FOOD & FIBRE CoVE
Learner-Focused, Industry-Led, Government-Enabled[1]

GEORGE ANGUS CONSULTING

DYNAMIC MODULAR LEARNING:

FINAL REPORT

[1] Photo credit: Drazen Zigic, Freepik

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THE RESEARCH PROJECT

A central challenge in work-based learning is determining whether the delivery and assessment of learning can be effectively distributed between education providers and employers across a diverse range of programmes. The problem lies in ensuring that such shared responsibility does not compromise the consistency, comparability, and integrity of learning and assessment outcomes across different workplaces offering the same study programmes in New Zealand.

This project sought to define the characteristics of a VET delivery and assessment model for learning in the workplace – based on the disaggregation of qualifications and credentials on the NZQCF (New Zealand Qualifications and Credentials Framework) into learning outcomes and elements of learning outcomes – that can then be reassembled into the optimum sequence of theory and practical modules for each unique provider/employer/learner combination. A determining principle was that, while the model needed to be flexible, adaptable, and responsive to the respective needs of the provider, employer, and learner, in every instance it would also need to meet the learning outcomes and required course content of the qualification or credential it was being applied to.

The phases of this project consisted of:

1. Desktop research and literature review
2. System design & Stakeholder engagement
3. Final report

ACKNOWLEDGEMENTS

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Our sincere thanks extend to the industry leaders and education professionals who generously contributed their time, expertise, and perspectives. This report strives to accurately and respectfully reflect your insights and priorities, and we hope it does justice to the views and needs you have shared with us.

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INTRODUCTION

The Need for Modularisation of Learning

In the 2024 report: '21st Century Delivery and Assessment of Training in the Food and Fibre Sector in New Zealand', several recommendations were made that have led directly to this project—one of which is particularly relevant here. That recommendation concerned supporting the use of micro-credentials. Importantly, however, it is the challenges they sought to address that remain most pertinent:

> "Learners are being enrolled in entire programmes when they may only require some of the modules. This can result in the learner not gaining the required skills in time to be applied in their workplace, and the learner withdrawing from the programme once they have completed the desired module.
> Often learners do not wish to complete a full qualification but are not formally recognised for the skills they do have if they do not currently align with an existing qualification"[2].

This concept of modularisation—and the potential it offers to better support both industry and learners—is central to this research. The post-COVID education landscape has accelerated new approaches to delivery, and modularisation provides a framework through which education can be made more flexible, adaptable, and responsive.

This research is centred on modularisation as a framework for delivering work-based learning that effectively balances employer-specific needs with comprehensive education. Work-based learning, as defined by the Tertiary Education Commission (TEC), involves learners studying primarily in the workplace through supported self-directed learning, where they are enrolled with a provider but acquire skills directly in their work environment. Critically, this model establishes shared responsibilities between providers and employers: while both parties support learners in their training, providers maintain responsibility for health and wellbeing support, and formal agreements outline the specific obligations of learners, employers, and providers. This collaborative framework recognises that learners—whether employees, contractors, or volunteers—benefit from the practical application of skills in real workplace contexts while maintaining the educational rigor and support structures that formal providers offer[3].

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[2] Food & Fibre CoVE & Muka Tangata, 21st Century Delivery and Assessment of Training in the Food and Fibre Sector in New Zealand

[3] Tertiary Education Commission (TEC), Work-based mode

Modularisation involves structuring learning in smaller, adaptable components, enabling a clear separation between on-the-job learning—where employees gain practical skills in their workplace—and off-the-job learning, which might occur on-campus, online, or through self-directed study. This separation allows modules to be designed and delivered in ways that meet both immediate workplace productivity requirements and broader educational objectives.

To create a system capable of achieving these aims, it is crucial to understand how learning can be adapted to employer needs without compromising the outcomes that providers require to award the qualification or credential. The central research question is whether it is possible and practical to "slice and dice" learning so that learners can leverage their assigned work tasks as meaningful learning opportunities, while ensuring that broader, less work-aligned content is delivered through complementary methods. Employers are more likely to invest in work-based learning if the content clearly supports productivity. Accordingly, the literature review begins by examining how employer-focused learning design can be paired with broader off-the-job learning.

The review then explores how modularisation can be applied to distinguish between on-the-job and off-the-job learning components and deliver each effectively, meeting the needs of learners, employers, and providers. By grounding the analysis in international examples, the research offers evidence, insights, and models that can inform the development of a more flexible and responsive system design for New Zealand.

The examples reviewed include approaches that are highly relevant to the New Zealand context as well as those that are aspirational or currently impractical. Together, they provide insights into what is possible, what is already working in New Zealand, and where small but meaningful changes could strengthen the system. These examples have directly informed the design iterations presented later in this report.

While micro-credentials feature throughout this report, they are treated as part of the wider discussion on modularisation rather than as a standalone focus. This is intentional: the term "micro-credential" remains inconsistently defined and applied, both domestically and internationally. Examples were therefore chosen selectively, with an emphasis on illustrating points of difference and showcasing how modular, skill-specific recognition can operate in practice.

The literature review does not attempt to be exhaustive. Instead, it highlights models and practices most useful for informing the subsequent phases of this project. Repetition across countries has been included only where it adds analytical value. The primary aim of this section is to present relevant systems and examples, with more detailed analysis reserved for the comparative section that follows.

The report concludes by presenting a proposed system design for New Zealand, outlining how modularisation could be embedded to support dynamic, work-aligned learning. With reforms to the vocational education system scheduled for implementation on 1 January 2026, the findings of this research are particularly timely. The system design

recommendations offered here aim to support the new Industry Skills Bodies (ISBs) and providers in creating a more flexible, inclusive, and responsive vocational education system.

INTERNATIONAL LITERATURE REVIEW – THE NEEDS OF EMPLOYERS

In this first literature review there are examples presented of both country-specific training which is designed to suit the needs of the employers, as well as country-specific research focused on the needs of employers when it comes to training: the value, and the importance.

AUSTRALIA

Unaccredited Training

In research exploring how employers train their staff, if they do, and whether it is accredited or unaccredited, an Australian study by NCVER discovered that "the reasons employers train their workforces had not changed appreciably over time"[4]. The research was focused on unaccredited/non-accredited/non-formal training which they defined as "structured training or instruction that does not lead to the attainment of a formal qualification or award, for example, short courses, product-specific training and industry or organisation-specific training".

The biggest barriers which employers said prevented them from giving employees more training were time away from work and the cost. The core rationale for employer's providing training being that they expect a benefit to the organisation. "The relevance of the training to the employer's needs and flexibility of delivery were also more important to them than who provides it or whether it is accredited"[5]. As part of this the researchers were also seeing a trend towards employers using unaccredited training "to meet highly specific training needs"[6]. By prioritising alignment with immediate business needs and adaptable delivery models, employers are signalling that training is valued chiefly as a performance-enhancing resource rather than the reputation that may come from an accredited piece of training. Underlying concerns about time away from work and cost mean that any programme perceived as too generic or rigid risks being rejected outright, even if it carries a prestigious credential. It can be surmised that employers therefore judge a programme's worth by its capacity to address specific skill gaps—whether that means a short, targeted upskilling module during slower shifts or a bespoke workshop delivered on-site—because such formats minimise disruption and maximise return on investment. From this perspective, the provider's reputation or an official stamp of accreditation can become almost irrelevant if the content fails to solve an immediate operational problem or cannot be scheduled around

[4] Ian White et al, Unaccredited training: why employers use it and does it meet their needs?
[5] Ian White et al, Unaccredited training: why employers use it and does it meet their needs?
[6] Ian White et al, Unaccredited training: why employers use it and does it meet their needs?

busy production cycles. This mindset also explains why many employers are turning to unaccredited offerings: when the need is narrow and urgent, a highly tailored but unaccredited course can deliver precise, on-the-job impact far more efficiently than a lengthier, accredited alternative. This is underscoring a broader shift toward outcome-driven learning: employers measure value by immediate applicability and minimal disruption, not by who issued the certificate.

When comparing directly between unaccredited training and the formal VET sector, employers were seen to be generally aware of the sector, but found it difficult to navigate and complex. In addition, the “key reasons for choosing unaccredited training over comparable nationally recognised training included cost-effectiveness, an approach that is tailored to their needs, and/or held at convenient or flexible times”[7]. With the emphasis on cost-effectiveness and bespoke content, employers reveal that any perceived bureaucratic hurdles or one-size-fits-all curricula associated with the formal VET system can deter them—even if that system carries official recognition. When a provider can offer a streamlined, on-demand solution that slots into busy schedules and directly targets specific skill gaps, the value proposition shifts decisively in favour of unaccredited offerings. The formal status of the training, therefore, is not always the most important factor; its ability to deliver immediate, practical benefits with minimal administrative friction also carries significant weight.

DENMARK

AMU System

Denmark's approach to modular vocational learning emerged from specific historical circumstances that continue to shape its implementation today. The Labour Market Training system (Arbejdsmarkedsuddannelser or AMU) system was established in the late 1950’s during Denmark's transition from an agricultural to an industrial society, with the explicit purpose of facilitating workforce mobility by developing transferable skills for workers moving from agricultural to industrial sectors[8]. Today, it serves as a critical component of Denmark's renowned "flexicurity" model, providing “a unique system that can quickly upskill the workforce with affordable and geographically accessible training – for the benefit of individuals, businesses and society,” according to Peter Thomsen, director of AMU Nordjylland[9].

AMU offers flexibility in course structure, with options ranging from “half, full-day or multi-week short courses right up to full training programmes with up to 90 days of AMU courses”[10]. With approximately 3,000 distinct AMU courses available across Denmark, across diverse skill domains, this approach helps ensure that training needs can be addressed through dedicated modules rather than being subsumed within broader programmes[11].

[7] Ian White et al, Unaccredited training: why employers use it and does it meet their needs?
[8] Danish Ministry of Education 2002, AMU: The Danish Adult Vocational Training Programmes
[9] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[10] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[11] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills

Courses can be taken “as both part and full-time” and “can take place at schools, out at the workplace and also online for certain subjects”[12]. The flexibility in delivery mechanisms has been designed to accommodate diverse learning preferences and life circumstances.

AMU courses are “targeted at local labour markets where the AMU programmes on offer are adapted to local needs”[13]. Individual AMU providers maintain “close dialogue with both local businesses and local job centres to put together relevant programmes”[14]. This decentralised implementation structure allows for regional customisation while maintaining national standards, creating a system that is simultaneously coherent and responsive to local economic conditions.

Denmark's system functions like “Lego bricks” that can be combined “according to the individual's or business' needs”[15]. It is operationalised by giving the opportunity to course recipients to receive “an individual skills assessment so that individuals can build a tailor-made programme based on a real skills assessment”[16]. This assessment-driven customisation ensures that learning pathways address actual skill gaps rather than presumed needs and helps ensure that the learner is the one making their own decisions about what type of training they have, and how.

Students “receive a certificate for each completed course, and some of the courses act as credit towards vocational training”[17]. This stackable approach to credentials allows for incremental recognition of skills development while maintaining pathways to more comprehensive qualifications.

Explaining a project which was aimed at training unskilled, potential workers for a local business, the CEO of CELF (Center for Erhvervsrettede Uddannelser Lolland Falster (The Center for Vocational Training Lolland Falster)) said that ““As an AMU provider, we can design and completely tailor our programmes to employers’ needs by creating packages of different AMU courses. We were founded to support the local business community together with businesses and public authorities, and “Your path to the construction industry” is an example of a course tailored to the expected needs of our local area””[18]. The ability of the AMU to be able to address both immediate skill needs and long-term economic development via localised, employer-responsive training models underscores the value of collaboration between training providers, businesses, and public authorities.

UNITED KINGDOM

There have been several employer surveys and research undertaken in England and the wider UK, providing insights into the level and types of training which employers are focusing on.

[12] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[13] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[14] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[15] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[16] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[17] Dorthe Kirkgaard Nielsen 2022, The AMU system lets the Danish workforce continuously improve its skills
[18] Emil Thirup-Sorknæs, The AMU system lets the Danish workforce continuously improve its skills

5,000 employers in England in 2021 were surveyed to understand their views on many different areas of education including training and workforce development, apprenticeships, traineeships, and placements. Some of these findings are of particular interest in understanding what types of training employers respond to, and how it has evolved over time.

Overall, it was discovered that more employers were only arranging on-the-job training (23%), compared to 2015-2019 (17-18%). With the most common types of training being provided being "job specific training, and health and safety or first aid training"[19]. Regarding the value of FE colleges and/or commercial training providers, employers that had used or considered using them were "least likely to agree that FE colleges and commercial training providers tailored and developed the content of training to meet employees' needs"[20]. However, the size of the company matters when it comes to their perception of the value of these companies:

> "the proportion that agreed that commercial training providers offer flexibility around business needs and tailor and develop the content of their training to meet employees' needs increased with size (the former ranging from 70% among those with 2 to 4 employees to 90% among those with 250+ employees; the latter ranging from 69% to 88% among these groups)"[21].

Employer priorities clearly centre on training that directly addresses operational challenges and workforce gaps. Training providers who recognise this imperative and continuously adapt their methodologies will maintain relevance and effectiveness, particularly when supporting resource-constrained smaller businesses.

