OECD Education Policy Perspectives

No. 39

Micro-credential innovations in higher education: Who, What and Why?

This Education Policy Perspective is Part A of a two-part series on micro-credentials (Part B can be found at (OECD, 2021[1])). It contributes new empirical evidence on the current offer of micro-credentials across OECD jurisdictions, and provides an account of what is known about the costs and benefits of short learning programmes offered by higher education institutions. The evidence presented can support the work of policy makers who wish to build upon the momentum of recent innovations spurred on by the pandemic, and more deeply understand the models of provision for micro-credentials currently in place across OECD jurisdictions.

Key messages from this Education Policy Perspective:

- There is an increasing learner interest in micro-credentials, and growing activity related to micro-credential development among governments and providers.
- In higher education institutions, the term “micro-credential” is not in widespread use. Nevertheless, higher education institutions are offering a diverse range of short learning programmes that would meet the criteria of micro-credentials programmes as commonly defined.
- Higher education institutions tend to develop short learning programmes for advanced, postgraduate and professional education, and short learning programmes provide them with a source of revenue that is less regulated by governments.
- Online provision of micro-credentials is widespread. Digital learning platforms are becoming an increasingly important channel for the delivery of micro-credential programmes and the COVID-19 pandemic has further strengthened their position. The past year has also seen a strengthening of “own-brand” online learning ecosystems and environments provided by private companies whose primary business is not education and/or training.
- Learners who avail of micro-credential programmes provided by higher education institutions tend to be more educated, more skilled and have greater levels of financial and social support from employers.
- Evidence on the outcomes of micro-credentials is limited, although some studies indicate that shorter programmes do provide at least a temporary labour-market boost, and stacking micro-credentials may improve prospects in the labour market.

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1. Micro-credentials – a race between innovation and public regulation

Micro-credential innovations are gathering pace across education systems

In the last decade, there has been a proliferation of learning programmes and credentials positioned as "alternatives" to traditional formal education programmes. These alternative credentials have been defined by the OECD as "*credentials that are not recognised as stand-alone formal educational qualifications by relevant national education authorities*" (Kato, Galán-Muros and Weko, 2020[2]). Alternative credentials include academic certificates, industry certifications and digital badges.

The expansion of alternative credentials has taken place in a context of increasing cost of higher education for both learners and providers, rapid labour market changes accelerating skills obsolescence and growing demand for more flexible learning opportunities. One form of alternative credentials that is gaining increasing policy attention is the micro-credential. Many definitions of the term are currently in use, and often contradict each other, as shown in Table 1.

Table 1. Selected definitions of micro-credentials

Source	Definition
European Commission (draft definition)	A micro-credential is a proof of the learning outcomes that a learner has acquired following a short learning experience. These learning outcomes have been assessed against transparent standards. The proof is contained in a certified document that lists the name of the holder, the achieved learning outcomes, the assessment method, the awarding body and, where applicable, the qualifications framework level and the credits gained. Micro-credentials are owned by the learner, can be shared, are portable and may be combined into larger credentials or qualifications. They are underpinned by quality assurance following agreed standards (European Commission, 2020[3]).
BloomBoard	Micro-credentials are a form of micro-certification earned by proving competence in one specific skill at a time, via a portfolio of evidence, created through classroom practice (BloomBoard, 2021[4]).
European University Association	A micro-credential is a small volume of learning certified by a credential (Cirlan and Loukkola, 2020[5]).
International Council for Open and Distance Education	A credential issued for a relatively small learning project that consists of several modules in a given subject (ICDE, 2019[6]).
MicroHE	A micro-credential is a sub-unit of a credential or credentials that could accumulate into a larger credential or be part of a portfolio. Examples are Verified Certificates, Digital Badges, MicroMasters, and Nanodegrees (MicroHE, 2019[7]).
New Zealand Qualifications Authority	A micro-credential certifies achievement of a coherent set of skills and knowledge; and is specified by a statement of purpose, learning outcomes, and strong evidence of need by industry, employers, iwi and/or the community. They are smaller than a qualification and focus on skill development opportunities not currently catered for in the regulated tertiary education system (New Zealand Qualifications Authority, 2021[8]).
Quacquarelli Symonds	A micro–credential is a sector-endorsed short course that provides the recipient with specialist skills (Frances, 2020[9]).
State University of New York	Micro-credentials verify, validate, and attest that specific skills and/or competencies have been achieved. They differ from traditional degrees and certificates in that they are generally offered in shorter or more flexible timespans and tend to be more narrowly focused (State University of New York, 2021[10]).

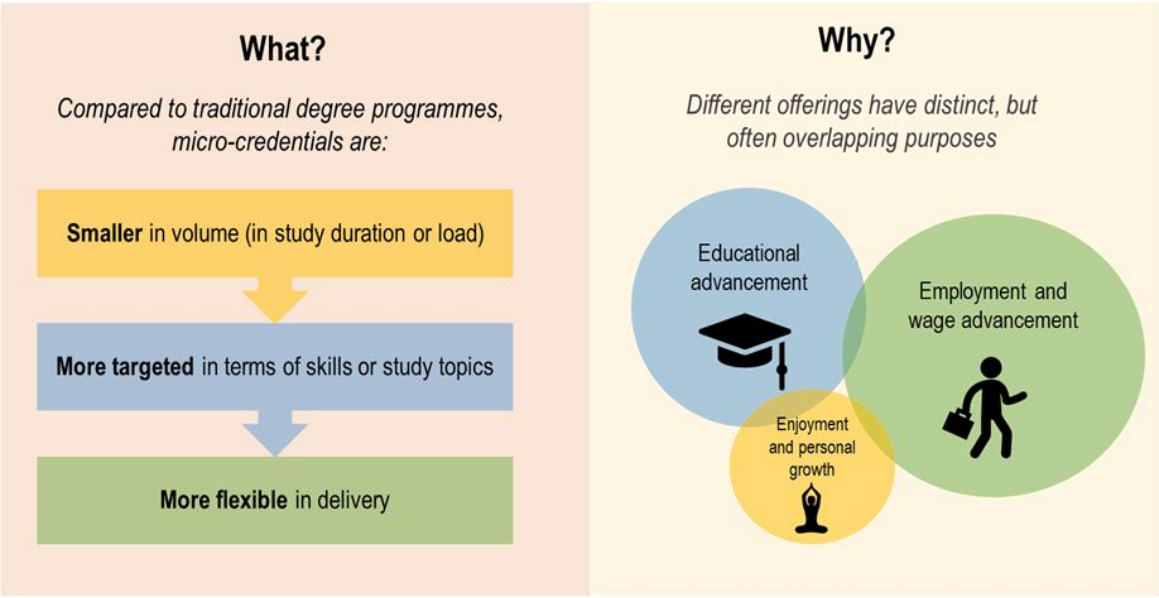
Most definitions of micro-credentials denote **an organised learning activity with an associated credential** – the credential recognises a skill or competency that has been acquired through an organised learning process and validated through an assessment. Consequently, the term "micro-credential" is commonly understood to refer to both the credential itself and the education or training programme which leads to the credential award. The association of micro-credentials with a specific organised learning

activity distinguishes them from badges, which are intended to visually communicate the achievement of a specific skill, knowledge or experience (Kato, Galán-Muros and Weko, 2020[2]).

While there are disparities across emerging definitions of micro-credentials, there are also some common factors. In the majority of definitions, the duration of the education programme associated with micro-credentials is described as "short" or the volume of learning associated with the credential as "small". Micro-credential programmes are often designed to be more flexible in their delivery, compared to traditional degree programmes. As a result, it has been argued that the term "small" is most appropriate in order to maximise inclusiveness in the definition of micro-credential programmes, to allow for cases where the study load is small but the period of study may be learner-directed or spread over a long period (MICROBOL, 2021[11]).

Many definitions identify education programmes leading to micro-credentials as being targeted in nature, focusing on the acquisition of knowledge on one topic of study, or the accomplishment of one skill. This contrasts with the holistic nature of degree programmes, which are designed to provide learners with a well-rounded and complementary set of knowledge and skills in a particular field of study. Learners may enrol in micro-credential programmes as a stepping stone to achieving a degree, but may also do so for enjoyment, as a means to further an interest or a skill not related to their career, or in order to develop professionally. Moreover, these purposes often overlap, particularly for adult learners who have already been in the workplace for many years or have previously attained higher education (Figure 1).

Figure 1. What are micro-credentials, and what are they for?



Source: Authors' elaboration.

