Micro-credentials in engineering education: Finding ways forward in the New Zealand context

WHAT ARE MICRO-CREDENTIALS?

Micro-credentials are packages of learning designed to meet specific learner needs. They are generally smaller than conventional qualifications, and are emerging as an important part of the mix of alternative credentials. They validate skills and learning linked to specific workforce demands. Alternative credentials include industry training, skills-based short courses, massive open online courses (MOOCs) and other online credentials. These credentials are often competency-based and can include pathways such as recognition of prior learning and recognition of current competency.

There are differing definitions of micro-credentials

NZQA is leading three pilots of micro-credentials. Their working definition argues that micro-credentials are not units of learning toward a full qualification, rather they demonstrate the acquisition of discrete skills and knowledge that are important to learners and employers.

Engineering e2e acknowledges that this type of 'just-in-time' training has a place, particularly as part of the professional development of engineers. However, the

international portability of engineering qualifications, the credibility of engineering education in New Zealand and assumptions about safe work practices are all based on larger programmes of study.

But there is certainly a case for more innovation in the way engineering programmes are delivered.

WHAT IS ENGINEERING E2E DOING?

Engineering e2e has engaged with engineering education providers, employers of engineers, professional associations and policy agencies. There is a keen interest in exploring the potential role of micro-credentials, but some uncertainty about where best to invest energy and effort.
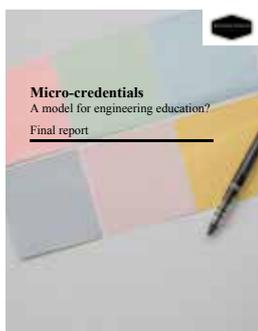
In July 2017, Engineering e2e published the research report *Micro-credentials: A model for engineering education*, which found that many of the elements needed for micro-credentials to succeed are in place in New Zealand. There are opportunities to offer micro-credentials across the spectrum of engineering education and many local and international models to draw on.

Our work prioritises the uptake of the New Zealand Diploma in Engineering (NZDE) in engineering disciplines that have been under-served, and for people in employment. Our efforts have generated eight potential candidates for micro-credentials.

We have selected pilots for further development and detailed design. The experience of other attempts to introduce micro-credentials suggests that this development phase can be time-consuming. As a result, we are looking to continue to provide support and promote collaboration among the pilot leads.

We will engage with the New Zealand Board for Engineering Diplomas, engineering educators and Engineering New Zealand and work with the five current trials of micro-credentials to learn from their experience. We will liaise with NZQA and other Government agencies to ensure alignment with the emerging policy and regulatory settings.

Published November 2017

THE EIGHT FEASIBILITY STUDIES FOR ENGINEERING E2E MICRO-CREDENTIALS PILOTS

Engineering e2e is delighted to be able to fund eight proposals which provide options for the piloting of micro-credentials in engineering education – we're calling them micro-credentials feasibility studies.

Our Steering Group recommended that the Tertiary Education Commission (TEC) fund these feasibility studies to help shape the implementation of micro-credentials in New Zealand and promote more responsive and innovative engineering education.

1. Using micro-credentials to refresh Engineering Education curricula

A proposal to further develop Otago Polytechnic's Edubits micro-credential model and apply it to the existing streams of the NZDE. This study explores better specification of the new curriculum development model, establishing alignment with the current or reconfigured NZDE graduate profile and determining how to ensure the programme attracts subscriber acquisition cost (SAC) subsidies, or the equivalent.

2. Using micro-credentials to develop a Fire Engineering stream for the New Zealand Diploma in Engineering

A proposal prepared jointly by Manukau Institute of Technology and Fire NZ to develop a new stream of the NZDE in fire engineering design as a curated set of micro-credentials.

3. Augmenting the NZDE with green building micro-credentials

A proposal from the Skills organisation to develop micro-credentials aligned to electrical, structural and mechanical engineering pathways that address gaps in workforce development for people involved in green building construction.

4. Using micro-credentials to strengthen professional development for electrical engineers

A proposal from the Electrical Engineering Association to use micro-credentials as a vehicle to validate existing professional development programmes against the New Zealand Qualifications Framework and give employers greater confidence in and more clarity about the professional development programmes.

5. Using micro-credentials to simplify recognition of prior learning

A proposal developed by Downer to pilot a curated set of engineering mathematics micro-credentials to understand whether this approach might enable enrolment in the NZDE by employees.

6. Simplifying the NZ Diploma in Infrastructure Asset Management through micro-credentials

A proposal from the Institute of Public Works Engineering Australasia to redesign the flagship Level 6 qualification for managers of infrastructure assets around micro-credentials. Funding is sought for an initial design phase that would investigate how best to configure and integrate micro-credentials into this programme.

This proposal has some potential to improve the responsiveness of the education and training system for these learners. We will invite expressions of interest from relevant tertiary education organisations (TEOs).

7. Certificate in Civil Engineering – a micro-credential option for the first year of the NZDE

This proposal focuses on improving the relevance of the NZDE Civil Engineering stream by reorganising learning so that graduates can after the first year have the skills required to function as entry level engineers in the land development design or construction fields of the civil engineering industry.

8. Using micro-credentials to improve Pasifika participation in engineering education

A proposal conceptualised by TEC to promote Pasifika engagement in tertiary education and to address chronic issues with the pathways from secondary school into the NZDE. This proposal envisages micro-credentials in mathematics and other curriculum areas necessary for success in engineering education being offered to senior secondary school students in the AIMHI (Achievement in Multicultural High Schools) group of schools and trainees participating in the Auckland-based Māori and Pasifika Trades Training (MPTT) initiatives. This feasibility study tests the concept with AIMHI and the MPTT consortium and identifies a suitable delivery partner.

This proposal addresses an area of significant need. We will invite expressions of interest from relevant TEOs.

FIND OUT MORE...

Progress reports on all Engineering e2e initiatives can be found at **www.engineeringe2e.org.nz/Progress**