A 2022 Employer Skills Survey covering the whole of the UK found that 60% of employers in 2022 had funded or arranged training for their employees in the previous 12 months, a 5-6% decrease since 2011[22].

The survey classified the types of training which employers may provide into two terms which they asked questions in relation to, defining them as:

- "Off-the-job training: training beyond that which takes place on-the-job or as part of an individual's normal work duties. This can be undertaken at an employer's premises, at a provider, at home or elsewhere.
- On-the-job training: Training undertaken at the individual's work position and covering activities that would be recognised as training by staff, rather than learning by experience which can take place all the time"[23].

[19] Mark Winterbotham et al, Employer Pulse Survey Research Report April 2022
[20] Mark Winterbotham et al, Employer Pulse Survey Research Report April 2022
[21] Mark Winterbotham et al, Employer Pulse Survey Research Report April 2022
[22] Department for Education, Employer Skills Survey 2022
[23] Department for Education, Employer Skills Survey 2022

49% of UK employers were found to provide on-the-job training to their staff, down from 53% in 2017, and off-the-job training was 39%, down from 48% in 2017. 21% of employers only offered on-the-job training. The most common type of training was job-specific training at 84%[24].

UK training participation has experienced a concerning downward trajectory since 2017, signalling potential challenges ahead. This decline emphasises the growing importance of strategic, targeted training solutions for employers committed to workforce development.

An article by the Confederation of British Industry (CBI) explained that 17% of the respondents of their survey had not invested in adult education and lifelong learning in the previous five years, compared to 9% of respondents in 2021. "The top answer selected by employers [for why they weren't investing] was a lack of suitable, high-quality provision available locally, which was chosen by 35% of respondents" [25].

32% of the responding firms said that the high cost of training and a lack of money to pay for it were some of their key barriers. Alongside the "challenges in sparing time for employees to attend training"[26]. It is perhaps for this reason that it was identified that short courses had become more popular, "with 26% of respondents increasing their use in the past year, compared to 4% who reported a decrease. The popularity of short courses chimes with insights from CBI members about the value of shorter, responsive forms of training to enable employees to top up their learning and address skills gaps as they arise"[27].

Employer feedback reveals a persistent gap between available training options and actual business requirements. Addressing accessibility and flexibility barriers could unlock significantly greater employer investment in workforce development initiatives.

IRELAND

SOLAS, the state agency responsible for Further Education and Training (FET) in Ireland, which is the Irish term for vocational education[28], have developed a programme called 'Skills to Advance', which is:

> "a national initiative that provides upskilling and reskilling opportunities to employees in jobs undergoing change and to those currently employed in vulnerable sectors…
> Working closely with small and medium-sized enterprises, Skills to Advance helps employers identify skills needs and invest in their workforce by providing subsidised education and training to staff"[29]

[24] Department for Education, Employer Skills Survey 2022
[25] Robert West, Increasing employer investment in training
[26] Robert West, Increasing employer investment in training
[27] Robert West, Increasing employer investment in training
[28] SOLAS, About
[29] SOLAS, Skills to Advance

As part of this programme, two sets of micro-qualifications were developed, one in Green Skills, one in Digital Skills. It is noteworthy that SOLAS explicitly state that their engagement was with small and medium sized companies to support the development of these micro-qualifications, ensuring that they are locally led. For each micro-qualification "Training is provided by ETBs in your region and will consist of short programmes, delivered in a blended learning format with tutor support and online digital resources, to enhance the learning experience. Delivery is flexible to suit both employer and employee needs. The programmes will involve approximately 25-30 hours contact time with a tutor"[30]. Each ETB that offers the programmes around the country, offers them at different times, days, with a mixture of some teaching in-person, online or hybrid[31]. "All programmes are fully accredited and lead to a Level 4, 5 and 6 Special Purpose Awards on the National Framework of Qualifications (NFQ)"[32].

Government-subsidised education that combines flexibility with accreditation creates a compelling value proposition for employers. This model enables organisations to strengthen workforce capabilities through adaptable, blended delivery that aligns with operational realities.

INTERNATIONAL LITERATURE REVIEW – DYNAMIC MODULAR LEARNING

In this second literature review, we examine country-specific approaches to dynamic modular learning alongside research on the flexibility and adaptability of modular systems. The focus is on how modular structures can be applied in practice to address diverse learner needs while ensuring consistency in both delivery and assessment.

AUSTRALIA

Microcredentials

Australia has a National Microcredentials Framework which formally defines them in Australia as:

> "a certification of assessed learning or competency, with a minimum volume of learning of one hour and less than an Australian Qualification Framework (AQF) award qualification, that is additional, alternate, complementary to or a component part of an AQF award qualification"[33].

[30] SOLAS, Green Skills and Digital Skills Micro-Qualifications
[31] Further Education & Training Course Hub, Find a Course
[32] SOLAS, 15.01.2024 PRESS RELEASE
[33] Australian Department of Education, Skills and Employment 2021, National Microcredentials Framework

The Australian government's Department of Education, and the Universities Admissions Centre, created 'MicroCred Seeker', as a register to search for available micro-credentials from both vocational and higher education, however higher education is much more strongly represented. The register also organises micro-credentials according to industry profiles, enhancing discoverability and relevance. In the agricultural sector specifically, there are currently 22 distinct micro-credentials, with 13 incorporating credit toward formal qualifications, all of which are offered by universities[34]. This integration with the credit system can increase the value of these micro-credentials within formal educational pathways as it opens up the possibility to 'stack' as well as have earned credits.

Beyond those included on MicroCred Seeker, numerous other micro-credentials are developed and available at the state and regional levels, by industry bodies and across the vocational education sector. TAFE Queensland, for example, offers agriculture-focused micro-credentials, all available on-demand and online, organised into three categories: Digital Skills, Technology Skills, and Work Skills[35].

In addition to 'formal' micro-credentials, some industries have decided to create their own micro-credentials off-framework, to be able to also support and recognise learners with prior learning. Engineers Australia for instance, the national body for engineering in Australia, decided to create their own sets of stackable micro-credentials covering many different subject areas to create what they as an industry wanted from education via a newly created entity: Engineering Education Australia. Within each micro-credential, the learning is primarily online and self-paced, with some live online workshops, (some require the learner to be in the workplace to be able to demonstrate particular skillsets). Three pathways were established:

- **Learning pathway** is for a learner who is brand new to that skillset, going through the online learning and then undertaking their assessment.
- **Advisory pathway** is for a learner with the existing skills and knowledge but who requires some support which comes via an online meeting with an education specialist, followed by the assessment.
- The **Assessment pathway** is for those learners who are experienced and are looking just to undertake the assessment and get recognition for their skillset[36].

Skill Sets

The Australian Skills Quality Authority (ASQA), defines a skill set as:

> "a single unit of competency or a combination of units of competency from a training package which link to a licensing or regulatory requirement, or a defined industry need"[37].

[34] MicroCred Seeker, Agriculture, Forestry & Fishing microcredentials
[35] TAFE Queensland, Agriculture Micro-credentials
[36] Engineering Education Australia, Construction Contract Management
[37] ASQA, Glossary

Central Queensland University expands on this definition, explaining that skill sets:

> "can also provide credit towards a related certificate or diploma. Skill sets provide job ready skills in less time than a certificate, and can assist with entry into some diplomas. Upon completion of a skill set graduates are issued with a Statement of Attainment which is a nationally recognised certification"[38].

Skill sets therefore seem to bridge the gap between individual micro-credentials and full qualifications. The formal recognition they have, enhances their market value while also maintaining pathways to additional qualifications.

Skill sets are registered on the Australian government training website, a joint initiative between the federal, state, and territory governments. Each skill set on the register, lists the units of competency, the training package(s) that include the skill set, and potential qualification pathways from that skill set[39].

In a study exploring the value and use of skill sets within Australia and its agriculture industry, participants of skill set training explained to the researchers that the benefits for them included "the small time commitment required, the ability to manage other work commitments and limit the loss of income, the ability to focus on specific, relevant and practical skills, the relatively low cost of the training and the ability to undertake training locally or even on-site at a business/farm location"[40].

In 2010, Agrifood Skills Australia submitted a comment of support for skill sets, explaining that:

"While significant sections of the agrifood industry support full qualifications as a means of skilling their workforce and individuals use them as a means of gaining employment in a sector of their choice, many enterprises need their workers trained in the skills required to do the job at hand. Many individuals in these workplaces want no more than the training that will help them get a job, keep it, or will be a means of progression"[41].

Skill sets bridge a critical divide between academic structures and workplace realities. By focusing on immediate job requirements, these credentials satisfy both employer needs for task-ready competencies and learner preferences for accessible, career-relevant training that doesn't demand full qualification commitments.

Agronomy Sector Innovations

Recent vocational education reforms in Australia established Jobs and Skills Councils (JSCs) to enhance industry responsiveness. Skills Impact, one such JSC, representing sectors

[38] CQU, Skill Set
[39] Training AU, Skill set AHCSS00044 Organic Horticulture Management Skill Set
[40] John Mills et al, Workforce skills development and engagement in training through skill sets
[41] John Mills et al, Workforce skills development and engagement in training through skill sets

including agribusiness and ecosystem management[42], has utilised modular learning to support agronomy-focused initiatives[43].

A 2020 analysis by Skills Impact explained how they identified critical gaps in agronomy education, noting "a need for more workers with practical skills in agronomy and the lack of national skills standards to address the technical expertise required to apply agronomy practices"[44]. Responding to this identified need, the organisation developed a comprehensive Diploma in Applied Agronomy accompanied by complementary modular credentials including "a skill set in digital agronomy. Two units in agricultural data and nutrition have also been developed and six units revised"[45].

Australia's framework showcases remarkable adaptability in addressing diverse training needs simultaneously: developing comprehensive qualifications (the diploma), intermediate credentials (the skill set), and foundational components (individual units). The diploma itself comprises 12 units of competency, with training providers offering flexible delivery options including both face-to-face and online formats that "offer flexible delivery modes, where students can pace their learning according to individual need"[46].

The Aquaculture and Agriculture Tech Skills Hub

Launched in early 2022, the Aquaculture and Agriculture Tech Skills Hub represents an innovative institutional approach to modular learning implementation. This collaborative organisation works with industry, community, and government sectors "to establish and support new ways of attracting, skilling, upskilling, retaining and growing local workforces through the identification of a broad suite of new and updated skills and workforce programs"[47].

The Hub operationalises a comprehensive approach to skills development through three complementary learning pathways: micro-credentials, skill sets, and full qualifications. Its micro-credentials are specifically designed to be self-paced and online, positioning them "to provide valuable information on new and emerging areas... offer[ing] a flexible and accessible way to study and gain a recognised learning outcome and digital badge"[48]. The Hub is working with partners on new skill sets "to support the implementation of pilot programs, to enable existing workers, particularly in regional locations, to acquire new skills"[49]. To-date they have created five skill sets across various topics from aquaculture technology to cyber security in the workplace, and are also exploring pilots for qualifications utilising the same topics[50] [51].

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[42] Skills Impact, About Us
[43] Skills Impact 2020, Agriculture, Horticulture, Conservation and Land Management
[44] Ibid
[45] Ibid
[46] Longerenong College, AHC51920 Diploma of Applied Agronomy
[47] TAFE Queensland, Aquaculture and Agriculture Tech Skills Hub
[48] Ibid
[49] Ibid
[50] TAFE Queensland, Aquaculture and Agriculture Tech Skills Hub: Skill sets
[51] TAFE Queensland, Aquaculture and Agriculture Tech Skills Hub

CANADA

Ontario Learn Consortium

The OntarioLearn consortium includes all 24 publicly-funded colleges in Ontario, 2 indigenous institutes and a support organisation. The rationale for establishing the consortium in the first place was so that they could “extend their reach, offering online courses and programs to students who would not otherwise have access to them…a popular choice for people who live in rural and remote areas, who have different learning styles or disabilities, who lead busy lives”[52].

The courses “are delivered asynchronously, which means that [the student] can log in and work on [their] courses any time, day or night that works with [their] schedule. Courses have set start and end dates and a defined course schedule, with specific deadlines for assignments and tests”[53]. The platform allows them to engage with “with their course facilitator and classmates who may be participating from anywhere in Ontario, Canada or internationally”[54].

Strategic institutional partnerships effectively dissolve traditional barriers of geography and resource limitations. Resource-sharing arrangements expand educational access across diverse populations while preserving quality standards, eliminating the need for each institution to build comprehensive digital infrastructures independently.

FINLAND

National and Local

Finland’s education system is an innovative mix of national and local led, as well as a mix in the size of their programmes. The National Framework for Qualifications and Other Competence Modules (FiNQF) was established in 2017 by the Finnish National Agency for Education[55].

In schools, “only core curricula apply across the country, this leaves room for local education authorities to organise teaching in the best way suited to local circumstances. This decentralised system is based on locally drawn up and implemented curricula, in which pupils' individual needs are taken into consideration”[56]. There are also no national tests, nor authorities to create them, with the focus being on the “assessment and evaluation of learning outcomes at schools [which] is encouraging and supportive”.