Policy makers have come to see micro-credentials as a way to provide learners with important opportunities for academic advancement, personal development, upskilling and reskilling. Micro-credential frameworks have been identified as a means to bring greater coherence to the diverse set of short non-degree learning programmes across higher education systems and even national borders. Micro-credentials are also recognised by governments as a potential means to support improved access

to higher education, including for learners from underserved groups. For example, the Rome Ministerial communiqué adopted in November 2020 by the 49 European Higher Education Area (EHEA) countries, identified micro-credentials as a conduit for "*creating a supportive environment…that enables higher education institutions to tailor education provision to the needs of different types of learners (lifelong learners, part-time learners, learners from under-represented and disadvantaged groups) and to build a culture for equity and inclusion* " (EHEA, 2020[12]).

A range of desired characteristics for micro-credentials have been recommended by various actors, including proposals for micro-credentials to be made available in digital format for easy portability, to be stackable into qualifications, and to be associated with transparent, validated assessment instruments. Other characteristics considered important are the existence of robust quality assurance mechanisms for micro-credentials, and employer involvement in programme design and/or approval (Figure 2). The extent to which each of these characteristics is assimilated into micro-credential offerings, or will be in the future, depends greatly on their intended purpose; the characteristics of micro-credentials will ultimately be driven by the diverse needs and actions of learners, providers and governments.

Figure 2. Some desired characteristics of micro-credentials

Source: Adapted from selected micro-credential frameworks (see Table 1).

Several challenges stand in the way of the realisation of the future vision of policy makers for micro-credentials. The central challenge is that there is a lack of common agreement about how micro-credentials should be defined, and how the concept of a micro-credential integrates with existing offerings of small-scale, targeted, certified learning programmes within education systems. Recent studies of national and institutional micro-credential initiatives have shown that micro-credentials are being implemented in many ways. The study load associated with education programmes leading to micro-credentials, the extent of targeting of learning material and the certification process varies extensively across and even within institutions and systems. A lack of knowledge and common understanding about micro-credentials has been recognised as a central challenge to their coherent implementation across higher education systems (Orr, Pupinis and Kirdulytė, 2020[13]; Lantero, Finocchietti and Petrucci, 2021[14]).

A lack of knowledge and common understanding has been recognised as a central challenge to the coherent implementation of micro-credentials across higher education systems.

There is also a lack of widespread agreement on how micro-credentials should be situated with respect to existing qualifications. In the International Standard Classification of Educational Qualifications (ISCED) a qualification is defined as an award leading to the completion of an entire education programme at a specific level of education, or completion of a stage of a wider education programme. Thus, micro-credentials based on stand-alone education programmes not sufficient for level completion and those not clearly linked to a wider educational programme currently have no defined place in the ISCED qualifications classification. This lack of standing within existing frameworks limits the interpretability of micro-credentials beyond specific institutions or collaborative networks, or (at best) national contexts. Addressing these challenges to articulation will require concerted and co-ordinated efforts from providers and governments (OECD, 2021[1]).

Providers and delivery modes are multiplying

Micro-credentials may be offered by a range of organisations, not all of which are traditional providers of training and education. Micro-credential providers include schools, higher education institutions, and private education and training providers. Providers also include specialised learning platforms, collaborative initiatives that focus on particular professions and occupations, and a growing number of companies and professional associations that design their own competency-based offerings. Finally, public and non-profit bodies such as charities, government departments and international organisations may offer micro-credentials related to their missions.

In some jurisdictions, micro-credentials are being proposed by governments and institutions as a **completely new type of education and training offering**. For example, New Zealand has created a new category of qualifications specifically called micro-credentials, subject to government accreditation and registration (New Zealand Qualifications Authority, 2021[8]). Education institutions are also increasingly developing new micro-credential frameworks through institution alliances and partnerships with organisations outside the higher education sector.

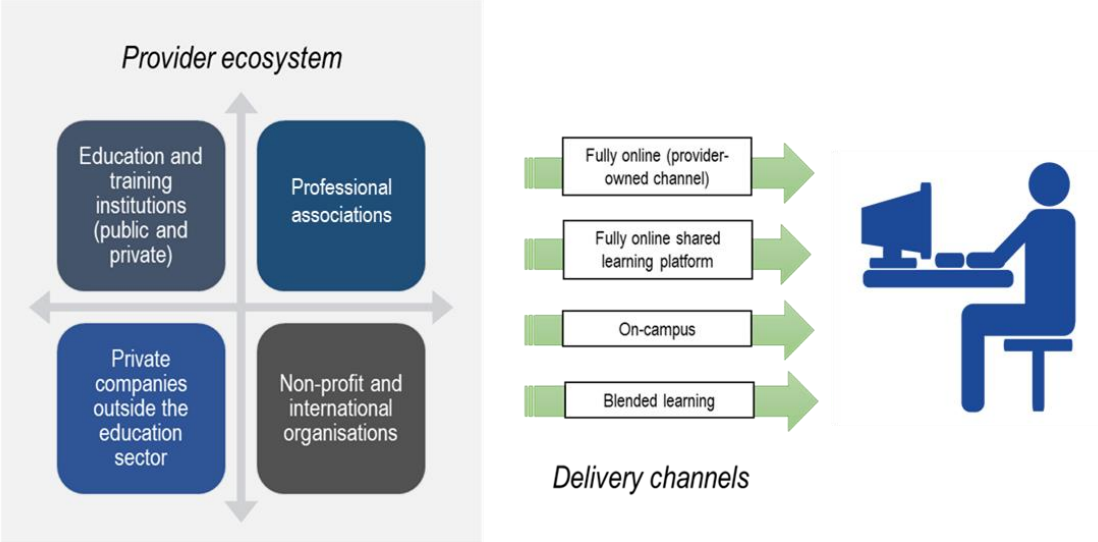
At the same time, the stated objectives of micro-credentials are similar to those of existing short, certified education programmes oriented towards vocational and continuing education and lifelong learning – building new skills, professional development and supporting the societal objective of greater levels of educational opportunity. Thus, micro-credential development might also efficiently proceed by re-branding and, in some cases, **reorienting traditional continuing education and training** offers, in an attempt to bring them within a widely-recognised framework.

Micro-credentials are delivered through a range of different channels. Many micro-credentials are school- or campus-based. However, the increasing digital maturity of education institutions has increased their capacity and interest in offering micro-credentials wholly online, in order to reach a wider audience of potential students. Online delivery channels for micro-credentials may be specific to the provider or shared with other providers. The past decade has seen the emergence and rapid expansion of **online learning platforms**, allowing educational institutions and other providers to reach a wider audience for their content,

and provide a means for learners to easily compare and access micro-credential offerings from a range of providers. Online learning platforms are often used to provide micro-credentials through asynchronous learning, creating even more flexibility for learners. While initially such learning platforms were focused on providing Massive Open Online Courses (MOOCs), the model has largely been monetised, allowing them to achieve a stable business model by offering education products at a wide range of prices (Eckstein, 2021[15]).

Figure 3 summarises the main categories of micro-credential providers and delivery channels. Each of these providers and channels has strengths and weaknesses regarding the utility and articulation of their offerings and their accessibility to a wide range of learners. At the same time, technological developments and cross-sector collaboration between providers are blurring the distinctions between different programme and provider types. As a result, the traditional, in-person, one-to-many relationship between education providers and learners is being gradually overturned in favour of an ecosystem where novel connections between providers and learners are being formed, and interactions increasingly take place online.

Figure 3. Micro-credential provider ecosystem and delivery channels



Source: Authors' elaboration. Icon image credit: Pixabay/Clker-Vector-Images.

The following sections present the results of some new research on the offer of micro-credentials. They focus primarily on the provision of micro-credentials in higher education, while acknowledging that micro-credentials are offered by many other types of providers. The analysis is supported by a review of offerings of individual higher education institutions, data harvested from online learning platforms and a synopsis of recent government-supported micro-credential programmes (Sections 2 and 3). The most recent developments are emphasised, providing an account of the rapidly developing innovations in practice since the onset of the COVID-19 pandemic. The final section (Section 4) includes an overview of what is known about learners in micro-credential programmes, and a summary of available evidence about the costs and benefits of shorter higher education programmes.

2. Micro-credential initiatives in higher education institutions

Micro-credentials are finding a place in the higher education landscape

Micro-credentials are likely to play different roles within higher education systems, depending on their specific context, structure, traditions and the characteristics of the wider education and training system. For example, while some OECD jurisdictions (such as Australia and Ireland) have a well-developed "further education" sector separate from higher education providing postsecondary training, in other jurisdictions (such as the United States), this function is largely integrated within the higher education sector.

