Full STEaM Ahead for future Engineers

STEM students building a future

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Can you imagine high school students giving up a week of their precious school holidays to immerse themselves in further learning?

That's exactly what 23 girls did in mid July when they spent a week of their mid-year break at Engineers Australia, participating in Akorn and Enable Education's "Full Steam Ahead Girls designing for an inclusive community" program.

It was a real pleasure for me to be involved in this program. On the first day I observed them immersing themselves into the challenges faced by someone living with a disability. They were working with one hand constrained, or using crutches, or a different tool that helped them simulate the conditions experienced that they were design for. On this first day I told them about my career to date and explained what engineers 'do'. I asked if they had any questions, but there were few.

I returned two days later and was delighted to bump into a group who were testing a prototype for their design and calibrating it. One of the girls who had not spoken much on the Monday confidently explained the design and demonstrated the prototype.

It was a sensor on her ankle that alerted her when she was getting close to an obstruction, such as a wall. It reminded me of the reversing sensors on a car.

When I asked the girls if they had any questions – this time they were much better prepared. I was asked my view on the immigration of skilled migrants; about different projects I had worked on; and my favourite question, 'but what do you actually do all day'?

I explained that my days can be quite different – which is one of the things I love about my job. These days I'm in management so most of my days are spent in meetings. I explained that earlier that day I'd had a meeting reviewing the proposed changes to the building regulations. Then I'd met with a client to get feedback on how our team were performing on a project, and later in the day I would be reviewing material that would go to all staff about an internal initiative I am leading.

They seemed genuinely surprised that I wasn't going to spend my entire day behind a computer or calculator.

I told them that whilst I still love to get my hands on some numbers to crunch, mostly my role requires stakeholder engagement:

- To understand their needs & define the brief
- To test solutions
- To present alternatives and communicate ideas.

As we are more 'digitally disrupted' our computations are becoming quicker and we're spending more of our time on human centred activities.

Education

These activities require skills other than those you might think of when you hear 'maths & science'. For example I explained to them that the empathy they had demonstrated on the first day whilst experiencing life with a disability was an important step in their design process. If they had skipped this and jumped straight into design, I doubt the outcomes would be as good.

Throughout the week, the girls had been visited by people who live with disabilities. I had also shared with the girls that my son lives with cerebral palsy.

I was delighted to see them validating their proposals with myself – from my son's perspective – and the other visitors.

I was also asked 'what's it like being one of the only females' and 'why are you encouraging more girls to study engineering'?

I explained that occasionally I felt 'outnumbered' by the men, but the great thing about my role as a consulting engineer in buildings was that our clients' teams are quite diverse. This is one of the reasons we encourage diversity within our own teams.

The end users of our designs – the public and private sectors – is of course a diverse population. It's therefore critical that we understand all of their needs, not just one portion.

I went on to explain that in my current role as director of strategy, I sometimes find the women outnumbering the men with a number of our senior managers such as practice managers and People team.

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At the end of the week I returned to Engineers Australia and was greeted by some of the girls who were proudly waiting in the lobby of Bourke Place to welcome their family and friends for their final presentations.

I was so impressed by the way the girls introduced themeselve, their design ideas, and the quality of the presentation They diligently explained their considerations for price, target audience, manufacturing & distribution, the detail of their prototypes, and finished up by answering questions from the audience.

I was amazed at how resourceful they had been in constructing their prototypes and the passion they showed in their presentations. It made me reflect on the attributes they demonstrated – which are key to consulting engineering – are not those you would typically classify as 'maths or science'. They had confidently and competently nailed:

- Confidence & good communication
- Articulation of technical solutions in plain English
- Understanding of their 'clients' needs.

I encouraged them all to consider engineering as they be outstanding contributors to the industry and to our communities.

But regardless of what they do, I encouraged them to include their final presentations and report in their CV & portfolios as they clearly demonstrated their commitment (over the school holidays) and would showcase these 'employable' qualities.

Following is a summary of their ideas and prototypes.

Group 1 – Button hooker (to help do up buttons) good for those with arthritis, they also considered a Braille cube and fall sensor.

Group 2 – High reacher – syringe hydraulics to power the hydraulic motion of the hand. Hand shape chosen to humanise the item. Originally they had considered a submarine wheelchair

Group 3 – Helpful hands –something to help people in wheelchairs to do common actions, modular attachment for under wheel chairs.

Group 4 – Dual sensory crossing system with vibration to alert when its safe to cross the road. Vibration mechanism inside the unit, (similar to that in a phone). Benefits to blind and deaf people. Can transfer vibrations through a cane.

Group 5 – App with list of accessible facilities. App controls wheelchair, lifts up & down, sets speed, brakes, includes an umbrella. Maps of disabled parking, disabled toilets, ramps.

Group 6 – sensors to detect obstacles. Can be used on wheelchair or ankle. Chimes and vibrates to alert person to obstacle. Also considered Braille stickers, u brush –for brushing teeth. Stair ramp, converts into a ramp for staircase.

Education

About Benita Husband

Benita has over 15 years experience in the construction industry, and is Norman Disney & Young's Director of Strategy. She works with the CEO and executive to implement their Strategy, and is project director for some of their key clients. She is the Victorian planning minister's appointment to the building regulations advisory committee.

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Benita has worked on the design of buildings including the MCG, the Australian embassy in Jakarta and the King Hamad general hospital in Bahrain. She holds a number of industry qualifications including Registered building practitioner, Chartered professional Engineer, and is a fellow of Engineers Australia.

Benita has been involved in encouraging more women to participate in engineering since she was a student of engineering herself. She continues to champion diversity in the industry, and has been recognised with two awards from the National Association of Women in Construction, featured in Engineers Australia's publication 'Inspiring stories of female engineers' and most recently was featured in the 2017 international 'Celebrating women' campaign.

Norman Disney & Young