[52] OntarioLearn, About OntarioLearn
[53] Centennial College, OntarioLearn Information
[54] OntarioLearn, 2022-2023 Annual Report
[55] Eurydice, Finland: 2.5 National Qualifications Framework
[56] Finland Ministry of Education and Culture, Special features of the Finnish education system

Digivisio

Building upon this qualification framework is Digivisio, an ambitious joint programme between all 37 Finnish higher education institutions. The initiative aims to create a comprehensive digital learning infrastructure by 2030, with core objectives that directly support modular and flexible learning approaches[57].

The programme is focused on developing a national digital service platform to enable compatibility of digital services between the various higher education institutions so that "lifelong learners can flexibly and continuously complete studies that meet their individual needs across the boundaries of higher education institutions and develop their competence through an open course offering"[58]. This explicit focus on cross-institutional flexibility represents a significant advancement in addressing one of the persistent challenges of modular learning: the limited transferability of credits and competencies between institutions.

Digivisio's vision extends beyond technical infrastructure to a comprehensive learning ecosystem, as the initiative explains:

> "Digivisio's goal is to create an internationally esteemed learning ecosystem…the joint study offering of higher education institutions and interaction with society… lifelong learners can flexibly and continuously complete studies that meet their individual needs across the boundaries of higher education institutions and develop their competence through an open course offering"[59].

This collaborative nationwide approach brings institutions together within a shared framework rather than leaving them to develop separate, disconnected solutions, ultimately creating a more seamless and accessible learning journey for students across Finland.

The Continuous Learning Reform

Complementing the above structural and technological frameworks, Finland has implemented a Continuous Learning Reform that directly addresses the policy and service dimensions of modular learning implementation. This reform "seeks to respond to the skills needs arising from changes in the world of work, which is why it aims to develop the education and employment services as a whole"[60].

A central feature of this reform in 2023 was "the establishment of a Service Centre for Continuous Learning and Employment, which helps to improve the skills of working-age people and promote the availability of skilled labour"[61]. This institutional innovation

[57] Digivisio, Basic information on the Digivisio 2030 programme
[58] Digivisio, What will learning be like in 2030?
[59] Ibid
[60] Finnish Government: Ministry of Economic Affairs and Employment & Ministry of Education and Culture, Reform has opened up new continuous learning opportunities but it should not stop here
[61] Ibid

provides dedicated infrastructure for implementing and coordinating modular learning initiatives across the educational landscape.

Ireland's reforms prioritise recognition of non-traditional learning pathways through innovative credentialing mechanisms as it “seeks to develop micro-credentials and a national Open Badge system for basic skills for adults, which will help to identify and recognise learning acquired through non-qualification programmes. Micro-credentials enable the acquisition of learning needed in employment without completing a full qualification programme”[62].

The role of SECLE (The Service Centre for Continuous Learning and Employment) is to analyse the competence and labour market needs of working life, fund education and training for people of working age, develop information, guidance and counselling services, and support regional and broader cooperation[63]. In September 2024, it was praised in the European Central Bank’s report on improving the competitiveness of the European Union, stating that “the European Union needs more agents like SECLE that closely follow the needs of the labour market, and increase the co-operation between employers and other operators. In this way, there would be enough of skilled labour in all of Europe in the future”[64].

INDIA

Modular Employable Skills (MES) scheme

The Modular Employable Skills (MES) scheme which was active in India for ten years, launched in 2007 by India's Ministry of Labour and Employment through the Directorate General of Employment and Training (DGET), represented a significant shift in India's approach to vocational training. The scheme was designed to address critical skill gaps by providing short-term, competency-based training focused on specific employable skills rather than comprehensive long-term qualifications.

The MES framework was built on a modular structure, defining MES as the minimum set of skills needed for employment in the workforce. It enables skill upgrading or development, multiple entry and exit points, both vertical and horizontal mobility, flexible lifelong learning opportunities, and the recognition of prior learning[65]. These modules were developed in consultation with industry to ensure relevance, with the National Council for Vocational Training (NCVT) providing certification. What distinguished MES was its approach to flexible delivery: the scheme developed multi-modal training delivery that accommodated diverse learner circumstances through multiple pathways including via delivering part time, weekends, full time and on-site, helping leading to its success[66].

[62] Ibid
[63] SECLE, About Us
[64] SECLE, Report on Competitiveness of the EU: SECLE exemplary in advancing the availability of skilled labour
[65] Government of India, Operations Manual for Skill Development Initiative Scheme (SDIS)
[66] Ibid

IRELAND

Quality and Qualifications Ireland (QQI) Awards

At the core of Ireland's approach to any type of learning is their National Framework of Qualifications (NFQ), managed by Quality and Qualifications Ireland (QQI). QQI is the national qualifications authority, awarding body, and quality assurance body. The framework comprises ten levels of learning and covers general education, the higher education sector, and the vocational education sector (known in Ireland as the further education and training (FET) sector)[67]. Modularisation or 'small awards', has been a part of the NFQ since its launch in 2003[68], with Qualifications regarded as 'Major Awards'.

There are three types of 'Small Award':

- **Minor Awards**, also known as component certificates. "These awards are single modules which can be completed and certificated individually. All minor awards are linked to a major award which allows learners the opportunity to build on their minor awards and work towards gaining a major award"[69].

- **Special Purpose Awards** are "developed for specific areas of learning that have a narrow scope. All special purpose awards comprise one or more components"[70].

- **Supplemental Awards** recognise "learning concerned with updating, upskilling or continuing education and training. They are occupation related awards and they consist of one or more components"[71].

There is no national policy at present to allow for the opportunity to 'stack' awards together from different providers. Stakeholder engagement was open until March 2025 by QQI to explore this with new regulations currently being determined. QQI note in their green paper on access, transfer, and progression policy that they "see more accumulation of small volumes of learning possibly building towards a qualification (through micro-credentials for example), often referred to as 'stacking' by providers"[72]. One of their key recommendations is "Proposing an approach to credit accumulation to facilitate 'stacking' of micro-credentials and other small qualifications"[73].

Micro-Qualifications

[67] QQI, The National Framework of Qualifications
[68] QQI, The National Framework of Qualifications
[69] QQI, QQI Award types
[70] Ibid
[71] Ibid
[72] QQI 2024, QQI Green Paper: Green Paper on QQI's Access, Transfer and Progression Policy
[73] Ibid

SOLAS is the state agency responsible for Further Education and Training (FET) in Ireland, which is the Irish term for vocational education[74]. They have developed 'Micro-Qualifications' (MQ) in collaboration with 16 Education and Training Boards (ETBs), which are described as being a "new upskilling offer for Irish business, for both employees and employers"[75]. "They are short, stackable, accredited [by QQI], programmes delivered locally"[76]. "A FET MQ is typically 25 hours training delivery and 25 hours self-directed learning"[77], and are highly subsidised[78].

SOLAS' 2030 Green Skills Strategy specifically targets the growing demand for environmental and sustainability skills while further refining the modular learning methodology. The strategy commits to "continue the development of a framework that allows learners to stack FET microqualifications and achieve nationally recognised certifications"[79]. This ongoing development reflects an understanding that modular learning frameworks must evolve continuously to maintain alignment with educational and workforce needs.

By pledging to "engage with Regional Skills Fora and business to prioritise programmes that are relevant to industry needs and that can be adapted to new and emerging digital and technological trends"[80], the Green Skills Strategy positions modular learning as a responsive mechanism for addressing rapidly changing workforce requirements. The strategy is focused on a learner-centred philosophy by committing to "design programmes to be flexible and tailored to learner requirements (i.e., part-time / full-time, online / blended, night-time, or modularised)"[81], helping to maximise accessibility and maintain educational quality.

NEPAD/CAADP

Promotion of ATVET

Agricultural Technical Vocational Education and Training (ATVET) policy framework and development are jointly led in Africa by "the technical arm of the African Union", NEPAD (New Partnership for Africa's Development) [82] and the Comprehensive African Agriculture Development Programme (CAADP)[83]. They led a project promoting ATVET across six countries in 2012-2013.

When analysing the results of the programme, one of the core problems with ATVET in Africa at that point, which they identified was that "A purely institution-based method of technical and vocational training delivery (i.e. without significant involvement of employers)

[74] SOLAS, About
[75] SOLAS, Micro-Qualifications brochure
[76] Ibid
[77] Ibid
[78] Ibid
[79] SOLAS (2024), Green Skills 2030
[80] Ibid
[81] Ibid
[82] NEPAD, Agricultural Education and Skills Improvement Framework (AESIF) 2015 - 2025
[83] CAADP and NEPAD 2013, Promotion of Technical Vocational Education and Training (TVET) for the Agricultural Sector (ATVET) in Africa

does not reflect the real professional world and results in poor training quality, inefficient delivery and insufficient training in practical skills"[84]. When it came to identifying best practice, they determined that "Modularisation makes it easy for farmers to both continue their farming work and attend short courses without the one disrupting the other"[85].

The report also recommended several 'success factors', each partnered with an explanatory condition. One was flexible mode of delivery and modularisation, for which they said "Outcome-based ATVET provides high flexibility in the way of training organisation and delivery according to the needs of target groups and occupational requirements. Training modules accessible for graduates unable to continuously attend classes"[86]. By emphasising both employer involvement and flexible delivery, NEPAD/CAADP has established a framework for agricultural education that acknowledges the practical realities of rural livelihoods across the continent.

THE NETHERLANDS

Collaborative Development Processes

The Netherlands employs collaborative processes for module development, with companies and education institutions jointly developing optional modules to respond quickly to innovations or emerging needs[87]. This co-creation approach ensures that modules reflect both educational standards and workplace relevance.

This approach also creates space for regional initiatives, acknowledging that there are geographical variations in labour market needs, as regions "will be also afforded some leeway to draft optional modules themselves to be able to respond to regional needs and/or to help learners progress through the education and training system"[88]. In addition, there is also the opportunity for providers to offer 'cross-over qualifications': "VET schools, supported by evidence on the need for a specific cross-over qualification, can submit an application at SBB to offer a cross-over qualification"[89].

Higher Education Microcredentials

Since October 2021, 34 higher education institutions (12 universities and 22 colleges) have participated in a national pilot introducing micro-credentials in Higher Education. Whilst the pilot concluded at the end of 2023, it has since been operationalised and expanded due to the initial successes and growth that they have witnessed[90]. In the pilot at least, they defined a micro-credential not as the learning or training, but the recognition, the

[84] Ibid
[85] Ibid
[86] CAADP and NEPAD 2013, Promotion of Technical Vocational Education and Training (TVET) for the Agricultural Sector (ATVET) in Africa
[87] CEDEFOP, Vocational education and training in Europe – Netherlands 2023: system description
[88] CEDEFOP, Vocational education and training in Europe – Netherlands 2023: system description
[89] Simon Broek (2022), Case Study: The Netherlands
[90] Npuls, Continuing to build on Microcredentials in higher education and research universities

certification of that training, validating "a smaller education unit (in the pilot, ranging between 3 and 30 ECTS)", which will be formed of learning outcomes[91]. One of the intentions of the pilot was for the institutions taking part to collaborate on a joint quality framework, and to recognise each other's micro-credentials and learning outcomes. This can support learners in moving between different providers, "learning outcomes achieved in a program certified with microcredentials at one institution are also recognized as such at the same institution or by another institution … learning outcomes that overlap with an accredited program may lead to exemptions when enrolling in the program"[92]. The potential ability to break down larger qualifications to a learning outcome level to then support recognition of prior learning, could be a useful methodology to support more flexible educational pathways.

THE PHILIPPINES

Flexible Delivery

The Technical Education and Skills Development Authority (TESDA) published 'Guidelines in implementing Flexible Learning in TVET' which included a list of different modes of delivery which training providers could use "depending on their institutional capacity, trainers' capability and learners' access to learning resources and technology"[93]. The options provided are:

- Face-to-face learning
- Online learning
- Blended learning (which they define as a combination of face-to-face learning and online learning)
- Distance learning (which they define as taking place away from the training provider and using print-based materials)
- A combination of distance and face-to-face learning[94]

The guidelines detail the requirements that the provider needs for each option and mandates updates to training plans and ensuring the curriculum is suitable for that method(s)[95]. The flexibility of this approach recognises that training providers operate in diverse contexts with varying resources, technological capabilities, and student demographics, ultimately enabling more accessible and appropriate vocational education pathways that can be tailored to specific institutional and regional needs.

Vocational Education Micro-Credential Framework

From 2021, TESDA has been creating and developing structures and pilots to support micro-credentials and lifelong learning across the vocational education sector. They explain that by

[91] Ibid
[92] Ibid
[93] TESDA, TESDA Circular – Guidelines in implementing Flexible Learning in TVET
[94] Ibid
[95] Ibid

"offering flexible, modular programs through both institutional and online platforms, TESDA ensures that technical education remains relevant, accessible, and responsive to the needs of learners and employers"[96]. At the end of 2024, TESDA published new guidelines for establishing TESDA Training Programs as micro-credentials, with an official launch for micro-credentials in TVET following in March 2025[97] for which they utilise the 2022 UNESCO definitions: "a record of focused learning achievement that verifies what the learner knows, understands, or can do. It meets the standards required by relevant quality assurance frameworks and offers flexibility, making it stackable and targeted toward specific competencies that can be assessed and verified"[98].