Higher education institutions offer micro-credentials for several reasons. Early studies note that one of the main reasons is their aim to increase their visibility and reputation (Kato, Galán-Muros and Weko, 2020[2]). With regard to MOOCs, major driving factors that have been frequently cited are the cost savings associated with materials reutilisation, the reduction in the need for facilities, and the larger potential pool of learners leading to recruitment efficiencies (Hollands and Tirthali, 2014[16]). In addition, micro-credentials allow for small-scale experimentation of new pedagogies and technologies, including innovations in teaching and learning and more flexible delivery modes. Finally, micro-credentials can be a means to generate additional revenue for higher education institutions (Kato, Galán-Muros and Weko, 2020[2]).

More recently, leaders of higher education institutions highlighted a need to increase their responsiveness to learners' and labour markets' demands as one of their key motivations to offer micro-credentials (OECD, 2021[1]). Learners require regular upskilling through their adult lives, in a context where more dynamic career pathways are becoming the norm, and tasks associated with particular roles evolve in response to the integration of technology. These trends are putting increasing pressure on adult learning systems to become more adaptive to changing demands and more "future-ready" (OECD, 2019[17]). It is well recognised that participation in continuous learning can help learners to achieve greater levels of personal fulfilment and growth. Participation in continuous learning is also associated with positive social outcomes, such as improved health and enhanced social inclusion (OECD, 2020[18]). Micro-credentials can play a role in supporting more flexible and tailored interactions between learners and higher education systems.

An ongoing topic of debate is the extent to which higher education programmes leading to micro-credentials are, or should be, classified as formal education. Many of the current non-degree programmes on offer in higher education institutions across OECD countries take place in the space of non-formal education. The defining characteristic of non-formal education is that it is an addition, alternative and/or complement to formal education within the process of lifelong learning of individuals. Non-formal education mostly leads to qualifications that are not recognised as formal or equivalent to formal qualifications by the relevant national or sub-national education authorities, or are not considered qualifications at all (OECD/Eurostat/UNESCO Institute for Statistics, 2015[19]).

The development of coherent micro-credential frameworks could therefore provide a means of organising and orienting existing non-formal education programmes across higher education systems by providing a basis for their classification and comparison. At the same time, many stakeholders and policy makers envisage a process of quality assurance and national recognition of micro-credentials, thus integrating them more deeply into the formal education system. Some recent policy initiatives related to micro-credentials aim to provide a clearer articulation of the specific function and status of micro-credentials within national quality assurance and qualification frameworks in order to support their acceptance among learners and employers (OECD, 2021[1]).

Micro-credentials in European higher education institutions

The concept of micro-credentials is gaining traction among higher education institutions and governments in Europe. Recent European policy initiatives and research projects are preparing the ground for a broader and more coherent establishment of micro-credentials across Europe. Europe-wide initiatives such as the European Skills Agenda, the 2020 Osnabrück Declaration on vocational education and training (VET) policy and the European Union objective to achieve the European Education Area by 2025 all highlight micro-credentials as a way to support effective lifelong learning (European Commission, 2020[20]; European Commission, 2020[21]; Osnabrück Declaration, 2020[22]).

The European Union view of the value of micro-credentials is broad; micro-credentials can be used to successfully upskill and reskill professionals, support personal development, and increase learners' potential for education advancement by providing flexible and permeable learning opportunities (European Commission, 2020[3]). The Council Resolution on a strategic framework for European co-operation in education and training towards the European Education Area and beyond (2021-2030) states that "*exploring the concept and use of micro-credentials can help widen learning opportunities and could strengthen the role of higher education and VET in lifelong learning by providing more flexible and modular learning opportunities, and offering more inclusive learning paths.*" (Council of the European Union, 2021[23]).

Several European Union-supported research projects are ongoing or recently completed, exploring ways to build a common European framework for micro-credentials. For example the Erasmus+ MicroHE project developed guidance on micro-credentials recognition in Europe through interviews with stakeholders, expert workshops and peer review processes (MicroHE, 2019[7]). The ongoing Erasmus+ MICROBOL project is investigating how to apply Bologna tools, including the Lisbon Recognition Convention, for micro-credentials offered by higher education institutions (MICROBOL, 2021[11]). In addition, individual European governments are currently preparing policies for micro-credential development. For example, according to a survey carried out by the MICROBOL project, 14 out of 34 responding countries have already implemented policies related to the recognition of micro-credentials, while eight further countries have the topic currently under discussion (Lantero, Finocchietti and Petrucci, 2021[14]).

Micro-credential development is also proceeding through the EU's European Universities initiative, a new model of transnational institutional alliances that is focused on strengthening co-operation and improving the quality and competitiveness of higher education institutions in Europe (European Commission, 2021[24]). Most of them have the development of lifelong learning at the core of their joint long-term strategy, such as the European Consortium of Innovative Universities (ECIU), the EuroTeQ Engineering University and the European University for Well-Being (EUniWell), which are actively collaborating on joint micro-credential offers (OECD, 2021[1]).

As governments and higher education institutions design and develop micro-credential offerings, they may be hampered by a limited understanding of different models of existing provision that could serve as a comparison point or an inspiration for their own plans. This is due to the pace of development of micro-credential innovations and a lack of standardised information on the purposes for which micro-credentials are being used, and the specific needs for learning and development that they are fulfilling. While many case studies of specific initiatives have been described, there have been few systematic reviews of micro-credential initiatives across a range of higher education institutions and countries.

A large share of European higher education institutions offer targeted certified short learning programmes that meet the basic criteria to be classified as micro-credentials. These programmes are labelled and branded by institutions in different ways (for example, "continuous education" or "specialisation diploma").

However, in the vast majority of cases these programmes do not carry the label of "micro-credential" - it is an emerging term, and up until recently has not been in widespread use across higher education systems in Europe. Thus, the OECD team devised a methodology to systematically review the characteristics of higher education short programme offerings that are "in the micro-credential space" in a sample of higher education institutions across Europe. Box 1 describes the methodology used to carry out the review, and the parameters for including programmes in the analysis.

Box 1. Developing empirical evidence on non-degree programmes in European higher education systems

The OECD Higher Education Policy Team conducted a review of short, targeted, certified programme offerings in **84** higher education institutions across **21** European OECD countries (four institutions in each country). The methodology for the analysis entailed:

1. Selecting a set of European countries that reflect the broad range of characteristics of higher education systems in Europe.
2. For each country, identifying and selecting the largest two institutions in the university sector, and the largest two institutions in the technological/professional/vocational sector. The largest institutions were defined in terms of the size of their overall enrolments at ISCED 5-7. In countries with a unitary system (i.e. no binary division in institution types), the four largest institutions were chosen, based on overall ISCED 5-7 enrolments. Annex A provides the entire sample set of higher education institutions reviewed during the exercise.
3. Reviewing the website of each institution to identify **short, certified non-degree education programmes** in place in each of the institutions. In this context, "programmes" were defined as **a grouped set of individual non-degree courses, offered by the institution under a common label or brand**, such as "university diploma" or "postgraduate certificate". Programmes were included in the analysis if they had elements that could contribute to educational advancement or professional development, and if the volume of learning entailed less than or equal to the equivalent of one year of full-time study (i.e. 60 European Credit Transfer and Accumulation System [ECTS]).

Short programmes that are mainly targeted towards learning for enjoyment were not included (for example, lifelong learning for "hobby" purposes, evening classes and seminars offered on special interest subjects, or "universities of the third age" programmes for retired senior citizens). Programmes and courses aimed solely at existing students and academic researchers were also excluded (e.g. summer schools).

The programmes were coded according to the extent to which they are expressed in a "common currency" (i.e. ECTS credits), the range of ECTS credits associated with courses offered under the initiative, and the target education level of the courses offered (undergraduate, postgraduate, both or not specified).

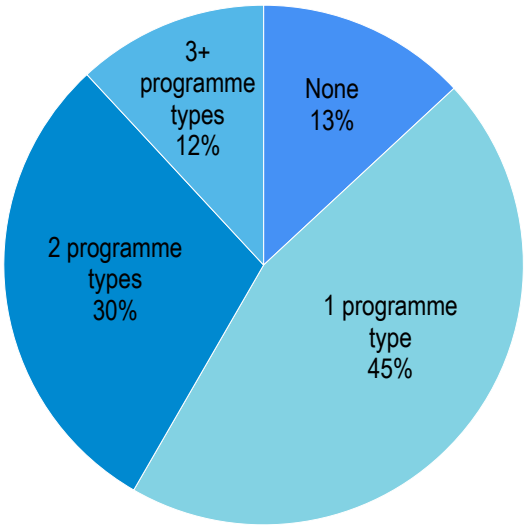
The exercise resulted in the identification of **118** distinct short certified non-degree programmes in operation across the sample set of institutions, and provided additional insights on the extent and type of micro-credential activity across Europe.

