



Micro-credentials in engineering education: five pilot programmes

Engineering e2e's micro-credentials project supported the development of eight feasibility studies and resulted in the establishment of five pilot programmes to be run this year.

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.

THE BENEFITS OF THIS METHOD OF LEARNING

Micro-credentials offer the potential for a more flexible engineering education pipeline and a more diverse student population, including people in employment, women, Māori and Pasifika. They can also give clearer signals to employers about the attributes of students and graduates, particularly in relation to the graduate outcomes sought through the New Zealand Diploma in Engineering (NZDE) and Bachelor of Engineering Technology (BEngTech).

MICRO-CREDENTIALS IN THE NEW ZEALAND CONTEXT

In 2017, Engineering e2e engaged with engineering education providers, employers of engineers, professional associations and policy agencies, and commissioned the research report [Micro-credentials: A model for engineering education](#) (published in July 2017). It found that many of the elements needed for micro-credentials to succeed are in place in New Zealand.

EIGHT FEASIBILITY STUDIES

Engineering e2e recommended that the Tertiary Education Commission fund eight feasibility studies to help shape the implementation of micro-credentials in New Zealand, promote more responsive and innovative engineering education and grow the number of people pursuing the NZDE, BEngTech and other engineering programmes.

We engaged consultant Brenden Mischewski to lead this project and provided ongoing support to the groups, including: advice on project approach, coordinating stakeholder engagement, developing a community of practice, identifying and addressing regulatory and funding issues, and monitoring the progress of the feasibility studies.

FINDINGS FROM THE FEASIBILITY STUDIES

The project reports indicated strong stakeholder interest in the concept of micro-credentials and involved considerable diversity in approach and design. Major outcomes from the studies included: a better understanding of the opportunities that micro-credentials present for engineering education; the promotion of discussions within the education community about innovative delivery arrangements.

FUNDING FIVE MICRO-CREDENTIALS PILOT PROGRAMMES

The Engineering e2e Steering Group approved funding for five of the projects to run as pilot programmes this year. These programmes are outlined overleaf.

1. STRENGTHENING A PROFESSIONAL DEVELOPMENT SYSTEM

The Electricity Engineers Association (EEA) is using 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 professional development programmes.

EEA is working with employers, technical subject matter experts, micro-credential designers, other stakeholders and providers to deliver targeted, well-aligned credentials that address specific industry skills needs.

The pilot aims to help develop the next generation of engineers in line and cable design areas. It also introduces employers to the opportunities around micro-credentials and how they could address skills gaps and strengthen the electricity supply industry's professional development system. It is hoped that micro-credentials will offer a broad mix of skill sets from a range of providers that deliver employers and learners a relevant and coherent programme of skills and current knowledge requirements.

2. PASIFIKA PATHWAY PROJECT

The Manukau Institute of Technology (MIT) is using micro-credentials to improve Māori and Pasifika participation in engineering education. The Pasifika Pathway Project is a partnership between MIT and AIMHI (Achievement in Multi-Cultural High Schools) – a group of nine decile one urban secondary schools with a large proportion of Māori and Pasifika students.

The project has set up a bridging programme to prepare students for engineering education. Students' NCEA credits are assessed against the NZDE course to identify gaps in their knowledge of mathematics.

The aim is to ensure a solid pathway is mapped out so that the students can progress into the NZDE programme – on successful completion, the students gain cross-credits towards the NZDE Engineering Mathematics course.

Students from Sir Edmund Hillary Collegiate and Tamaki College (24 in total) are participating in the pilot programme. The 'knowledge gap' Mathematics courses will run during Terms 2 and 3 holiday breaks and following NCEA examinations. Students will attend MIT where MIT lecturers will deliver the courses. The lecturers have been working alongside Maths teachers to get to know the students involved in the project and to ensure topics to be covered are well planned.

3. AN ALTERNATIVE PATHWAY

Unitec's pilot focuses on the role of micro-credentials in providing an alternative pathway for people who may be unwilling or unable to engage in on-campus courses. Their report found that micro-credentials have the potential to open up the NZDE (Civil) programme to a more diverse range of students.

The pilot is comprised of five three-credit micro-credentials recognising knowledge and capabilities in the design, construction and maintenance of urban roads. The micro-credentials will be online, on-demand and shareable.

Learners can demonstrate competency through recognition of prior learning or through the completion of online learning resources. Assessors will review these and verify that the learner has demonstrated the related competency before awarding the micro-credential. Those who complete all five micro-credentials can then sit the same exam as students enrolled at Unitec, and on passing receive a cross-credit to the equivalent course at Unitec.

4. MEETING THE NZDE GRADUATE ATTRIBUTES

Otago Polytechnic completed a feasibility study on the use of micro-credentials in New Zealand engineering education and evaluated the appropriateness of Edubits – the polytechnic's platform for delivery of micro-credentials – as a delivery mechanism.

Their report identified several opportunities for Edubits to deliver micro-credentials, both within an NZDE framework and directly to industry. This included the development of recognition and assessment of prior learning (RPL/APL) pathways to demonstrate the meeting of the NZDE graduate attributes, thereby opening access to those in the engineering industry wishing to obtain an NZDE.

The pilot will develop RPL/APL pathways and deliver micro-credentials that allow candidates to demonstrate the attainment of graduate attributes.

5. I.AM BADGES FOR PUBLIC WORKS ENGINEERING

The Institute of Public Works Engineering Australasia NZ Division's (IPWEA NZ) pilot is a collaboration with employers of public works engineers and strongly supports their goal of addressing a skills shortage in the public works profession.

IPWEA NZ and iQualify (the Open Polytechnic's learning management system) are working together to develop a sequence of micro-credentials that are authored by the industry. The micro-credentials are being developed as I.AM digital badges, and will demonstrate the development of distinct competencies aligned with the range of activities and roles in public works engineering.

The first four badges will cover the fundamentals of infrastructure asset management and are pitched at learners new to the profession. It is envisaged that they will appeal to a much wider market of learners than IPWEA NZ's existing reach. The broader aim is to increase the learning pathways into infrastructure management. The badges are scheduled to be launched in the next three months.

FIND OUT MORE...

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