Notably, in addition to what one could argue are the 'standard' terms which come with micro-credentials, stacking etc, there are some new terms which will likely enhance flexibility in the system:

> **"Bundling**
> A micro-credential structure that combines multiple micro-credentials into a holistic qualification that encompasses a broad set of competencies…
>
> **Re-bundling**
> A structure where micro-credentials from different training regulations can be combined to
> create new and tailored qualifications. This flexibility ensures that the education and training
> system can provide individual learner pathways as well as quickly respond to evolving industry demands and emerging skill requirements.
> Re-bundling transforms the qualification framework into a supermarket of competencies that can offer a flexible, customizable, and adaptable framework for qualifications.
>
> **Stand Alone Micro-Credentials**
> Can serve as independent units of certification, allowing learners and workers to gain specific skills and knowledge without committing to a full qualification. This approach is beneficial for individuals seeking to upskill or re-skill in particular areas without extensive time commitments.
>
> **Supermarket of Competencies**
> A system or approach where a wide range of competencies and skills are offered and can be
> selected by learners and workers based on their individual needs and career goals. This could involve a flexible and modular approach to learning, where learners and workers

[96] TESDA 2024, Omnibus Guidelines on TVET Micro-Credentialing for the Skilling, Upskilling, and Reskilling of the Workforce
[97] TESDA 2025, National launching of micro-credentialing program
[98] TESDA 2024, Omnibus Guidelines on TVET Mlcro-Credentialing for the Skilling, Upskilling, and Reskilling of the Workforce

> can pick and choose the specific competencies they want to acquire, similar to how one might select items from a supermarket shelf.
>
> **Unbundling**
> Allows for the disaggregation of qualifications into smaller, more manageable micro credentials"[99].

These definitions can create significant opportunities for learners to customise their vocational education journey with unprecedented flexibility. By conceptualising skills as modular components that can be unbundled, rebundled, and accessed independently, TESDA's framework has the potential to change traditional vocational training approaches. The "supermarket of competencies" metaphor particularly exemplifies dynamic modular learning, allowing individuals to select precisely the skills they need when they need them—mirroring how modern careers evolve in non-linear patterns. This approach not only democratises access to vocational education by removing barriers of time and rigid programme structures but also creates a responsive system that can rapidly adapt to emerging industry needs without overhauling entire qualification frameworks. TESDA's innovative terminology signals a fundamental shift toward treating competencies as dynamic building blocks rather than fixed qualifications, potentially transforming how vocational skills are acquired, recognised, and applied throughout the Philippines' workforce.

Higher Education Micro-Credential Framework

In the Philippine higher education sector, there has been "significant demand for lifelong learning… Lifelong learners need to survive this dynamic environment that demands a workforce equipped with the agility to adapt to evolving skill requirements and embrace emerging technologies"[100]. To support this demand, the Commission on Higher Education (CHED) published in early 2025, following a consultation period on its proposals in 2024, its own 'Guidelines for Micro-Credential Development, Approval and Recognition in Higher Education'.

CHED defines a micro-credential as

> "a course or sets of courses offered to lifelong learners within a field of study offered by an HEI [(Higher Education Institute)] or industry partners, solely developed or jointly developed by the HEI and industry partner as a component of a recognized higher education program or a standalone course that will benefit the lifelong learner's academic, personal and professional growth, aligned with the standards, and needed skills and competencies of the industry"[101].

The guidelines state that micro-credentials can be offered "through various modalities, including residential mode, modular formats, and online delivery via mobile learning, flipped

[99] Ibid
[100] CHED 2025, Guidelines for Micro-Credential Development, Approval and Recognition in Higher Education
[101] Ibid

learning, or other Open and Distance e-learning (ODeL) approaches”[102]. The credentials can be at any of levels 5-8 (matching the levels at University in the Philippines), and be between 1-30 credit units (17-510 hours)[103].

CHED mandates that micro-credentials should be designed, developed and implemented based on eight principles: “learner-centered, outcomes-based and skills-based, personalized learning, industry-driven, accessible and inclusive, flexible learning, portability and mobility and assessment”[104]. Delving deeper into their explanation around ‘flexible learning’, CHED states that micro-credentials are “designed and developed using various flexible learning options allowing every learner to progress at their own pace and their place. Micro credentials support flexible learning pathways that include the possibility of stacking, validating, and recognizing Micro-credentials from across various providers”[105].

CHED's framework represents a significant evolution in the Philippines' higher education landscape, embodying dynamic modular learning through its emphasis on flexibility, personalisation, and industry alignment. By enabling learners to curate their educational pathways through stackable credentials across multiple providers and modalities, this framework responds directly to the rapidly changing demands of the modern workforce. The parallel development of these complementary frameworks by TESDA and CHED creates a comprehensive national approach to micro-credentials that spans both vocational and higher education, offering Filipinos flexible pathways for skills development across the entire post-secondary education landscape, though greater alignment between the two systems would potentially further enhance learner mobility across educational sectors and reduce potential confusion.

SINGAPORE

The WSQ and Skills Frameworks

Singapore Workforce Skills Qualifications (WSQ) is a “national credential system that trains, develops, assesses and certifies skills and competencies for the workforce”[106]. This framework provides the credentialing infrastructure that enables recognition of modular learning achievements within the national qualifications landscape. The WSQ system is directly integrated with the Skills Frameworks, which “provides key information on the job roles and skills that an individual needs to perform various job tasks and to stay transferable”[107].

As of May 2025, there are 38 different skills frameworks available from Agrifood to Food Manufacturing to Sea Transport[108]. Each framework provides a significant amount of

[102] Ibid
[103] Ibid
[104] Ibid
[105] Ibid
[106] SkillsFuture, Singapore Workforce Skills Qualifications
[107] Ibid
[108] SkillsFuture, Skills Frameworks

information including a list of available training programmes (covering both higher and vocational education) in that sector, separated by whether the viewer is looking as a student/fresh graduate or as an adult learner/mid-career switcher[109].

The granularity of these frameworks is highly detailed, with the framework also including skills and competencies, publicly available datasets covering a list of the technical skills and competencies, and critical core skills required for each listed job role. When accessing the data set in May 2025, there were 1869 job roles listed, each with its own role description and performance expectation, 36916 critical work functions and key tasks, mapped against the respective job roles[110]. This comprehensive mapping creates a high level of transparency regarding the competency requirements across the labour market, enabling precise alignment between modular learning offerings and workplace needs.

The SkillsFuture Initiative: Comprehensive Modular Learning Strategy

The SkillsFuture initiative represents Singapore's overarching strategy for continuous education, “a national movement to provide Singaporeans with the opportunities to develop their fullest potential throughout life, regardless of their starting points”[111]. A central feature of this approach has been the expansion of “flexible, modular and bite-sized learning options…taking into consideration the demands of working adults”[112]. These modular offerings are strategically aligned with Singapore's Industry Transformation Maps (ITMs) which are “frameworks designed by the Future Economy Council (FEC) to help companies adapt to changing environments, enhance capabilities, develop human talent, and promote collaborations”[113]. There is a particular focus on the four emerging domains and growth sectors: Digital Economy, Green Economy, Care Economy, and Industry 4.0[114].

Recent developments have reinforced this commitment to modular learning approaches. The 2023 national budget featured an additional S$4 billion to the National Productivity Fund to include “supporting businesses here in building new capabilities, adding greater value to the domestic ecosystem, and upskilling workers”[115], demonstrating substantial financial support for the skills development ecosystem. Additionally, the introduction of Job-Skills Integrators (JSIT) helps “to optimise training provision and job matching services for companies and individuals. They will help to aggregate manpower and skills demand, activate supply of training, and help match skilled workers to jobs”[116].

MySkillsFuture Platform and Course Catalogue

The MySkillsFuture platform serves as a centralised access point for modular learning opportunities, featuring “a searchable course catalogue with, as of May 2025, 27,993

[109] Singapore Food Agency, Pursuing Careers in the Agri-Food Sector
[110] Jobs-Skills Portal, Skills Frameworks
[111] SkillsFuture, About SkillsFuture
[112] SkillsFuture, Skills-Based Modular Courses
[113] Singapore Indeed, What are industry transformation maps?
[114] MySkillsFuture, Pick up industry-relevant skills with SkillsFuture Series
[115] EDB Singapore, Budget 2023: S$4 billion top-up for National Productivity Fund
[116] SkillsFuture, Jobs-Skills Integrators

courses available"[117]. This catalogue integrates offerings "from a variety of institutions across Singapore and the World", creating a comprehensive marketplace for modular learning opportunities.

The platform provides detailed information for each course, including course overviews, learning outcomes, relevant job roles, entry requirements, modes of delivery, the cost (full fee, the cost after SkillsFuture funding, and any additional applicable funding initiatives), as well as ratings from trainees who had attended the course previously[118]. This transparency enhances decision-making for learners navigating the modular learning landscape.

Multi-Modal Delivery Mechanisms

Within the vocational education system there can be many different types of flexible and modular education available, with each offering different in its details. Republic Polytechnic for instance has an Academy for Continuing Education (ACE) which offers a variety of modular and flexibly delivered programmes and courses[119]:

- **Part-Time Diplomas** (30 months) – set times, modular learning, but generally available via both face-to-face in-person and online learning
- **Post-Diplomas**: Specialist Diplomas or Diploma (Conversion) (12 months)- set times, modular learning, some are just face-to-face or hybrid learning with others available via both face-to-face in-person and online learning
- **SkillsFuture Work-Study Programmes** (12-18 months) – exclusively for recent graduates to gain work-study arrangement to extend skills and support transition to workplace. The programmes are modular, with different numbers of Modular Certificates (MCs) depending on learner's choice, depending on subject area are usually available via both face-to-face in-person and online learning
- **Short Courses** (1 day +) – available on the STEP (Skills Training and Enhancement Portal), set times, are specifically in-person, whilst others have intakes on different days with different delivery (face-to-face or online).
- **Skills-Based Modular Courses (SBMCs)** – learners can enrol in stand-alone courses to deepen/learn skills, or use it as a pathway to earn a Diploma or Post-Diploma by stacking. Each module says whether it is a 'stackable' course and gives the validity period for the learner to achieve the other modules to be awarded the full qualification, e.g., 2 years. Course dependent, usually set times, some offer dynamic delivery (face-to-face in-person or online learning), others are blended only (Synchronous online learning, Asynchronous e-learning at learner's own pace, Face-to-face in-person)
- **SkillsFuture Career Transition Programme** (3-6 months) – supports mid-career learners to acquire new skills to improve in their current industry or change to a new industry/role. Course dependent but they are modular, and some are fixed modes of

[117] MySkillsFuture, Courses
[118] MySkillsFuture, Courses
[119] Republic Polytechnic, Academy for Continuing Education (ACE)

> delivery but are blended (mixture of classroom, Synchronous online learning, Asynchronous e-learning at learner's own pace)[120]

Each of these offerings are quite different but they all offer flexibility to meet diverse learner needs and circumstances. The options demonstrate a sophisticated ecosystem of learning pathways, each tailored to specific educational objectives and learner contexts. What stands out is the intentional variation in temporal commitment—ranging from single-day courses to multi-year diplomas—coupled with thoughtfully designed delivery mechanisms that accommodate different learning preferences and life circumstances. While some programs necessitate synchronous participation, others incorporate asynchronous elements that enable self-paced progress. Similarly, the spectrum of modularity differs significantly, with some offerings structured as standalone units and others designed as stackable credentials that accumulate toward comprehensive qualifications. This differentiated approach reflects an education system that recognises the varied nature of modern learners and their varied constraints, providing multiple entry points and progression routes that can be navigated according to individual circumstances.

SPAIN

Significant Ecosystem Reform

Spain's approach to modular learning emerges from a context of systematic vocational education reform intended to address persistent challenges in the country's labour market, including skills mismatches and youth unemployment. The reform responded to these challenges through a coordinated policy framework that reimagines the entire vocational training ecosystem rather than implementing isolated innovations within an existing system. At the core of this transformation is Organic Law 3/2022 on the organisation and integration of vocational training. Introduced in 2022, this law established "a single, modular and flexible offer of formal vocational training from a lifelong learning perspective"[121]. This fundamental legislation created the legal foundation for a comprehensive redesign of vocational education in Spain.

A defining feature of Spain's approach is its systematically graduated credentialing structure, which offers

> "a range of training courses of different lengths and learning volumes ranging from small units or micro-training (Grado A), learning modules (Grado B) to VET programmes (Grados C and D) and specialisation courses (Grado E). This formal VET provision is cumulative, certifiable and accreditable, enabling IVET learners, as well as employed and unemployed people, to design and progress in their own training pathways to meet personal needs, expectations and abilities"[122].

[120] Republic Polytechnic, Academy for Continuing Education (ACE)
[121] CEDEFOP 2022, Spain: VET revolution
[122] CEDEFOP 2022, Spain: VET revolution

This tiered approach provides detailed granularity in official vocational qualifications while maintaining coherence across the credential ecosystem.