Note: A number of mergers and institution reclassifications were identified among the reviewed sample of institutions since the last update of the European Tertiary Education Register (ETER) database in 2016. See Annex A for more details.

Across the entire sample set of institutions, it was found that the term "micro-credential" was generally not being used to describe any of the identified short programme offerings. Of the entire sample, only two institutions were using this specific label or a similar one to describe a short programme initiative – the micro-credit (*microkraad*) programme of the University of Tartu in Estonia, and adult education micro-credentials (*micro-tanúsítványok*) in the Budapest University of Technology and Economics in Hungary. Instead, a range of other terms are in use to describe short higher education programmes (Table 2). **Nevertheless, for brevity and simplicity, the term "micro-credential programmes" is used throughout the remainder of this section to analyse the practices of the sample set of institutions.**

Figure 4 shows the extent of the activity concerning micro-credential programmes across the sampled institutions. The vast majority of institutions in the sample had at least one type of micro-credential programme, each of which contained a number of individual courses. Only 13% of the institutions appeared not to offer short programmes at all, while 12% of the sampled institutions offer at least three distinct micro-credential programme types. Overall, institutions in Europe seem to be making extensive use of short programmes to supplement their traditional degree offerings, or in some cases, to certify completion of elements of a degree programme.

Figure 4. Number of micro-credential programme types identified in each higher education institution in the sample set

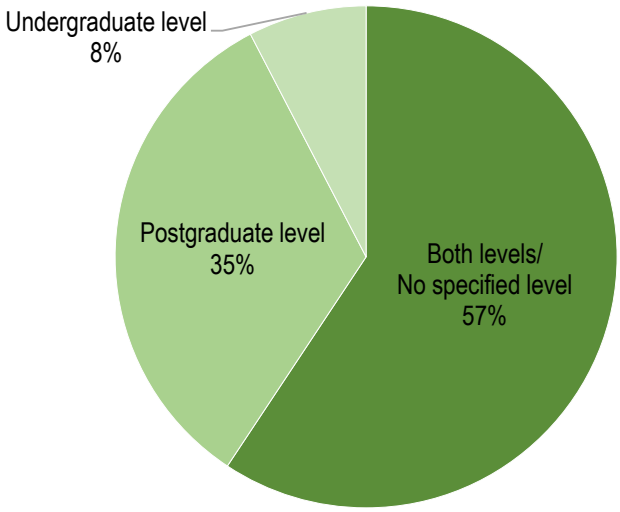


Source: Based on a sample of 84 European higher education institutions (as of May 2021). See Box 1 and Annex A for more details.

The set of micro-credential programmes identified tend not to be easily classifiable at distinct levels of higher education, unlike traditional degree programmes. The majority of micro-credential programmes were either not specific about the targeted level of higher education (i.e. undergraduate or postgraduate) or individual courses offered within the programme were mixed in terms of the level of education delivered. Many of the programmes without specific indication of a level were training programmes, or programmes supporting increased specialisation of professionals in a specific field. Of the remaining programmes, most were aimed at the postgraduate level, in the form of various advanced, professional or specialised training courses, some of which provide pathways to a master's degree. In contrast, micro-credentials aimed

specifically at the undergraduate level appear relatively rare, with only a very limited number of programmes in place across the sample of institutions reviewed (Figure 5).

Figure 5. Micro-credential programmes in the sample set of higher education institutions by targeted level of higher education



Source: Based on a sample of 84 European higher education institutions (as of May 2021). See Box 1 and Annex A for more details.

The lack of short programmes specifically aimed at the undergraduate level may be a cause for concern from an inclusiveness perspective. It gives a tentative indication that micro-credential programmes are primarily being developed within higher education institutions for the benefit of learners who already have a higher education and less as a means to support wider access to higher education. Without specific policies in place, this may lead to a situation where learners who are already advantaged in terms of education and professional status may benefit disproportionately from micro-credentials offered in higher education (OECD, 2021[1]). At the same time, a range of promising initiatives were identified that can facilitate increased participation in higher education, particularly in the Nordic countries (Box 3).

Table 2 provides a classification of micro-credential programmes based on the features of the 118 programmes identified in the sample of European institutions. The typical characteristics of the identified programme types are cross-mapped against some of the desired micro-credential characteristics specified in Figure 2. In total, eight types of micro-credential programmes can be distinguished, each with a distinct set of typical characteristics.

Table 2. Typology of identified micro-credential programmes in European higher education institutions

	Programmes typically have the following characteristics….					
Programme type	Stackable	Nationally recognised certification	Educational orientation	Professional orientation	Statements of study credits in common currency	Example programmes from the sample set
Individual courses and modules from larger programmes	Yes	No	Yes	No	Yes	Free-standing courses *(University of Stockholm)*, Single-module courses *(Munster Technological University)*, Master's degree modules *(Baden-Wuerttemberg Cooperative State University)*
Extension and complementary courses for existing students (may also be offered externally)	No	No	Yes	Yes	Yes	Extension curricula *(University of Vienna)*, Complementary Certificates *(University of Geneva)*, UCL Extend *(University of London)*
Specialisations for the acquisition of specific knowledge and/or skills	No	No	No	Yes	Yes	Specialisation Diploma *(University of Seville)*, Specialisation Courses *(University of Porto)*, Professional Diploma *(University College Dublin)*
Continuing professional development and training courses	No	No	No	Yes	No	Permanent training diploma *(Complutense University)*, Professional continuous training *(University of Helsinki)*, Specialised training *(Budapest University of Technology and Economics)*
Continuing education and lifelong learning courses	No	No	Yes	No	No	Continuous education *(National and Kapodistrian University of Athens)*, Lifelong learning programme *(Aalto University))*
MOOCs and asynchronous learning programmes	No	No	Yes	Yes	No	MOOCs (*Utrecht University)*, Self-learning (Selbstlern) (*University of Hagen)*
Institution-specific degrees and diplomas	No	No	Yes	Yes	Yes	University Certificate *(Lille University)*, Higher University Course *(University of Barcelona)*
Postgraduate sub-degree programmes	Yes	Yes	Yes	Yes	Yes	Postgraduate certificate *(University of Birmingham)*, Postgraduados *(Lisbon Polytechnic Institute)*

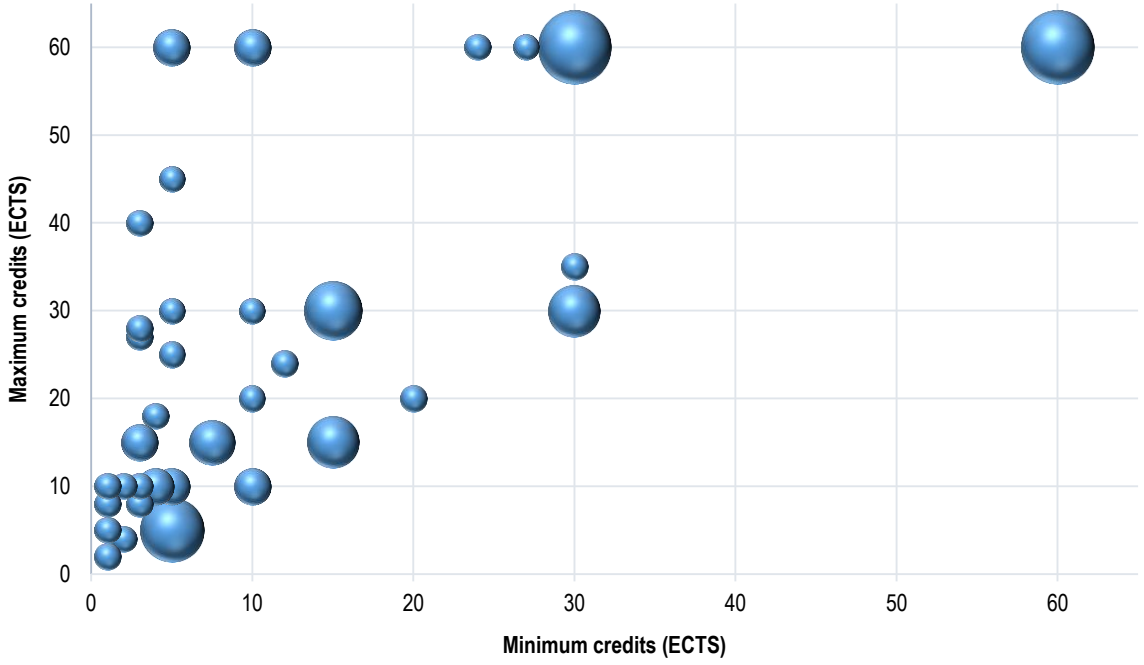
Source: Based on a sample of 84 European higher education institutions (as of May 2021). See Box 1 and Annex A for more details.

