

IN THIS ISSUE . . . *We look at the newly published research report commissioned by TEC that examines how staircasing can be used as a strategy to enhance the uptake of mid-level tertiary engineering qualifications in New Zealand.*

FROM THE CHAIR . . . *The first recommendation in the 'Creating Engineers' report featured in this newsletter is to form regional engineering education hubs including representatives from primary (and intermediate) schools, secondary schools, polytechnics, universities and employers.*

This is a very interesting concept and one I've recently been talking about with tertiary institutions and my local regional economic development agency. I think there's potential for such hubs to coordinate a number of Engineering E2E initiatives including, secondary-tertiary pathways projects, degree apprenticeships and further work on staircasing. I believe hubs could make a significant contribution to increasing the number of engineering graduates.

*Last month, we celebrated the achievements of the Engineering E2E Programme as described in our recent **Strategic Update**. In this issue, I'd like to acknowledge and thank all those who have contributed to this success:*

- Firstly the volunteers who make up the Engineering E2E Steering Group, who have shown commitment and enthusiasm in support of the various initiatives we have underway, have proved generous with their time and knowledge, and remain focused on achieving the best possible outcomes for learners. I look forward to continuing to work with them in 2016.*
- Project Coordinator Mica Moore, who has supported the Steering Group with skill and attention. She's moving to new work next year and I wish her well.*
- The wise heads at TEC, particularly Murray Johnson who has contributed his huge knowledge of tertiary education in New Zealand and around the world.*
- Those who publish the many case studies and other materials now available on our website: writer Megan Rodden, designer Roger Joyce and layout editor Jo Pettitt, thank you for your contributions to our excellent suite of publications.*
- Our programme manager, Angela Christie, whose job it's been to coordinate the range of initiatives and participants – her vision and energy has fueled her highly active involvement in many engineering education pathways initiatives over many years, and brings invaluable perspectives to our initiative.*
- Finally, and importantly, thank you to all those in the engineering community and beyond who have contributed your thoughts and ideas to Engineering E2E during the past 18 months. We've appreciated hearing from you, writing about what you do and using your feedback to inform the work we do.*

Next year, I'm looking forward to seeing the public awareness campaign begin to roll out and the start of some other new initiatives we have in the pipeline.

Best wishes for a safe and very happy festive season.

SIR NEVILLE JORDAN

Chair, Engineering E2E Steering Group



NEW RESEARCH REPORT:

'Creating Engineers – Climbing the Educational Staircases'

New TEC-commissioned research has been published on how staircasing can be used as a strategy to enhance the uptake of mid-level tertiary engineering qualifications in New Zealand, with a specific focus on employer involvement and sponsored degrees.

Following TEC-commissioned research into degree apprenticeships as a mechanism for increasing the number of Level 6 and 7 engineering graduates in New Zealand (Goodyer & Frater, 2015), Massey University School of Engineering and Advanced Technology (SEAT) was asked to examine 'staircasing and pathways' as viable strategies and mechanisms for progression into, or within, engineering careers, based on the literature and interviews with key stakeholders.

Initiatives undertaken through the Engineering E2E programme contribute directly to the achievement of the Government's Business Growth Agenda priority of building a more productive and competitive economy.

STAIRCASING EXPLAINED

For the purposes of the study, staircasing was defined as the transition via bridging courses to supplement normal progression from school to tertiary study, enabling students to progress, through a series of steps, from primary and intermediate school through secondary school and on to tertiary study.

The interviews revealed that staircasing is seen as a crucial mechanism for maximising the potential of those who have missed the progression from school to tertiary studies, or who wish to enrol in IT/engineering subjects but who haven't achieved the prerequisite qualifications.

Existing staircasing options appear to be well-designed and effective in terms of increasing graduate numbers and their subsequent employment, but they are demanding on resources and are mainly remedial in function – many cases could have been recognised and targeted earlier.

CRITICAL ISSUES

The report approaches the provision of engineers in terms of a supply chain, extending the analysis beyond 'staircasing and pathways' to the whole system, interpreted through a supply-chain 'lens'. It identifies four key critical issues that underline the need for and effectiveness of 'staircasing and pathways':

1. Lack of structured communication and feedback between supply chain actors
2. Issues in the teaching of primary school Maths, leading to insufficient numbers of students qualifying in higher Maths and Physics at Year 13
3. Early disengagement of young people with Maths and Science
4. Misperception of engineering career paths.

KEY RECOMMENDATIONS

The report's key recommendations address these issues through structured intervention to improve communication and feedback (via regional education hubs) and gives specific recommendations with respect to rejuvenating the early 2000's 'Numeracy Project'. Other recommendations relate to student learning styles, the visibility and awareness of the full range of engineering career paths and the special case of computer engineering.

The report's recommendations are summarised as follows:

1. Form regional engineering education hubs including representatives from primary (and intermediate) schools,



FEATURED CASE STUDY

ENABLING STUDENTS TO STUDY ENGINEERING

Taking the right Science and Maths is a major stumbling block to students enrolling in and succeeding in engineering. At Epsom Girls' Grammar School, however, a higher than average number of girls go into engineering. What's the difference? Empowering them to make choices – because they have taken those subjects – and showing them the end goal.

See www.engineeringe2e.org.nz/Employers/Case_study.cfm?ID=39

- secondary schools, ITPs, university and employers.
2. Instigate new programme of teacher training for the numeracy project and develop new teacher support material for the numeracy project.
3. Reverse devolved responsibility for teacher training in Maths and Science from schools back to the MoE.
4. Utilise current thinking around student learning styles and intelligences to identify students with aptitude for engineering before Year 9 and develop programmes that exploit learning style theory to prepare and motivate students to continue studying prerequisite engineering subjects.
5. Identify and define a set of marketable career paths within engineering.
6. Further develop vocational pathways to all levels of tertiary engineering qualification.
7. Design and articulate an NZDE/BEngTech to Master of Engineering Management pathway.
8. Scholarships, linked to tax benefit or employer subsidy, to be made available for employees to upskill to NZDE or BEngTech.
9. The social competence of IT students should be recognised as an essential component of all tertiary IT courses.

FIND OUT MORE...

- **Download the full 'Creating Engineers' report**
- Check out the Our Progress section on the Engineering E2E website: engineeringe2e.org.nz/Progress