The Vocational Training Act 3/2022 introduced significant reforms to enhance flexibility, including the implementation of "micro-credentials" (microformaciones) as smaller, stackable learning units that allow incremental skill acquisition within the national qualification framework[123]:

> "The law mandates a Vocational Training System in which all training is accreditable, cumulative, and capitalisable. The training offer is structured in a vertical, tiered manner, establishing an ascending "continuum" based on the breadth of each training offer. Offers are organised from "micro-credentials" to vocational training qualifications, depending on whether they include a single learning outcome, one or more professional modules, or a complete package of professional modules, while maintaining their cumulative nature at all times. This model facilitates the generation of training pathways. Thus, any offer will be organised into units that take progression into account and can provide continuity. All offers will allow progress along training pathways leading to accreditations, certifications, and qualifications with national and European recognition.
>
> Furthermore, all vocational training will be dual in nature, as it will be carried out between the training centre and the company. With adaptations to each productive sector and each degree family, all vocational training will include sufficient training in workplaces, in two intensities depending on the characteristics of the training period in the workplace"[124].

The framework is impressive in its creation of an interconnected learning ecosystem where all educational components—from micro-credentials to comprehensive qualifications—maintain individual value while functioning as building blocks within larger credentialing pathways. The 'continuum' approach democratises skill acquisition by allowing learners to accumulate competencies incrementally according to their circumstances, while the mandatory dual-nature requirement enhances practical relevance by ensuring authentic workplace application throughout every learning experience, establishing a dynamic, personalised competency development ecosystem aligned with both individual needs and labour market requirements.

National Flexible Learning Systems

The Spanish government offers a number of initiatives of their own to support flexible learning. CIDEAD functions as the official distance education centre directly operated by the Ministry of Education, providing comprehensive regulated educational programs across primary, secondary, baccalaureate, and vocational training levels that lead to officially recognised qualifications within the Spanish education system and European Qualifications Framework[125], while implementing structured academic calendars with specific enrolment

[123] Government of Spain, Organic Law 3/2022, of March 31
[124] Government of Spain, Organic Law 3/2022, of March 31
[125] Government of Spain, CIDEAD

periods and assessment timelines administered through a centralised virtual learning environment with standardised curriculum materials[126].

Aula Mentor operates as a non-formal education initiative also supported by the Ministry of Education but designed specifically for adult lifelong learning, offering shorter, more targeted courses focused on professional skills development and personal enrichment without necessarily leading to official qualifications[127], employing continuous enrolment options, self-paced learning, and competency-based assessment through a distributed network of learning centres (Aulas Mentor) established via collaboration agreements with local authorities, educational institutions, and non-governmental organisations that create accessible community learning hubs where learners can access technological resources and receive in-person support while studying subjects online with specialised tutors providing personalised guidance through virtual communication channels[128][129].

SWITZERLAND

The Adult Education Trainer Certification System

Training for adult educators in Switzerland, via the SVEB Swiss Association for Continuing Education adult education trainer certification system builds on a progressive structure comprising three levels of qualifications, and within each, there are particular modules to be achieved, which over time can be 'stacked' to a larger qualification, with many different providers available, course dependent, to deliver[130].

There is flexibility in delivery approaches, including both in-person and blended learning options. In reviewing one training provider's course information for these qualifications, they incorporate innovative approaches to accommodating learner circumstances, such as the opportunity to attend sessions in a parallel in-person course if the learner misses some of their own in-person sessions[131]. Scheduling innovations further enhance accessibility, with timetabling to have courses throughout the year across all weekdays and various times to cater to the requirements of different learners[132]. There are also financial incentives for completion, offering "50% course fee reimbursement in the form of federal subsidies if you attend all modules and graduate with the…qualification"[133].

[126] Government of Spain, CIDEAD
[127] Government of Spain, Aula Mentor
[128] Government of Spain, Aula Mentor
[129] Eurydice, Spain: 2.2 Lifelong learning strategy
[130] SVEB Swiss Association for Continuing Education, AdA modular system
[131] SVEB Swiss Association for Continuing Education, Course Comparison: The SVEB Certificate for Trainers - Individual Support
[132] SVEB Swiss Association for Continuing Education, Course Comparison: The SVEB Certificate for Trainers - Individual Support
[133] SVEB Swiss Association for Continuing Education, Course Comparison: The SVEB Certificate for Trainers - Individual Support

UGANDA

Industry-Integrated Design and Delivery

The Uganda Skills Development Fund (USDF) was established in-part, to address skills shortages in the formal sector (i.e., those in employment compared to the informal sector of artisans and the 'gig economy'). In a review of the project, some of the successes were explored. One part of the fund was for upgrading skills in medium and large enterprises of the formal sector. The intention was to provide "short-term skills training for company existing employees or persons the applicant intended to employ, subcontractors supplying goods or services to the company, e.g. farmers to enhance their productivity, competitiveness and profitability"[134]. This programme utilised a cascading training model, where some "companies first trained trainers of trainees (ToTs), who in turn trained the workers or employees"[135].

The effectiveness of this approach is evidenced by the fact that an estimated 2,000 new jobs were created, "4,234 trainees [were] assessed and certified by DIT [Directorate of Industrial Training]; the certificates are the evidence of the skills acquired and are used to seek employment in the country and beyond"[136]. This certification process provides formal recognition for modular learning achievements, enhancing their value in the labour market.

NEW ZEALAND LITERATURE REVIEW

In this domestic literature review, examples are presented of New Zealand's current vocational education framework and its dynamic modular learning approaches, alongside analysis of institutional practices that demonstrate flexibility and adaptability within the New Zealand Qualifications and Credentials Framework (NZQCF). The focus is on how New Zealand's existing system utilises modular structures—including unit standards, skills standards, micro-credentials, and diverse delivery modes—to meet varied learner and industry needs across different geographical and seasonal contexts, while also examining emerging challenges and opportunities within the evolving regulatory landscape leading to the 2026 system reforms.

The New Zealand Qualifications and Credentials Framework (NZQCF)

In New Zealand, in addition to Qualifications, there are Skills Standards, Unit Standards, and Micro-credentials on the New Zealand Qualifications and Credentials Framework (NZQCF). Each of these can be short and modular, and to a degree can also by dynamic.

[134] Private Sector Foundation Uganda, End of Project Report November 2022
[135] Private Sector Foundation Uganda, End of Project Report November 2022
[136] Private Sector Foundation Uganda, End of Project Report November 2022

Unit Standards and its successor Skills Standards comprise sets of learning outcomes and content which needs to be taught/assessed to achieve competency. Standards can then be clustered into a qualification and can also 'stack' into micro-credentials, or indeed, be delivered and given as individual awards.

Micro-credentials are a different way of providing education within New Zealand. They are on the NZQCF, comprise 1-40 credits, and are listed on the national online register. During their development, if there is material already present in a unit standard which they wish to also include within a micro-credential, NZQA suggest, but do not mandate, that developers should integrate that unit standard. This would mean that when a learner completes that micro-credential, they also gain recognition for the unit standard. It is different for skill standards however, with NZQA mandating that once "suitable skill standards are available for a micro-credential, they must be used"[137] This means that when a skill standard has some content that could be part of a proposed new micro-credential, the developers must incorporate that skill standard into the micro-credential. Whilst this is, in part to reduce duplication, there is the risk of making some micro-credentials significantly bigger than they need to be.

Qualifications specify the learning outcomes (LOs) that need to be achieved in order for a qualification to be awarded but can't directly specify the unit/skill standard(s) that might apply to the learner achieving the LOs. On the other hand, the developer of a unit/skills standard can specify what learning outcome(s) that standard might contribute towards, and a study programme can specify delivery via one or more unit/skills standards amongst other delivery options. Micro-credentials can be 'stacked' into a qualification, and in some cases they have formed the entire qualification, which can occur if the qualification is between Levels 1-6[138].

The recognition of prior learning and the transferability of credits between institutions represent critical components of a flexible, learner-centred system. The New Zealand Qualifications and Credentials Framework (NZQCF) provides the structural foundation for this approach, establishing a coherent system where diverse learning achievements can be recognised across institutional boundaries. Credit recognition transfer (CRT) - "where one institution recognises credit gained at another institution towards a qualification or micro-credential. CRT generally describes credit from formal learning provided and credentialed by a tertiary provider"[139]. In their guidance NZQA provide robust feedback regarding CRT for micro-credentials, stating that "Clear and robust policies and procedures relating to CRT are essential when considering the stacking of micro-credentials to recognise the learner's achievement of the micro-credential if achieved before enrolling in the programme".[140]

The majority of qualifications in New Zealand are earned via the achievement of a programme, which leads to the qualification. NZQA allows for different providers to design their own programmes, rather than a one-size-fits-all approach, leading to multiple

[137] NZQA, Guidelines for micro-credential listing, approval, and accreditation version 2
[138] NZQA 2024, Stacking Micro-credentials
[139] NZQA 2024, Stacking Micro-credentials
[140] NZQA 2024, Stacking Micro-credentials

pathways available to earn the same qualification. When it comes to delivery, NZQA allow for these options:

"• in person, face-to-face in a traditional classroom setting
• in a workplace
• online in real time classes (synchronous)
• self-paced online via assignments, tasks, and quizzes (asynchronous)
• by including work placements, practicums, or block courses; or
• a combination of some or all the above?

A programme may have more than one mode, if different learner groups require a different learning pathway through the programme.

Alternatively, different learning pathways may be outlined in separate programmes. Two or more programmes may lead to the same qualification, for example, one programme in a full time on-campus mode and one programme in a blended mode for work-based learners.

Providers should offer flexibility in approach, allowing the learner the option to study or train via whichever means of delivery is best suited to when, where, and what students or trainees are learning and their personal circumstances"[141].

This diversity in delivery is also reflected in the funding via the Tertiary Education Commission (TEC). For their Unified Funding System they have five modes of delivery. They explain that an "individual learner's programme can be made up of one or more modes. This enables learners and employers to access learning opportunities in a way that works best for them and supports them to move seamlessly between different ways of learning"[142]. The five modes are:

- Provider-based – at least 75% of the course needs to be delivered in a synchronous learning manner either on campus or an approved delivery site. Learning can be online in this method but cannot be the only form of delivery.
- Provider-based: extramural – the majority of the learning is not on campus and is not in the workplace. The learners will do self-directed learning.
- Work-based: pathway to work – there will have been some study in a provider-based mode, and they will help the learner find jobs with training agreements and support the establishment of their learning in the workplace. This is only to cover the transition period between study and work of up to 3 months or 30 credits (whichever comes first).
- Work-based – The majority of the learning will be in the workplace with the provider and employer collaborating on the delivery of training and support. Self-directed learning would occur as needed.
- Assessment and verification – The employer has created or purchased a programme of study which will lead to a qualification and delivers the training to the learner in the workplace. A provider will work with the employer to match the training to a

[141] NZQA, Guidelines for programme approval and accreditation
[142] TEC, Modes of delivery – Unified Funding System

qualification. Providers will be the ones responsible for the quality of the assessment of the programme[143].

This deliberate diversity in delivery methods from both NZQA and TEC recognises that different pedagogical approaches offer distinct advantages—traditional on-campus delivery excels in immediate feedback and community building, while dynamic modular learning provides flexibility and personalised pacing for diverse learner needs. Critical to NZQA's framework is the rigorous equivalence maintained between these approaches through the alignment of assessment methodologies and learning outcomes, ensuring quality isn't sacrificed for accessibility. The strategic integration of dynamic modular learning from both NZQA and TEC represents an encouraging response to evolving educational landscapes, balancing the competing demands of standardisation and innovation in qualification delivery.

Open Polytechnic & WITT (Western Institute of Technology at Taranaki)

Within New Zealand, there are different ways in which the same qualification can be delivered. Open Polytechnic, currently a part of Te Pūkenga, offers a flexible, modular approach to food and fibre education that accommodates seasonal factors through distance learning. Their New Zealand Certificate in Organic Primary Production (Level 3) comprises three different courses, which are all delivered online, and currently have an entry point for each of the courses every month[144], the same with the four-course New Zealand Certificate in Horticulture (General) (Level 3)[145]. This flexibility allows students to align their studies with seasonal farming and growing activities if they wish.

Open Polytechnic's online, self-paced learning is entirely based on each learner's individual situation. The learner can go as quickly or as slow as they need to, depending on circumstances and are allowed to take up to three years to complete the Horticulture General Certificate, and two years for the organic Primary Production. Learners have a tutor whom they can call, ask questions, get advice and suggestions for their own particular areas, and there is a part of the Learner Management System (LMS) where all learners from all cohorts can talk to each other, ask questions, and have the tutors provide information too, as well as a separate page for each cohort, to build support within each cohort as well. As it is all online, students are enrolled from all across the country.

WITT (Western Institute of Technology at Taranaki), also currently a part of Te Pūkenga, provide their training in-person, offering an alternative within that geographical location for people who would prefer an in-person experience. Their New Zealand Certificate in Organic Primary Production (Level 4) for instance is described as "actively producing vegetables, fruit

[143] TEC, Modes of delivery – Unified Funding System
[144] Open Polytechnic, New Zealand Certificate in Organic Primary Production (Level 3)
[145] Open Polytechnic, New Zealand Certificate in Horticulture (General) (Level 3)

and herbs over a full growing year"[146], having the courses follow natural seasonal progressions, tied to the regional elements of Taranaki.