In a majority of the identified micro-credential programmes across Europe, the associated study load of the courses are largely expressed in a "common currency" of academic credits. Overwhelmingly, where such a currency is specified, it is expressed in ECTS credits, the credit system recognised throughout the

European Higher Education Area. In total, 72 of the 118 identified micro-credential programmes had a clear statement of study credits associated with individual courses. This is a positive finding with respect to improving the articulation of micro-credentials across institutions and jurisdictions. It indicates that at least there can be a common understanding of how much study and workload was required of the learner to achieve the credential in each case – a fundamental requirement to create possibilities for credit transfer and recognition.

At the same time, in most cases, the amount of study credits associated with individual offerings within micro-credential programmes is not standardised. A wide variety of credits were associated with courses not only within institutions but within individual micro-credential programmes. Figure 6 shows the range of ECTS available for courses within each identified micro-credential programme. The courses on offer ranged in study load from 1 ECTS to 60 ECTS (i.e. the equivalent of one year of full-time study).

Figure 6. Range of ECTS study credits within a sample of 72 micro-credential programmes across European higher education systems



Note: The bubbles show the minimum and maximum ECTS credits offered on courses within each identified micro-credential programme type. The size of the bubble indicates the relative number of programmes with each ECTS range, with the smallest bubble size equal to one programme and the largest bubble size equal to eight programmes. Credits stated in national credit currencies have been converted to ECTS.
Source: Based on a sample of 84 European higher education institutions (as of May 2021). The data in the chart refer to the 72 micro-credential programmes identified in the sample of institutions having specified study credits. See Box 1 and Annex A for more details.

Notwithstanding the wide variety of ECTS associated with micro-credential offerings, there are some examples of commonalities in ECTS load across a range of programmes, institutions and even countries. The most prominent of these examples is a set of stackable standardised postgraduate qualifications with similar characteristics, that can be found in institutions in a number of jurisdictions including the Flemish Community of Belgium, Scotland and Switzerland (Box 2).

Box 2. Stackable short postgraduate programmes with common characteristics across jurisdictions in Europe

Institutions in a number of European jurisdictions offer a structured pathway towards stacking short postgraduate qualifications, with similar ECTS across jurisdictions and institutions for each qualification. Though these qualifications are not generally labelled as micro-credentials within national systems, they fulfil the key intended characteristics of micro-credentials, being short in duration, targeted to a specific topic, and often more flexible in delivery than longer programmes.

In **Switzerland**, many institutions offer Certificates of Advanced Studies (CAS), nationally recognised postgraduate qualifications that require at least 120 contact hours with students, a written exam, and may also have other requirements depending on the specific programme. A typical CAS has 15 ECTS and is aimed at professionals who are looking for upskilling or increased specialisation in a given subject area. It is possible in some cases to progress from the CAS to a Diploma in Advanced Studies (DAS), which typically requires the equivalent of 30 ECTS of study, in addition to a dissertation. In some instances, those with a DAS may also progress to a Master's in Advanced Studies (MAS).

Scotland has a similar structure of stackable postgraduate qualifications. Postgraduate Certificates and Postgraduate Diplomas are short programmes offered at the postgraduate level in Scotland (Scottish Credit and Qualifications Framework [SCQF] level 11). Postgraduate certificates require a completion of 60 credits in total (30 ECTS) of which 40 credits (20 ECTS) must be at SCQF Level 11. The Postgraduate Diploma requires 120 credits of study (60 ECTS) of which 90 credits (45 ECTS) must be at SCQF Level 11.

Institutions in **the Flemish Community of Belgium** also offer a range of postgraduate certificates and postgraduate diploma programmes, typically requiring 30 ECTS and 60 ECTS of study load respectively. These programmes may be stacked from certificate to diploma to masters.

Another type of micro-credential initiative is also generally targeted at postgraduate study, but has a design and/or certification that is specific to the institution. Such offerings can take many forms, and (explicitly or implicitly) rely on the reputation of the institution and the quality of its education to signal the value of the resulting certification. For example, the University of Seville in Spain offers so-called "own degrees" that are not officially recognised or funded by the government of Spain. Such programmes can be offered up to master's level. Similarly, Lille University in France proposes "*certificats universitaires*" and "*diplômes universitaires*" - short programmes that are funded fully by learners and recognised as institution-level rather than national-level qualifications.

Micro-credential programmes are also often intended by institutions to provide highly specialised and advanced education to skilled professionals who already have undergraduate, and even postgraduate, qualifications. For example, the University of Porto in Portugal offers "Advanced Studies" programmes of approximately 30 ECTS, where the programme content is classified at the 3rd cycle (doctoral) level. In Swiss institutions, many of the Advanced Studies programmes are aimed at those who already have a master's degree, in fields such as healthcare, law and management.

While there is a comprehensive range of postgraduate micro-credentials programmes offered across the sample set of higher education institutions, programmes focused specifically at the undergraduate level appear much less common. One type of provision is complementary or extension curricula, aimed at providing a more interdisciplinary study programme or additional skills to existing students studying for bachelor's degrees, but also often made available to a wider set of learners. For example, the University

of Vienna in Austria offers a set of extension courses, of between 15 and 30 ECTS, intended to allow students to gain additional skills not covered by the bachelor programme in which they are enrolled. In some cases, students are required to take one of these extension courses in order to graduate, and many of the courses are also made available to a wider audience through the university's lifelong learning centre.

The other typical means of delivery of short undergraduate programmes is through the provision of individual bachelor-level modules as stand-alone programmes of study, with a credit certificate issued on completion. Some institutions offer the possibility of stacking these individual courses into larger qualifications, and allow the same programme to be taken in either a for-credit or a not-for-credit format. Nordic countries have a particularly flexible approach to stacking individual short modules at the undergraduate level, ranging from certifications as far as completion of a full bachelor's degree (Box 3).

Box 3. Stackable undergraduate-level short programmes in the Nordic countries

Higher education institutions in the Nordic countries offer short programme initiatives that can support pathways from single short courses to certifications and higher qualifications. While specific institution examples are given below, similar programmes were identified across other higher education institutions in each country, indicating that these practices form part of a wider framework or tradition in the country.

In **Finland**, at the Metropolia University of Applied Sciences, the open university of applied sciences section offers students the opportunity to register for individual courses, generally about 5 ECTS in length, or combine the study units into an Open Path, allowing them to earn 15-30 credits from modules typically offered in the first year of a bachelor's degree. Open Path students follow the same learning material as students enrolled in the complete bachelor's programme, commonly attending the same classes and sitting the same assessments.

In **Sweden**, universities may offer a range of "free-standing" courses and programmes. These programmes form part of the continuing education system. Typical study loads for free-standing courses might range between 7.5 and 30 ECTS. Courses are open to learners with a range of motivations, and may be provided on a more flexible basis than traditional higher education. For example, in the University of Gothenburg, free-standing courses are given continuously during the academic year, in a variety of subjects and levels. Lessons may be in the evening or daytime and can be distance courses or on-campus. Free-standing courses may be stacked into a degree if certain conditions are met with regard to the complementarity of courses. Credits from courses taken in other Swedish higher education institutions may be transferred to the University of Gothenburg and included in the degree application once the requisite number of credits is reached.

In **Norway**, the University of Oslo (along with other institutions) offers a "one-year programme" (*aarsenhet*) of 60 ECTS at the undergraduate level. Students in one-year programmes may study in order to decide whether they like the field of study before committing to a full bachelor's degree, or in order to deepen their knowledge in their field of work, specialise or retrain. In some fields of study, the one-year programme alone can provide a foundation of knowledge for applying for entry-level jobs. Otherwise, the programme can be used to gain advanced entry to a bachelor's degree programme in a related subject, or can be counted towards a professional specialisation or qualification.

