Human Research Ethics Committee on (08) 9266 2784 or by emailing to hrec@curtin.edu.au

All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.

Kind regards

Jolanta Szymakowski

1 of 1

Appendix 7: Participant Consent Form

Curtin University

Office of the Dean of Engineering

GPO Box U1987
Perth Western Australia 6845

Telephone +61 8 9266 4538
Facsimile +61 8 9266 2681
Email jolanta.szymakowski@curtin.edu.au
Web curtin.edu.au

13 September 2013

Industry Engagement in Engineering Education at Curtin University (SMEC-39-13)

PARTICIPANT CONSENT FORM

I (the participant) have read the participant information sheet and any questions I have asked have been answered to my satisfaction. I agree to participate in this activity, knowing that I may withdraw at any time without reason and without prejudice.

I agree that research data gathered for the study (with the exception of audio recordings) may be published provided my name or other identifying information is not used. Audio recordings are only used to generate a transcript, and are not published at all.

I have also been told the steps that will be taken to ensure confidentiality of all personal information.

I am aware that if I have any questions about this project I can contact Jolanta Szymakowski on 9266 4538.

Participant's Full Name: _____

Participant's Signature: _____ Date: _____

Please delete appropriate words below:

I *do / do not* agree to being audio recorded (when necessary for this research).

I *do / do not* agree to being observed during meetings or workshops for this research.

I *do / do not* agree to being approached to a follow up interview (when necessary for this research).

Sincerely
Jolanta Szymakowski

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