These contrasting delivery approaches exemplify the dynamic spectrum of vocational education within New Zealand's currently integrated Te Pūkenga system. The WITT model leverages location-based learning, deeply embedded in regional contexts, allowing students to develop competencies through direct engagement with Taranaki's specific growing conditions, seasonal patterns, and agricultural ecosystems. Meanwhile, Open Polytechnic's digital-first methodology transcends geographical constraints entirely, offering temporal flexibility through monthly intake opportunities and self-paced progression pathways that accommodate diverse learner circumstances—from full-time students to working professionals balancing multiple responsibilities. These complementary approaches within the same qualification framework demonstrate how modular design principles can be effectively implemented across different delivery modalities while maintaining educational equivalence and responsiveness to varied learner needs.

Primary ITO

Primary ITO utilise dynamic and modular methods including the use of stacking micro-credentials as part of the design of some of their programmes. With the New Zealand Certificate in Agriculture – Dairy Farming for instance, they have the qualification and the related programme and, for the programme, they developed a group of micro-credentials aligned to the learning outcomes for the qualification. Within each micro-credential there is a grouping of unit standards. If the learner achieves all the micro-credentials, then they have by default met the learning outcomes and earned the qualification.

Primary ITO created this structure for several reasons, firstly, Dairy calving for instance happens at different times of year depending where in the country the learner is; earlier in the year for Invercargill compared to Northland. To ensure that learners are doing their training at the time when it works best for their location, the micro-credential can be delivered at different times of the year, supporting a more regional-focused education system. In addition, there are seasonal workers from overseas who may meet the requirements for achieving a micro-credential, but wouldn't have time during their period of work in New Zealand to be able to achieve a full qualification. With micro-credentials, overseas seasonal workers therefore can still get formal recognition of the learning they have achieved against each micro-credential completed.

Artificial Intelligence in Assessment

A piece of research was recently completed to explore whether Artificial Intelligence (AI) can currently design and write both 'generic' assessments and adapt those assessments for individual learners. The study focused on creating an assessment for a micro-credential on the NZQCF and found that AI can write both standard and highly personalised assessments effectively. However, human intervention was still needed, primarily to address how the

[146] WITT, New Zealand Certificate in Organic Primary Production (Level 4)

micro-credential document was presented—specifically, the indicative content and the amount of extraneous information in the document that wasn't relevant for the assessment. It was discovered that if micro-credentials, unit standards, and skill standards were stripped down to only the essential assessment-related information, AI could design and write valuable assessments with the right prompts.

The reason for mentioning this is that it was suggested that all unit standards, skill standards, and micro-credentials could be distilled down to essential data, enabling the identification of gaps and the design of custom assessments and micro-credentials using AI. These could be personalised to suit individual learners' needs, including those with English as a second language, neurodivergent learners, or others who may face challenges in understanding assessments. The research was an initial piece focused on designing a baseline assessment, a mock assessment, and assessments personalised for a learner with Autism and a learner with English as a second language, all at Level 2 micro-credential level. This proof-of-concept, reviewed by subject matter experts and two workforce development councils, now presents an opportunity for further research and exploration and could be particularly useful here[147].

The 2026 Vocational Education System

The New Zealand government announced in April 2025 that there will be a reform of the vocational education sector, introducing an "industry-led independent work-based learning model", scheduled to be established on 1 January 2026[148]. These changes will disestablish the current Workforce Development Councils (WDC's), create new industry led Industry Skills Boards (ISB's), disestablish the Te Pūkenga 'mega polytech' approach, and allow work-based learning to be offered by any provider who meets the government's requirements[149].

With regards to the current system, and the opportunity for innovation, there are several critical elements which will need attention. In response to several questions about the new system, the Tertiary Education Commission (TEC), released answers to several frequently asked questions.

"**Will the work-based learning division of the new ISB be able to continue developing programmes? Or does all new development stop on 1 January 2026?**

The focus for work-based learning during the transition period (where the training units sit within the ISBs) will be on preparing for transfer, rather than growing. There will, however, be cases where new standards, credentials or qualifications will be required to meet industry needs. In these cases, new provision will be supported."[150]

"**Will regional ITPs be able to offer programmes nationally?**

[147] Stuart Martin, AI Generated Assessments for Vocational Education and Training
[148] Tertiary Education Commission (TEC), New work-based learning model
[149] Tertiary Education Commission (TEC), New work-based learning model
[150] Tertiary Education Commission (TEC), FAQs consultation on Industry Skills Boards' coverage

Institutes of Technology and Polytechnics (ITPs) are being set up to deliver regionally, to maximise the strength of local knowledge. We expect that this will be the main focus of their provision, however we will consider other arrangements if these have the support of industry."[151]

A concern is that, for 2026-2027, there could be less innovation possible. With the announcement of the ISB launch, some details have been provided, but many questions remain unanswered regarding their structure and operational mechanisms. The ISBs will have less funding than the WDCs, and during their first two years must simultaneously establish their policies and procedures while managing Te Pūkenga's existing apprentices and trainees. These learners will eventually transfer to newly developed industry-led private training enterprises, a process that could take up to two years.

Unlike the WDCs, ISBs will be permitted to charge for quality assurance[152]. If implemented, these charges could create additional costs when training providers develop new programmes or micro-credentials. For 'niche' offerings, such costs could prove prohibitive. Decisions about charging—including whether costs will be implemented and at what level—are unlikely until well after ISBs are established. Additionally, it remains unclear whether the eight ISBs will adopt consistent pricing, potentially creating uneven disadvantages across industries. This transition period presents a critical juncture for New Zealand's vocational education system, with potential constraints on innovation occurring precisely when international trends suggest the greatest need for adaptable, modular learning approaches.

COMPARATIVE ANALYSIS

Micro-Credentials

Across the international landscape, micro-credentials exemplify the core principles of modular learning by breaking learning and assessment into discrete, manageable units that can be combined flexibly. Australia, Ireland, New Zealand, and the Philippines all have formal frameworks for micro-credentials, each approaching modularity somewhat differently. Australia defines micro-credentials as certifications of "assessed learning or competency" with a minimum of one hour of learning but less than a qualification, while New Zealand has incorporated the use of micro-credentials within its NZQCF ranging between 1-40 credits. It is worth noting that, in New Zealand especially, micro-credentials are just another format of the same learning outcomes, and in some cases formed of some of the same standards as qualifications (via unit and skill standards), they are just a smaller, and sometimes more flexible type of qualification. The Philippines takes a particularly innovative approach to dynamic learning with their "supermarket of competencies" concept, allowing for unbundling, rebundling, and standalone micro-credentials that can respond rapidly to changing needs.

[151] Tertiary Education Commission (TEC), FAQs consultation on Industry Skills Boards' coverage
[152] Tertiary Education Commission (TEC), New Industry Skills Boards Announced

Of interest is how countries differ in their approaches to creating dynamic pathways through recognition and stackability of micro-credentials. In Ireland, while micro-credentials exist as "minor awards", "special purpose awards," and micro-qualifications, there isn't yet a national policy allowing for stacking from different providers. In contrast, New Zealand explicitly allows for modular stacking of micro-credentials into qualifications at levels 1-6, though not to the same extent for higher levels. The Philippines has gone further with their concept of "re-bundling" where micro-credentials from different training regulations can be dynamically combined to create tailored qualifications.

These differences reflect varying levels of system maturity and flexibility around micro-credentials. Countries like the Philippines and Spain have adopted more radical approaches to modular learning in particular, with Spain completely changing their framework to support this. Meanwhile, both Australia and New Zealand have created searchable registers to enhance discoverability of available learning opportunities. These varying approaches highlight how micro-credentials are being adapted to fit within existing qualification systems while pushing the boundaries of how learning can be packaged, recognised, and dynamically combined to meet diverse and evolving needs.

Personalised Learning

Personalisation and modular learning are naturally complementary. Breaking education into discrete components creates the foundation for tailored pathways that can respond to the individual needs of a learner. It can also respond to the critical needs of an employer, for instance designing the learning in a way which aligns to planned work activities rather than the employer having to adapt their schedules to the learning. The countries reviewed demonstrate different approaches to this relationship. Denmark's AMU system conceptualises learning modules as "Lego bricks" that can be assembled according to individual needs, based on skill assessments that identify actual gaps rather than prescribing standardised pathways. This modularity enables personalisation by creating flexibility in both what is learned and in what sequence. Finland's Continuous Learning Reform goes further by enabling modularity across institutional boundaries, allowing learners to construct pathways using components from multiple providers – a systems-level approach to modularity that fundamentally reshapes the educational landscape.

The dynamic aspect of these personalised, modular systems varies considerably between countries. In some systems, personalisation happens primarily at the starting point – an initial assessment determines a pathway that remains relatively fixed. More dynamic systems enable continuous adaptation as learner needs, interests, or circumstances evolve, such as planned work activities. Singapore's MySkillsFuture platform embodies this more dynamic approach by providing ongoing navigation support with detailed course information and user ratings, helping learners make informed decisions as they progress through their unique learning journeys. The Philippines' conceptualisation of a "supermarket of competencies" represents perhaps the most dynamic vision, where learners continuously select modules based on evolving needs, though implementation details remain developing.

These differences reflect fundamental tensions in designing modular learning systems. Highly modular, dynamic systems offer maximum flexibility but require sophisticated support structures and significant learner agency. Denmark's approach balances flexibility with guidance, using professional assessment to inform modular choices. Singapore and Finland emphasise infrastructure that enables informed navigation of complex modular landscapes. The Philippines' approach envisions radical learner autonomy in a fully modular system. Each approach reveals different answers to a central question: how can education systems harness modularity to personalise learning while ensuring coherence, quality, and meaningful outcomes? The diversity suggests there's no single optimal balance – effective systems must align with cultural contexts, institutional capabilities, and the specific needs of different learner populations.

Industry Involvement

Industry involvement is critical to making learning systems both modular and dynamic – modular in breaking skills into discrete, job-relevant components, and dynamic in responding to unique workplace needs as appropriate. The countries reviewed reveal different mechanisms for achieving this responsiveness however. Australia's Jobs and Skills Councils enable industry-led identification of skill gaps and development of targeted modules, as seen in Skills Impact's response to agronomy education needs through both a comprehensive diploma and modular components. This approach allows for updating specific skill areas without overhauling entire qualifications, improving system responsiveness. Singapore's approach is more systematised, with Industry Transformation Maps strategically guiding modular skills development and Job-Skills Integrators coordinating between training provision and workplace needs, creating a tightly coupled feedback loop.

The speed and depth of industry-education interaction varies significantly, shaping how truly dynamic these modular systems can become. NEPAD/CAADP's critique of purely institution-based vocational training highlights a fundamental tension: educational institutions typically operate on academic timeframes and prioritise comprehensive knowledge, while industry needs often evolve more rapidly and focus on specific competencies, with individual employer/workplace needs varying even more rapidly at the workface. Spain's mandatory "dual nature" vocational training represents a radical response to this tension, embedding learning directly within workplaces to ensure immediate relevance. This approach fundamentally reimagines modularity by making the workplace itself a learning module, rather than simply making classroom content more modular. Engineers Australia's creation of their own micro-credentials demonstrates another approach – bypassing traditional education systems entirely when they lack sufficient responsiveness.

These varying approaches reveal different conceptualisations of the relationship between education and work in modular learning systems. Traditional boundaries between education and industry create modular systems where industry primarily influences content and validates outcomes, but education providers maintain control over delivery and assessment. More integrated approaches create dynamic modular systems where the boundaries

themselves become more permeable – learning modules exist across both educational and workplace settings, with continuous feedback between them. The most dynamic systems, exemplified by Spain's approach and Singapore's comprehensive frameworks, feature tight coupling between skill development and application, continuous bidirectional feedback, and mechanisms for rapid updating of modular components as workplace needs evolve. This responsiveness represents the essential "dynamic" quality that transforms modularity from simply smaller units into a truly adaptive learning system.

Collaborative Working

Collaboration between institutions fundamentally transforms what modularity can achieve by enabling learning components to function across traditional boundaries. The examples reviewed demonstrate how different forms of collaboration create different possibilities for modular learning. The Ontario Learn consortium in Canada enables modular course sharing between 24 colleges, extending reach while maintaining institutional identities and (especially important for the New Zealand context) creating critical mass even for those disciplines that might not be sufficiently common on a regional basis to justify investment in delivering learning. Finland's Digivisio represents a more ambitious vision of institutional collaboration, creating infrastructure for seamless movement between modular offerings across all 37 Finnish higher education institutions. These collaborative structures don't simply aggregate existing modules – they create new forms of modularity that transcend institutional limitations, allowing learners to construct pathways that would be impossible within single institutions.