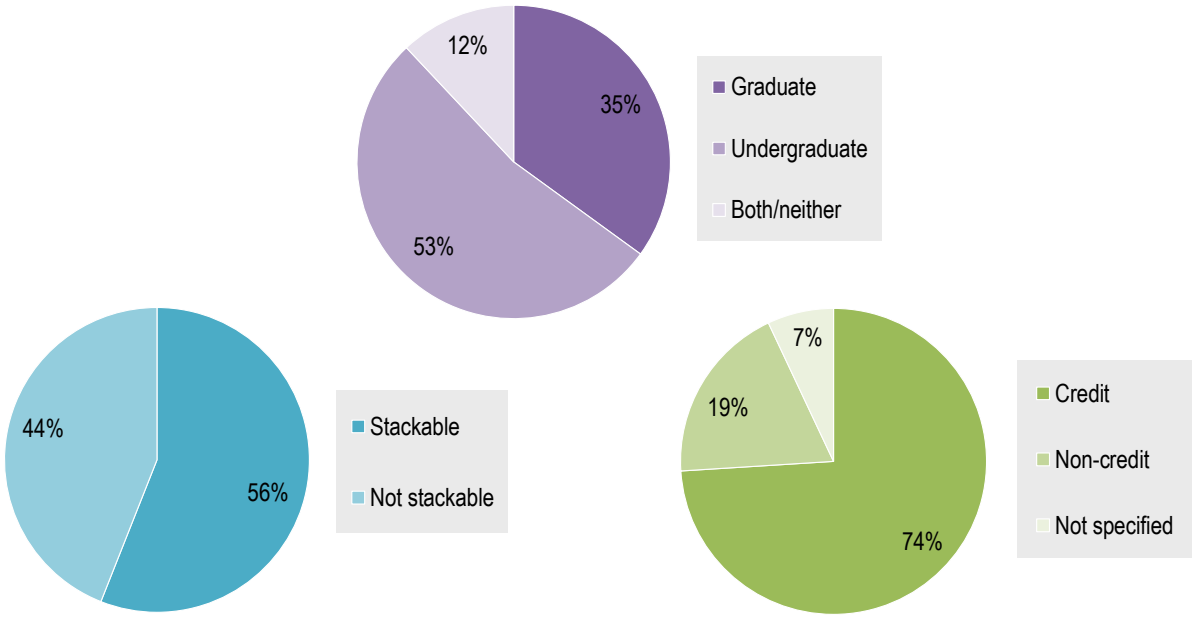
Higher education micro-credential programmes beyond Europe

Micro-credentials are rapidly being adopted in many countries outside of Europe. The United States has a long history of providing academic certificates, industry certifications and training programmes developed with industry partners within its higher education systems. These initiatives are generally known as "non-degree credentials" within the United States, although the label of "micro-credential" has also gained some traction.

The landscape of non-degree credentials across the United States is vast – a 2020 count of credentials identified just under one million unique credentials offered to learners, of which only about 40% are traditional degrees and diplomas from postsecondary education institutions (Credential Engine, 2021[25]). Individual institutions may offer different types of credentials depending on the possibilities for accrediting the programme, the needs of local employers, and incentives offered by state and federal programmes, such as workforce development funds. Similar to the situation in Europe, researchers in the United States have identified a lack of universally accepted taxonomy for non-degree credentials as a serious obstacle to progressing knowledge on their effectiveness. For example, while much research has been carried out on the learner experiences and outcomes of various non-degree credentials, the lack of a common nomenclature and understanding make the results difficult to generalise (Non-Degree Credentials Research Network, 2021[26]).

As in Europe, even within individual higher education institution systems in the United States, micro-credentials can be used as an umbrella term to describe a wide variety of programmes. In the State University of New York (SUNY) system, micro-credentials may be credit- or non-credit-based, stackable, and delivered at both undergraduate and postgraduate levels (Figure 7).

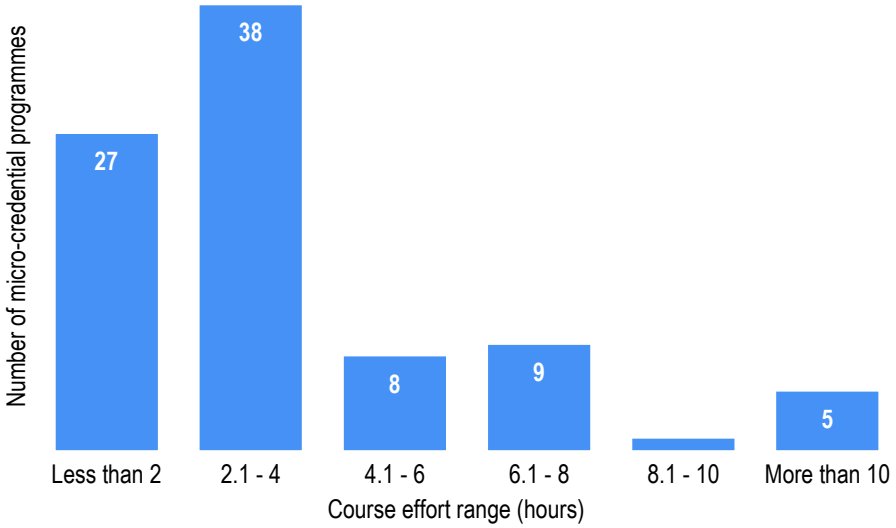
Figure 7. Variety in micro-credentials offered by the SUNY System (the United States)



Source: Adapted from the State University of New York system (2021[10]) (as of May 2021).

Institutions in other OECD jurisdictions have also developed a range of micro-credential offerings. In Australia the term "micro-credentials" is in much broader use throughout the higher education system, however, institutions still design and implement micro-credentials in diverse ways. For example, while the University of Sydney implements micro-credentials as professional certificates requiring the accumulation of 12 credit points (equivalent to 15 ECTS), the required course effort for micro-credentials can be measured in hours in the Royal Melbourne Institute of Technology (RMIT) – most require less than the equivalent of one day of study (Figure 8).

Figure 8. Course effort requirements for micro-credentials at the Royal Melbourne Institute of Technology (Australia)

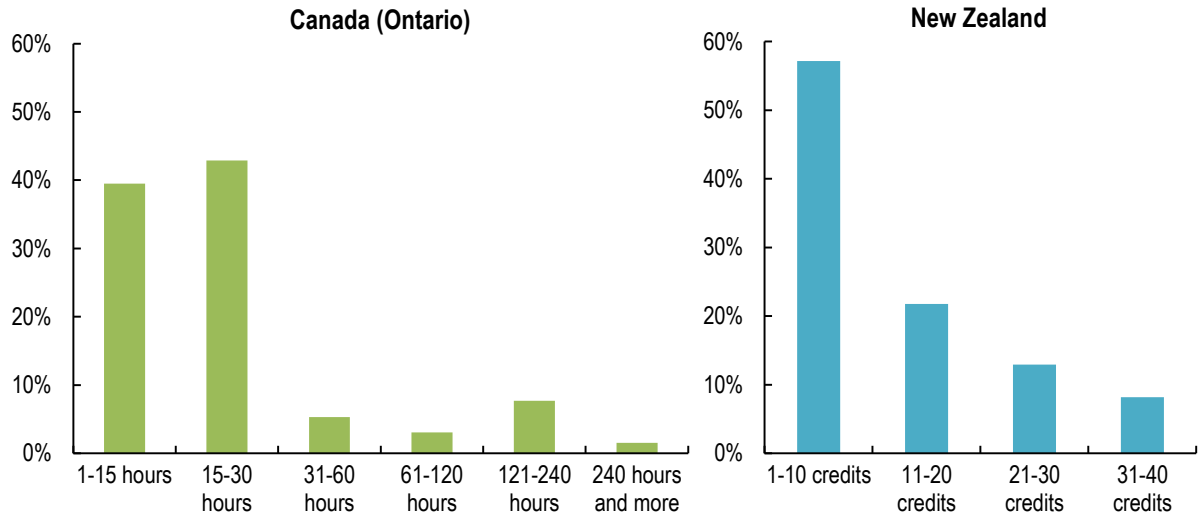


Source: Adapted from Royal Melbourne Institute of Technology (2021[27]) (as of May 2021).

A smaller-scale interpretation of micro-credential programme study loads is also more common in New Zealand and Ontario, which both have some government-supported micro-credential programmes. As can be seen in Figure 9, while the vast majority of publicly supported micro-credentials in Ontario require less than 30 hours of course workload (i.e. less than 1.5 ECTS), in New Zealand, more than half of the courses have a workload of less than 10 credits (5 ECTS).

