

Women in Engineering
9 May 2019



CREATE CHANGE

Teacher Workshop



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Introduction

Women in Engineering

Many of the problems facing the world will require complex and imaginative solutions, spanning across multiple disciplines and utilising a wide variety of perspectives and experience.

The best solutions will benefit from having diverse teams working on the problems at hand.

We have seen significant growth in female student numbers, with women now accounting for 24.3 per cent of commencing engineering students at University of Queensland in 2019 – up from 18.8 per cent before 2013 and well above the current national average of 17 per cent. The program's key performance indicator is to achieve more than 30 per cent female enrolment before 2023.

Our ultimate goal, however, is to improve the gender balance in students studying engineering across the whole university sector, not just at University of Queensland. We want to see broad systemic change that can benefit the industry in Australia and globally, and we fundamentally believe that schools, universities and industry need to work better together if this is to be achieved.

Your role as a teacher is so important in achieving this goal. From our post event feedback survey from WE Explore Day 2019, teachers are the one of the biggest influences in the degree decision making for these students, second only to their parents.

Thank you for your support with the University of Queensland Women in Engineering program, by encouraging and bringing your students to events such as the Explore Day and we hope they enjoyed the experience as much as we did. This was our first year running the Teacher workshop component and we appreciate your time and inputs to this interactive session and have put together key notes in this report, as well as contact details for continued engagement, collaboration and networking.

Topic 1: Engaging Girls in STEM

What have you tried and what works?

- Hands on projects
- Following the entire design process
- Design thinking in multiple faculties
- STEM ambassadors
- Grade 8 – Experimental design project integrated with unit plan
- Clubs and societies – physics Olympiad, maths extension and competitions, student led robotics club

What doesn't work?

- Over reporting on lack of balance
- Difficulty coordinating faculties in STEM to get a collaborative curriculum

New ideas to try?

- Get material testing equipment to be able to actually test materials being used - hands on
- STEM ambassadors – Year 10 or 11– student led but working with universities

Topic 2: Girls Engagement with UQ

Ideas for workshops, talks, visits

- Robogals 2-hour sessions for hands on opportunity and introduce girls to the basics
- Opportunities to build and design for a purpose
- Applied maths workshop – for Year 9 and 10 to help inspire them to continue with specialist maths
- Careers and information session in engineering, maths and computing
- Mentoring with current university students – include boys and girls
- “Pint of Science” – short talks showing current/past projects
- Exposing students to industry/high standard (and calibrated) engineering and science lab equipment – have them involved in a university lab class
- Use of PHD students, academics, researchers – to talk about what they are doing in their fields such as their specialist projects and link career paths with theoretical and teaching concepts
- UQ to come and help commence a wearable art project in STEAM class – such as coding lights in fabric
- More awareness on health and engineering link – use of fit bits and technology, biomedical, etc.
- Focus on aerospace industry – any contacts with companies building and designing these technologies
- Talks at schools from a range of faculties to talk to a wider audience
- Talks about subject selections for ATAR and the prerequisites
- Substantiality focus – but not just renewable energy
 - Sustainable design is a senior design syllabus – can experts in this field come and help run a classroom session to these students
 - Materials that are environmentally responsible
 - Waste management
 - Resources that can be used to introduce a unit

Topic 3: Professional Development

Topics

- Introduction to Robotics
- Electrical activities
- Ideas for extension students/STEM classes/clubs
- Programming, coding and software
- Using Microsoft products – such as Excel
- Available research that can be used to assist classes such as Physics syllabus Unit 4Sustabanlae design
- Designing with empathy (human centred)
- Having UQ teach the classrooms in new topics such as coding, which in turn allows the teacher to learn
- Sharing engineering stories/projects/research that link to the real world and linking this with core class concepts
- Workshops to demonstrate that failure is a part of the design process – in order to model in programming for STEM integration
- Architecture

Teaching style

- Hands on a must
- Actively engaging
- Easy to understand and able to share with colleagues – ideas, techniques, material
- Portable resources/practical kits that we could rent/hire and use to bring into the classroom

Timing

- Holidays – whole days
- Evenings 4-6 pm
- If during school hours, must be for the whole day to be time and cost effective
- Awareness of resources available – what's out there? What opportunities do we have to try them out?



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