The dynamic aspect of these collaborative systems emerges from their ability to respond to changing needs at different levels. The Netherlands' approach emphasises regional collaboration, allowing institutions and companies to jointly develop optional modules addressing specific regional labour market needs. This creates a more dynamic response capability than centralised systems, enabling modules to evolve at the pace required by local conditions rather than waiting for national-level changes. At the same time, national frameworks ensure these locally-developed modules maintain compatibility with broader qualification systems. This multi-level approach to modularity – with some components standardised nationally and others dynamically adapted regionally – creates a balanced system that can both maintain coherence and respond to diverse needs.

These collaborative approaches reveal an important insight: true modularity requires coordination mechanisms that transcend individual providers. Isolated modularity within single institutions creates flexibility only within the boundaries of that institution's offerings. Collaborative approaches create systems-level modularity where components from multiple sources can function together coherently. This requires not just technical standards for module design and assessment, but governance structures that enable recognition and quality assurance across boundaries. The examples demonstrate a spectrum of approaches to this coordination challenge – from Canada's focused sharing of online delivery to Finland's comprehensive digital ecosystem. What unites them is the recognition that meaningful modularity requires breaking down traditional institutional silos to create more

interconnected learning ecosystems where components can be dynamically combined across previously rigid boundaries.

Flexible Delivery

The examples reviewed demonstrate how flexible delivery multiplies the potential of modular content. The Philippines' TESDA framework explicitly recognises this relationship by identifying five distinct delivery options for modular learning, enabling providers to adapt delivery to learner circumstances. Singapore's Republic Polytechnic shows how the same modular content can be delivered through dramatically different temporal structures – from intensive short courses to part-time diplomas – creating flexibility that accommodates diverse life circumstances. New Zealand's contrasting approaches to the same qualification via Te Pūkenga – Open Polytechnic's self-paced online learning with monthly entry points to support anyone in the country who wishes to study online, versus WITT's in-person, seasonally-aligned delivery – demonstrates how delivery flexibility can maintain educational equivalence while accommodating different learner preferences and constraints. With Te Pūkenga breaking up at the end of 2025, there is a very real risk that the breakup will result in work-based training providers and ITPs focusing on their immediate issues at the cost of collaboration for the greater good.

The temporal dimension of flexible delivery particularly enhances the dynamic nature of modular learning. Traditional education systems often impose rigid timing constraints – fixed semester schedules, predetermined sequencing, and cohort-based progression. More dynamic approaches enable variability in both pace and timing. Denmark's AMU courses can be taken part-time or full-time, enabling learners to adjust their intensity based on changing circumstances. Switzerland's adult education system allows participants to attend sessions in parallel courses if they miss their own scheduled sessions – a simple but significant flexibility that acknowledges the complex realities of adult learners' lives. This temporal flexibility transforms how modular content functions in practice, enabling truly personalised learner journeys that adapt to individual circumstances rather than forcing learners to conform to institutional schedules.

These approaches to flexible delivery reveal important insights about creating truly dynamic, modular learning systems. First, they demonstrate that modularity must extend beyond content to include delivery mechanisms – breaking education into smaller more targeted units has limited value if delivery remains rigid. Second, they show how delivery flexibility creates different types of responsiveness – geographical flexibility through online options, temporal flexibility through multiple schedules and self-pacing, and methodological flexibility through varied pedagogical approaches. Finally, they highlight how different dimensions of flexibility address different barriers to participation – some learners need geographical flexibility due to location or mobility constraints, others need temporal flexibility due to work or care responsibilities, while others benefit from methodological flexibility due to learning preferences or disabilities. The most effective systems recognise these diverse needs and create multi-dimensional flexibility that enables truly dynamic, personalised learning journeys built from modular components.

Holistically Connected

Creating coherent systems from modular components represents perhaps the greatest challenge in implementing dynamic, modular learning. The examples reviewed demonstrate different approaches to this integration challenge. Singapore's comprehensive skills frameworks establish a common language for describing competencies across 1,869 job roles, creating a foundation for modular development that maintains coherence across the entire skills ecosystem. Spain's tiered credential system provides a structured progression pathway from micro-training (Grado A) to specialisation courses (Grado E), ensuring modular components fit within a coherent qualification architecture. Finland's Service Centre for Continuous Learning and Employment creates institutional infrastructure for coordinating modular initiatives across the educational landscape. These approaches address a fundamental tension in modular systems: how to balance the flexibility of smaller, combinable units with the coherence needed for meaningful credentials and career pathways.

The navigational dimension of connected modular systems varies considerably between countries. As education becomes more modular, the complexity for learners increases exponentially – with more options comes more decisions about what to learn, in what sequence, and from which providers. Singapore's MySkillsFuture platform directly addresses this navigational challenge through a centralised access point with detailed course information, helping learners make informed choices within the complex modular landscape. Other systems rely more on human guidance – Finland's reform emphasises information, guidance, and counselling services alongside modular offerings, recognising that many learners need personalised support to navigate increasingly modular systems. These approaches highlight that effective modular systems must invest not just in the modules themselves, but in the supports that help learners construct meaningful pathways from those modules.

The most sophisticated systems demonstrate how modularity must function across multiple dimensions simultaneously to create truly dynamic learning ecosystems. Vertical modularity enables progression between credential levels, as seen in both Spain's and New Zealand's tiered systems where smaller units can build toward comprehensive qualifications. Horizontal modularity enables movement across institutions and sectors, as demonstrated by Finland's cross-institutional framework. Temporal modularity enables learning to be distributed over time according to individual circumstances, as shown in Switzerland's flexible scheduling approaches. New Zealand's qualification framework exemplifies this multi-dimensional approach through its deliberate diversity in delivery methods—recognising that traditional on-campus delivery and dynamic modular learning each offer distinct pedagogical advantages while maintaining rigorous equivalence through sophisticated alignment of assessment methodologies and learning outcomes. What distinguishes truly connected systems is their ability to maintain coherence across all these dimensions simultaneously – ensuring that modular components retain their value and meaning regardless of how they're combined. This requires sophisticated qualification frameworks, robust quality assurance mechanisms, and effective information systems that enable both learners and employers to understand the value and relationships between

modular components. The diversity of approaches suggests there is no single optimal solution to this integration challenge – effective systems must align with cultural contexts, institutional capabilities, and specific learning needs while creating sufficient standardisation to ensure modules can function together coherently in dynamic combinations.

THE SYSTEM DESIGN DEVELOPMENT JOURNEY

The development of this system design involved an initial design, robust stakeholder engagement with government agencies, providers, and employers, and iterative refinement across three distinct approaches, each grounded in different philosophical foundations and implementation strategies.

Design 1: Framework Restructure

The initial design proposed a comprehensive restructuring of the New Zealand Qualifications and Credentials Framework itself, creating new credential types across three tiers: Learning Outcomes (1-10 credits) leading to Component Certificates, Skill Sets (2-30 credits) resulting in Professional Purpose Certificates, and Applied Learning Certificates (40+ credits) as qualification containers. This approach offered maximum flexibility and industry alignment through direct ISB involvement in credential creation. However, the design required extensive regulatory changes, new assessment protocols, and fundamental alterations to existing NZQCF structures, presenting significant implementation barriers and significant confusion for stakeholders familiar with current systems.

The feedback on this first design was mixed—while some respondents appreciated the lifelong learning focus and modular flexibility, many raised significant concerns about practical implementation and system differentiation. Key feedback themes included:

- **Unclear differentiation** – difficulty identifying genuine innovations beyond what current micro-credentials and skill standards already provide, with calls for clearer articulation of the system's unique value
- **Implementation challenges** – concerns about provider capacity, assessor training requirements, industry engagement mechanisms, and substantial infrastructure needed for meaningful participation
- **ALC viability** – mixed responses on Applied Learning Certificates, with supporters appreciating lifelong learning recognition but critics worried about employer understanding, international recognition, and whether generic qualifications would hold meaningful industry value
- **Quality assurance concerns** – questions about maintaining consistency across diverse providers and preserving standards within a more flexible system
- **Literature integration** – need for stronger incorporation of research findings to better justify proposed changes and demonstrate evidence-based design decisions

Design 2: New Digital Repository

The second iteration applied the findings from stakeholder engagement and focused on building an entirely new digital repository system from the ground up. This design emphasised comprehensive learning outcome storage, with ALQs and digital badges as the primary recognition mechanisms. It offered a clean system architecture free from legacy constraints and allowed the incorporation of cutting-edge digital credentialing approaches. However, developing new infrastructure would require significant upfront investment, create parallel systems during transition, and risk stakeholder uncertainty about which system held authoritative records. It also overlooked the established trust and recognition already embedded in NZQA's existing Record of Achievement system.

Stakeholder feedback on version 2 was notably much more positive and enthusiastic. While overall reception was strong, some important questions remained. These informed further refinements in the final version of the design, including:

- **Governance and management** – who would oversee the system and how it would be managed.
- **Costs** – greater clarity on funding requirements and long-term sustainability.
- **ALQs** – more detail on their structure, how learning outcomes would be framed, and the added value of ALQs compared with standalone LOs.
- **Digital badges** – further explanation of their potential benefits, along with safeguards to avoid 'credential overload.'
- **Implementation roadmap** – a clearer plan for how the system could be rolled out in practice.

Design 3: Enhanced Recognition Repository

The final design, explored in the chapter below, leverages and expands the existing New Zealand Record of Achievement system owned by NZQA, building on established infrastructure while expanding its functionality. This approach maintains stakeholder familiarity and trust while enabling comprehensive learning outcome tracking, skill metadata integration, and ALQ provision. The design minimises implementation risks by utilising proven systems, reduces duplication concerns, and maintains NZQA's authoritative role in credential management. Most importantly, it provides a practical pathway for immediate development within the 2026-2027 transitional timeframe while supporting long-term expansion possibilities.

The third design represents the balance between innovation and practicality, offering transformational capability while respecting existing institutional frameworks and stakeholder understanding.

PROPOSED SYSTEM DESIGN: A NEW ZEALAND RECOGNITION REPOSITORY

New Zealand's current vocational education landscape faces significant challenges in recognising and transferring learning achievements across providers, particularly as the sector transitions toward the 2026 industry-led model. Despite the flexibility inherent in the NZQCF through unit standards, skills standards, and micro-credentials, learners often struggle to demonstrate their accumulated learning when it spans multiple institutions, timeframes, or delivery modes.

The international literature reviewed for this project demonstrated how dynamic modular learning can be achieved, and the various ways that it can be designed, to suit a particular nation. In particular, this proposal has been influenced by the models of Denmark, Finland, The Netherlands, The Philippines, and Singapore.

In determining the specifics for the model (e.g. ALQ, credit limits, costs, etc.) these are placeholder values created to demonstrate how the model might work. It was considered more important that this proposed model was definitive than lose meaning through more generic text.

Expanding the New Zealand Record of Achievement System

Instead of creating something new, we propose updating and expanding the scope and provision of the current 'New Zealand Record of Achievement' system, owned by NZQA[153], leveraging established infrastructure while dramatically expanding its functionality. At present, the system "is an official transcript of all the New Zealand qualifications, micro-credentials and standards…achieved, as reported by NZQA-consented education providers and universities"[154]. By focusing on expanding this existing system which stakeholders already know and understand, we reduce confusion and duplication risks while maintaining NZQA as the platform owner.

The proposed expansion is to store every Learning Outcome (LO) earned by learners in New Zealand. For each learning outcome, the system would record: the outcome name, credit value, qualification level, achievement date, awarding institution, required assessments, theoretical components, and practical elements as minimum requirements. This system would be accessible to all registered training providers in New Zealand, employers, and the learners themselves.

[153] NZQA, New Zealand Record of Achievement
[154] NZQA, New Zealand Record of Achievement

Skill Metadata Integration

A longer-term element of the project, but one of immense value, would involve requiring each learning outcome developer to provide for addition to the system, detailed skill metadata, similar to digital credential requirements. This metadata would specify the skills that learners earn, become competent in, or showcase through successful completion/achievement of each learning outcome.

This granular approach would help there be more consistent training developed across the various providers wishing to train those particular learning outcomes, providing stronger credibility and validity. It would also signal to learners and employers exactly what capabilities each learning outcome represents, showcasing true value and supporting more precise recruitment and professional development decisions.

Implementation would begin by making skill metadata mandatory for all reviews of unit standards and skills standards, plus any new standards being created. This approach minimises additional developer workload since they should already understand the skills required for each learning outcome. For all new learning outcomes developed, skill metadata would be listed under the relevant outcome in the system.

Enhanced Recognition of Prior Learning

By providing learning outcome granularity down to the skill level, the system would dramatically improve recognition of prior learning, especially for learners transferring between providers. Every learning outcome achieved by a learner would be accessible to all providers. For learning outcomes with detailed skill metadata, this should eliminate RPL costs and allow learners to transition between providers without paying extra for recognition processes. This capability is particularly crucial as the Polytech restructure occurs as part of the vocational reforms, and has potential for higher education integration alongside vocational applications.

This approach positions New Zealand to lead internationally in learner-centred credential management, particularly crucial as the vocational education sector faces unprecedented transformation in 2026.

Applied Learning Qualifications (ALQ)

Research from India, the Philippines, and Spain demonstrates how education systems can structure for maximum flexibility while anticipating significant growth in lifelong learning. New Zealand currently lacks a national lifelong learning strategy or systematic approach. When contemplating a modular and dynamic system, ensuring it serves learners throughout their entire careers, rather than just initial education, we believe, is essential.