Even within the highly regulated New Zealand framework, providers have been able to autonomously develop micro-credentials with distinct characteristics. One innovative example is the EduBits micro-credential model devised by Otago Polytechnic. EduBits are credit-based micro-credentials awarded in badge form. Similar to other micro-credential programmes, the credential may be awarded after a period of study. However, it is also possible to earn EduBits by undergoing an assessment to demonstrate a particular skill without participating in the associated training course. Many of the courses provide the education component for free, while a small fee is charged for the assessment process (between NZD 80 and NZD 199 (USD 60 and USD 140)). EduBits are offered in a range of topics and credit awards (Figure 10).

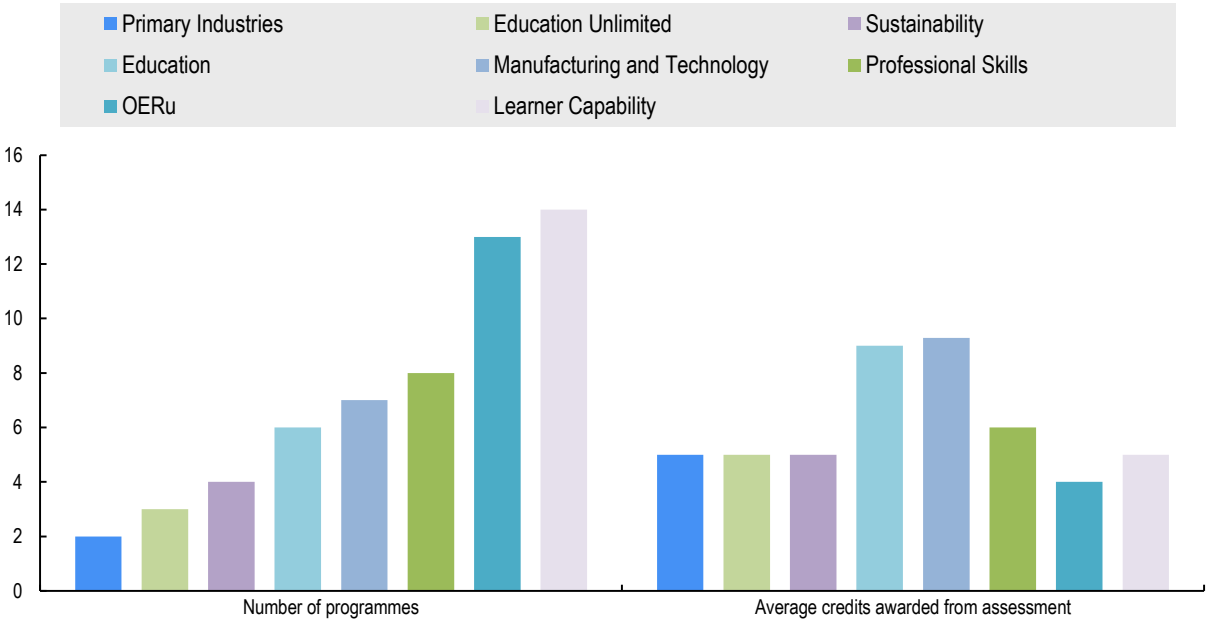
Figure 9. Course loads for micro-credentials in Canada (Ontario) and New Zealand



Note: Canada (Ontario): The number of micro-credentials eligible for the Ontario Student Assistance Programme funding.
New Zealand: The number of micro-credentials registered with the NZQA.
Source: Adapted from Government of Ontario (2021[28]) and New Zealand Qualifications Authority (2021[29]) (as of May 2021).

Figure 10. EduBits micro-credentials offered through Otago Polytechnic (New Zealand)

Number of programmes and average credits awarded for each micro-credential category



Note: Credits are expressed using the New Zealand credit system. Education Unlimited provides tailor-made workplace training to New Zealand businesses. OERu is a network of higher education institutions that provides free online courses for students worldwide.
Source: Adapted from EduBits (2021[30]) (as of May 2021).

3. Online platform-based micro-credentials

The movement of higher education programmes to online and blended delivery modes was already building momentum before the beginning of the COVID-19 pandemic in March 2020. By 26 March 2020, all OECD countries with available data except Japan had closed their campuses and moved higher education online, and around half of OECD countries' campuses did not reopen in the autumn (OECD, 2021[31]). While there were sharp dissimilarities in the extent to which higher education systems were ready for online learning before the pandemic, there is no doubt that substantial capacity has been built throughout higher education institutions for the development and delivery of higher education online in the past year.

Even as higher education institutions begin to reopen across the world, most of them continue to make much greater use of online education than before, to support physical distancing and manage numbers of students on campus. In the future, while the balance is likely to shift back towards on-campus education, institutions are likely to continue to develop a wide range of online courses and offerings in response to emerging student expectations and demand for more flexible learning options (OECD, 2021[31]).

Online digital learning platforms provide a means for higher education institutions and other providers to reach a much larger audience than is possible with campus-based education. While the first MOOC platform was created more than a decade ago, the development of digital learning platforms has rapidly progressed, and now includes platforms sponsored by governments, created through collaboration between institutions, and established by private companies on both a for-profit and non-profit basis. The majority of these platforms offer micro-credentials. The next sections describe the range of online learning platforms where learners may access micro-credentials.

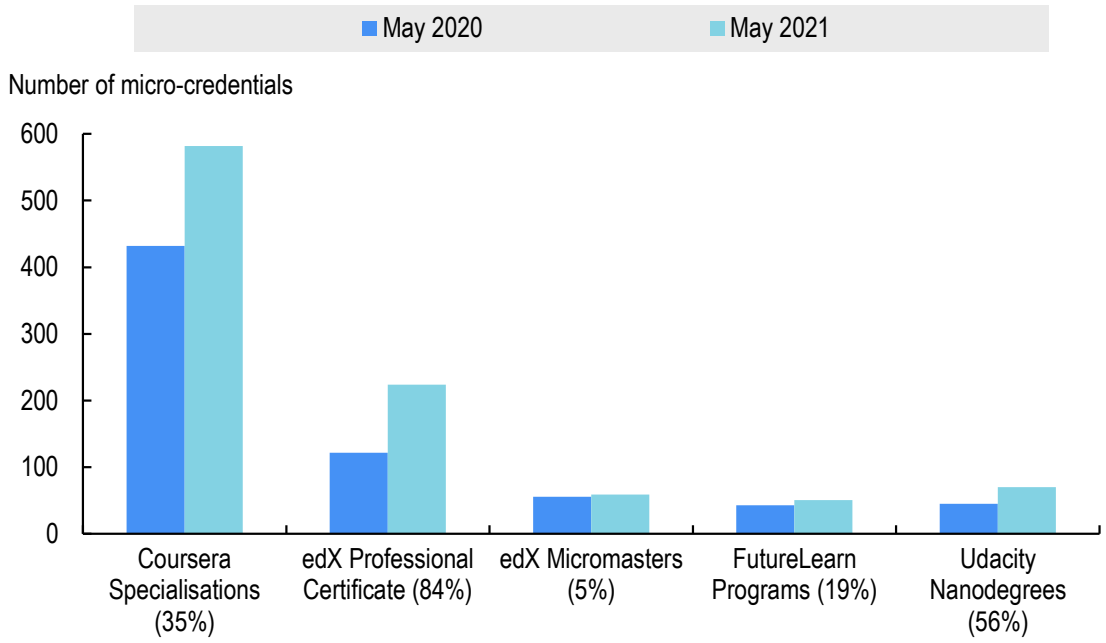
MOOCs and their associated micro-credentials

The growth of MOOC provision through online learning platforms from 2010 onwards marked a movement towards greater democratisation of educational content. Since their inception, the model for MOOCs has continued to evolve, and the offerings have become more sophisticated. Many higher education institutions now offer MOOCs in addition to other short and continuing education programmes. While much of the course material available on learning platforms may be studied on an audit basis without payment, increasingly, payments are required for certification of individual courses. Higher fees are charged by institutions where MOOCs are amalgamated into micro-credentials, such as specialisations, nanodegrees or professional certificates.