The ALQ Framework

We propose a structure exclusively available for lifelong learners called Applied Learning Qualifications (ALQs). With our proposed system including a strong learner-led element, this allows for the opportunity of exporting achievements into a structured container.

The New Zealand Qualifications and Credentials Framework use qualifications as containers already, where a “qualification formally certifies the achievement of a specified set of learning outcomes to a given standard”, with a minimum of 40 credits[155].

Utilising this qualification container concept, we propose that lifelong learners can 'stack' their achieved NZQA-accredited learning outcomes over a maximum seven-year period and receive recognition through ALQ issuance. This seven-year timeframe provides sufficient opportunity for working adults to accumulate meaningful learning while ensuring credentials reflect reasonably current competencies, aligning with international practices that typically range from five to ten years for modular credential accumulation.

An earlier iteration of our system design used the term Applied Learning Certificate (ALC) instead, but feedback indicated potential confusion with existing NZQCF Certificates at Levels 1-6. Since 'Qualification' doesn't exist at any NZQCF level per the July 2025 update, the ALQ designation provides recognition for authenticated learning from single or multiple training providers as a learning outcome collection.

The ALQ would be there exclusively for recognising lifelong learning. The proposed system can support learners in initial education through improved RPL and provider transfers because all learning outcomes will be registered in the system and trusted by NZQA, creating simpler pathways for learners regardless of their educational journey.

ALQ Structure and Requirements

ALQs will not be assigned specific qualification levels. Learners could undertake combinations from many different qualification levels within the NZQCF. As long as all learning outcomes are from accredited NZQA providers and total 40 credits (aligning with NZQCF qualification minimums), they can be issued an ALQ. The focus remains on recognising the learning itself rather than hierarchical positioning. To allow for practical flexibility, learners could apply up to 44 credits toward an ALQ, accommodating the fact that individual learning outcomes vary in credit value and requiring exactly 40 credits could prevent learners from including relevant achievements that push them slightly over this threshold.

Following stakeholder feedback, ALQs would allow for the incorporation of 'major' designations where at least 51% of the credits have learning outcomes which fall within the same subject field, using NZQA's 17 high-level classifications: Agriculture, Forestry and Fisheries; Arts and Crafts; Business; Community and Social Services; Technology; Core Generic; Education; Engineering and Technology; Health; Humanities; Law and Security;

[155] NZQA, The New Zealand Qualifications and Credentials Framework (July 2025)

Manufacturing; Māori; Planning and Construction; Sciences; Service Sector; and Social Sciences. The system would automatically detect a potential major and prompt learners to accept or decline this designation.

Each ALQ is unique to the learner's learning outcome selection. Learners can receive multiple ALQs over their lifetime - indeed this is the intention. To prevent minimal new learning between ALQs, no more than 15% of an ALQ can comprise learning outcomes already applied to a learner's previously issued ALQ. This 15% threshold allows for some overlap while ensuring each issued ALQ recognises a substantial additional learning achievement.

Costs and Funding

In terms of learner costs, we are proposing following the current NZQA Record of Achievement pricing model: learners can download free digital copies or receive one free paper copy when ordered within one year of ALQ recognition. Additional copies cost NZ$15.30 each, maintaining affordability while supporting system sustainability[156].

Funding for this expanded system should be managed by NZQA, recognising that alongside TEC, they represent the only major elements of New Zealand's vocational education system unchanged by the two major recent reforms. This proposed system design represents an opportunity for their reform - establishing a stronger, more holistic, and accessible platform that signals NZQA's expanded role in lifelong learning and its funding mechanisms.

A collaboration between NZQA and TEC may be useful to determine differentiated funding provisions that support both traditional qualifications and the proposed Applied Learning Qualification pathways, including the potential for learners to learn different sections of a qualification from different providers. To ensure equity and prevent barriers for disadvantaged learners, government and employer co-funding mechanisms should be explored, particularly for learners from low socio-economic backgrounds or those transitioning between careers, especially for those skillsets most in-demand. The funding model should support both the technical infrastructure and ongoing operational costs while maintaining the principle that learning recognition should remain accessible to all New Zealanders regardless of economic circumstances.

Potential Challenges

The proposal to attach detailed skill metadata to existing learning outcomes represents a significant undertaking. New Zealand's current system contains a significant amount of unit standards and skill standards, developed with varying approaches. Retrofitting these with granular skill descriptions would require extensive consultation with industry experts and educators to ensure consistency. Even with a phased approach starting with reviews and new standards, the inconsistency between detailed new standards and legacy ones could create quality disparities.

[156] NZQA, New Zealand Record of Achievement

System success depends on comprehensive participation from all registered training providers, yet many smaller establishments operate with minimal administrative infrastructure. The detailed reporting requirements may be viewed as burdensome rather than beneficial, requiring new software, staff training, and ongoing compliance monitoring. Providers may also resist sharing detailed learning outcome information, viewing transparency as potentially compromising competitive advantage. Without strong regulatory support and implementation assistance, participation could become fragmented.

While positioning NZQA and TEC as funding stewards offers institutional stability, the system's comprehensive scope presents significant ongoing costs that extend beyond traditional qualification funding models. The expanded infrastructure, detailed metadata requirements, and support for diverse learning pathways require sustained investment that may strain existing budgets. Coordinating funding across NZQA and TEC, while ensuring employer contributions don't shift costs onto learners, requires complex policy alignment that could delay implementation or compromise accessibility objectives.

Implementation Roadmap

The following proposed roadmap outlines a preliminary framework for system development, recognising that detailed planning would require extensive stakeholder consultation and technical assessment.

2026-2027 would be a perfect time to begin this transformation, as these years are already designated by government, NZQA, and TEC as transitional periods for moving from the current system to the industry-led model. This would provide an excellent foundation to integrate the proposed new system.

The ISB’s would require an immediate directive from NZQA that all new standards must include metadata requirements specifying skills per learning outcome. Given government, NZQA, and TEC statements about limited new programme and standards development during the transition years, this requirement would have minimal immediate impact while establishing the framework for future expansion.

Phase 1 (2026): Expand existing New Zealand Record of Achievement infrastructure to accommodate enhanced learning outcome storage. Begin pilot programmes with select providers to test data collection and integration processes. Establish metadata standards and templates for skill descriptions.

Phase 2 (2027): Launch mandatory metadata requirements for all new and reviewed standards. Begin systematic review of high-priority existing standards to add skill metadata. Develop ALQ framework and application processes.

Phase 3 (2028-2029): Full system launch with comprehensive provider integration. Begin issuing first Applied Learning Qualifications. Implement quality assurance mechanisms and

provider support systems. Monitor system effectiveness and refine processes based on early adopter feedback.

Phase 4 (2030+): Complete metadata retrofit of legacy standards. Evaluate potential integration with higher education systems. Assess international recognition opportunities and alignment with global frameworks.

ADDITIONAL RECOMMENDATIONS

During the course of the research and the development of the system design, a number of elements emerged that, although valuable, lay outside the scope of this initial study. These elements are presented here as additional recommendations. They are intended to complement the findings of this research and, in many cases, represent essential considerations for achieving its longer-term objectives.

A Strategic Platform Approach

Smaller providers face significant economic barriers in developing proprietary modules for every qualification they deliver. With the disestablishment of Te Pūkenga, the new organisations emerging from its breakup are also likely to encounter a period of considerable uncertainty and challenge. However, core work activities within the same occupation remain largely consistent whether performed in Northland, Wairarapa, or Southland, which presents a clear opportunity for strategic collaboration.
A comprehensive solution would be a centralised platform where all New Zealand providers could share online course offerings, creating a single access point for learners nationwide. This system could feature:

- Shared learning management capabilities
- Unified student records
- Integrated assessment tools
- Real-time credit transfer protocols

Such a platform would reduce duplication, increase efficiency, and expand learner access across regions. Most importantly, it would provide a sustainable foundation for innovation, ensuring that providers of all sizes can contribute to and benefit from a truly national system.

Digital Badges

Beyond ALQ utilisation for comprehensive learning recognition, individual learning outcome recognition can address situations in which learners possess learning outcome groups that they wish to share with employers, without sufficient credits for an ALQ, or when highlighting specific achievements. We propose that in the longer term, digital badges are

considered for integration within the system, enabling learners to access their learning records and share the information via the issuance of digital badges.

Digital badges represent a form of digital credential, which is defined as:

> "A digital record of focused learning achievements, verifying what the learner knows, understands and/or can do. The recognition of a piece of learning available online, usually in a digital certificate or digital badge format"[157].

Digital badges are defined as a:

> "clickable graphic that contains an online record of an achievement, the work required for the achievement, evidence of such work, and information about the organization, individual, or entity that issued the badge"[158].

While digital badge types and platforms vary, minimum requirements typically include learning piece descriptions (potentially where learning outcomes could be incorporated), a list of the skills which the learner has showcased via the achievement of the badge, and a list of how the learner has achieved the badge (assessment information).

Considerable development work would be required to determine badge scope, issuance criteria, and recognition frameworks. Critical questions include whether badges could incorporate multiple learning outcomes simultaneously—a capability essential to avoid prohibitive costs and administrative complexity for both providers and learners. We do however believe that this is a conversation worth considering as digital credentialing is growing, and the opportunity to embed within this proposed system would be an exciting addition.

CONCLUSION

This exploration of international approaches to dynamic, modular learning, combined with analysis of employer needs and stakeholder feedback, reveals a complex educational landscape where countries respond to similar workforce challenges through distinctly different implementation strategies. The research and stakeholder engagement process informed the development of a comprehensive system design that addresses New Zealand's specific challenges in recognising and transferring learning achievements across providers. This analysis distinguished between systems that are dynamic in delivery but not necessarily modular in structure, and those that are modular in content but not necessarily dynamic in their responsiveness – recognising that the ideal system would integrate both qualities effectively.

The development journey from initial framework restructure concepts through to the final Recognition Repository design demonstrates the value of iterative stakeholder engagement

[157] Stuart Martin et al, Learning for platform-based gig work: Exploring the value of micro and digital credentials
[158] Stuart Martin et al, Learning for platform-based gig work: Exploring the value of micro and digital credentials

in refining policy proposals. Initial feedback revealed concerns about terminology confusion, unclear differentiation from existing systems, and implementation challenges that fundamentally shaped the evolution toward leveraging existing NZQA infrastructure rather than creating entirely new frameworks. This process highlighted how micro-credentials and modular learning concepts, despite definitional ambiguity, have catalysed important policy conversations and created momentum toward more flexible, responsive learning systems.

Several critical tensions emerged from both international examples and stakeholder feedback that directly influenced the final system design. The balance between flexibility and coherence required robust frameworks to maintain meaningful pathways while enabling personalisation. The relationship between educational institutions and workplaces needed careful consideration of how dynamically systems could respond to changing needs. The balance between learner autonomy and guidance influenced decisions about professional assessment versus self-directed navigation. Finally, tension between standardisation and localisation shaped choices about maintaining national consistency while allowing regional adaptation.

Our proposed system design directly addresses these tensions, leveraging existing NZQA infrastructure while fundamentally expanding its scope and functionality. By storing every learning outcome earned by New Zealand learners with detailed skill metadata, the system creates a foundation for truly dynamic, modular learning pathways that maintain quality and coherence. The Applied Learning Qualification structure provides a unique solution for lifelong learning recognition, allowing learners to 'stack' achievements from diverse providers and timeframes into meaningful credentials that signal continuous professional development.

This system design positions New Zealand to lead internationally in learner-centred credential management, particularly crucial as the vocational education sector faces unprecedented transformation in 2026. The comprehensive benefits - from streamlined credit recognition transfer to granular employer visibility of candidate competencies - demonstrate how modular approaches can enhance rather than fragment educational quality. The proposed funding model, positioning NZQA and TEC as stewards of expanded lifelong learning provision, provides institutional stability while enabling innovation.

The additional recommendations for a strategic platform approach and digital badges integration further strengthen the system's potential impact. A centralised platform where providers can share online course offerings would reduce duplication and increase efficiency, particularly valuable for smaller providers facing economic barriers. Digital badges provide granular recognition capabilities that complement both traditional qualifications and ALQs, creating a comprehensive ecosystem of learning recognition.

However, the challenges identified - metadata retrofit complexity, provider integration barriers, and sustainable funding requirements - underscore the need for careful implementation planning and strong stakeholder engagement. The proposed phased roadmap, beginning with the 2026-2027 transitional period, provides a practical framework for managing these challenges while building system credibility and adoption.

As New Zealand prepares for significant vocational education reforms, this proposal offers a pathway toward a truly integrated, responsive learning system that maintains educational coherence while enabling the flexibility and personalisation that modern learners and employers require. The system's success will depend not just on technical implementation, but on creating genuine value for all stakeholders - learners seeking recognition for diverse learning journeys, employers requiring clear signals of competency, and providers needing efficient pathways for learner progression. By building on existing infrastructure while embracing innovative approaches to learning recognition, New Zealand can establish a world-leading model for dynamic, modular education that serves learners throughout their careers and responds effectively to rapidly evolving workplace demands.

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