At the onset of the pandemic, global interest in MOOCs spiked as lockdowns were enforced. Many innovations in MOOC development took place over the pandemic period, with the "pay-for-certification" model becoming even more embedded. The increased monetisation of MOOC-based certifications can create a new revenue stream for higher education institutions, but also reflects the cost to education providers of devising and administering assessments based on the MOOC content, maintaining records, and issuing certificates to learners. Thus, the "freemium" model is likely to dominate in the future, whereby course content is freely available, but assessment and certification of the learning require payment of a fee to the institution.

Micro-credentials offered through digital learning platforms continued to grow in number during the pandemic. Between May 2020 and May 2021 the number of micro-credentials offered on some of the most popular platforms increased by as much as 80%, depending on the platform and specific type of micro-credential (Figure 11).

Figure 11. Number of micro-credentials offered on selected learning platforms, and one-year percentage change



Note: Figures in parentheses refer to the percentage increase in the number of micro-credentials from May 2020 to May 2021.
Source: Adapted from Class Central (2020[32]), Coursera (2021[33]), edX (2021[34]), FutureLearn (2021[35]) and Udacity (2021[36]).

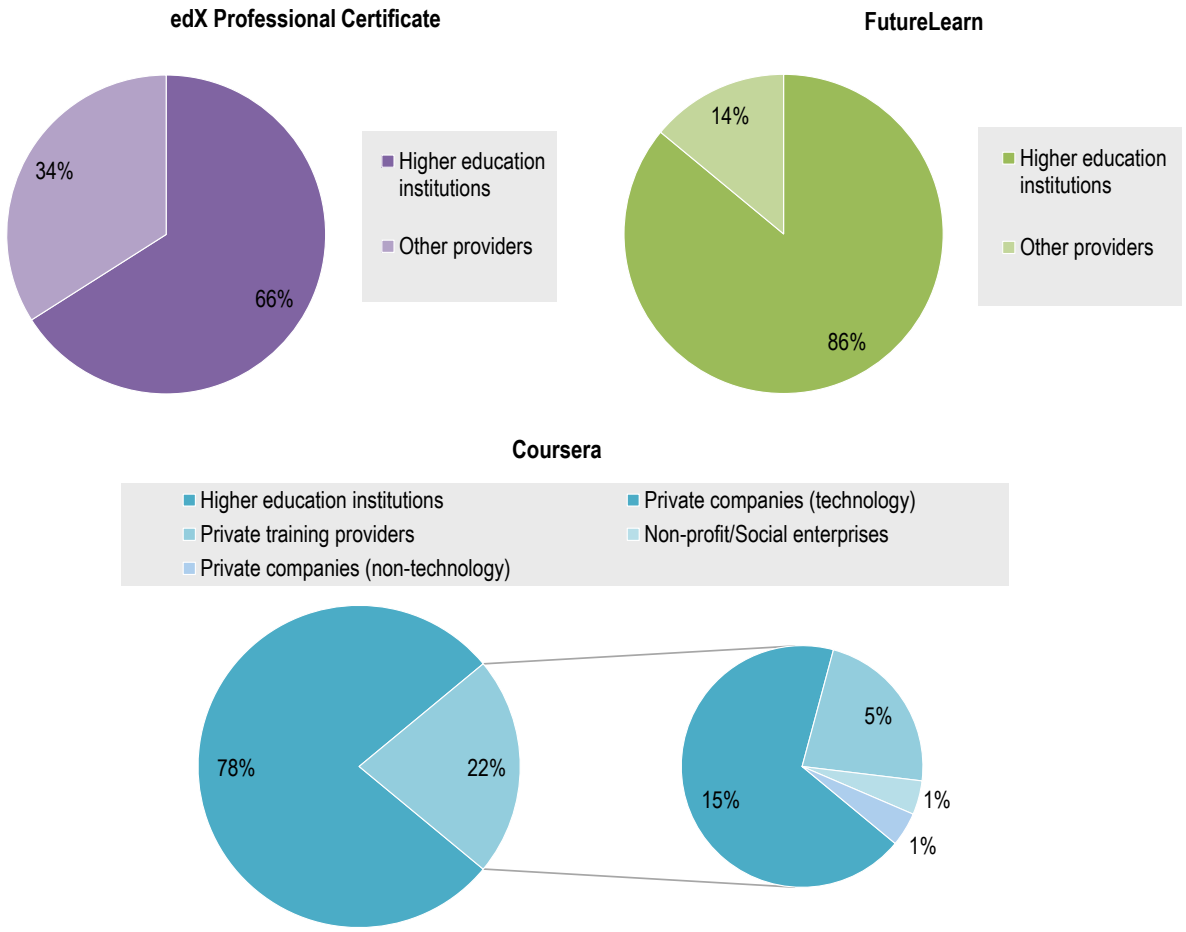
There is increasing overlap in the characteristics of micro-credentials offered on digital learning platforms and micro-credentials offered directly by higher education institutions. However, a key feature of many digital platforms is the existence of micro-credentials developed by providers outside of traditional higher education. As Figure 12 shows, a large share of micro-credentials on digital learning platforms are not offered by mainstream higher education providers. This share ranges from 14% of FutureLearn Programmes to 34% of edX Professional Certificates. Other than higher education institutions, private technology companies are the largest micro-credential providers on Coursera, offering 15% of all specialisations. Other provider categories on Coursera include private training firms, private companies other than technology companies and private non-profit organisations.

Micro-credentials delivered through shared digital learning platforms offer learners some advantages over institution-led initiatives. Unlike programmes offered directly by individual institutions, online platforms allow learners to easily identify a large range of educational opportunities, often with social proof available from other learners who have completed the same programme. Potential learners can also directly compare and choose between micro-credentials across different providers, and in many cases, can access the programmes immediately, creating maximum flexibility in learning pathways. At the same time, there is very limited independent evidence to date on the effectiveness of micro-credentials offered through digital learning platforms, either for improving learning outcomes or creating new pathways to achieve traditional educational qualifications (see Section 44.).

Higher education institutions offering micro-credentials on digital learning platforms are making greater efforts to increase their accessibility, relevance and alignment with traditional higher education programmes. This can be seen through two emerging trends in micro-credentials on digital learning

platforms: 1) offering credit towards traditional higher education programmes, and 2) greater collaboration with industry on micro-credential development.

Figure 12. Micro-credentials on edX, FutureLearn and Coursera by type of provider (2021)



Source: Adapted from Coursera (2021[33]), edX (2021[34]), and FutureLearn (2021[35]) (as of May 2021).

Recognising credits gained through micro-credentials on traditional higher education programmes

Institutions have an increasing tendency to offer credit on related larger educational programmes to learners who have completed a micro-credential through an online learning platform. Institutions may offer leaners holding the micro-credential a guaranteed pathway into a more traditional higher education programme and convert the micro-credential into credit towards the qualification. Many examples of credit recognition are emerging across different learning platforms. For example, the University of Chicago offers a MasterTrack micro-credential on Machine Learning through Coursera that may then be applied to cover approximately 20% of the course requirements for the Master of Science in Analytics degree from the university. Similarly, a MasterTrack in Innovation and Entrepreneurship in the HEC Paris can be credited towards their Master's programme in Innovation and Entrepreneurship.

Examples of micro-credentials are also emerging that are flexibly designed to support professional training and can also be counted for academic credit towards a traditional university qualification. On FutureLearn, a platform with more than 100 participating higher education institutions, the micro-credential programme on Genomics offered by the University of London, can be used as a form of continuing professional development (CPD) for clinical practitioners in healthcare, but can also be applied to exempt students from a module of the university's postgraduate certificate in Interpretation and Clinical Application of Genomic Data. Such "dual-purpose" programmes may be a promising way for micro-credentials to simultaneously provide both academic and professional progression for learners.

Collaboration with industry on the educational content of micro-credential programmes

Although higher education institutions still develop the majority of micro-credential programmes on online learning portals independently, an increasing tendency towards collaboration with industry can be observed. For example, on FutureLearn, more than one-third of the micro-credentials on offer have some form of industry involvement. The type of connection with industry can be shaped in different ways, and with parties from various economic sectors. Examples from the FutureLearn platform include:

- The UK Open University's postgraduate micro-credential on "Teacher Development: Embedding Mental Health in the Curriculum" is endorsed by the British Mental Health Foundation, while its postgraduate micro-credential on "Cyber Security Operations" is endorsed by Cisco Networking Academy.
- The University of Glasgow postgraduate micro-credential on "Data-driven leadership" is accredited by the Institute of Leadership and Management, a professional leadership body in the United Kingdom.

While many collaborations with industry occur on an ad-hoc basis, some promising initiatives are beginning to emerge, seeking to establish more robust frameworks for collaboration across sectors. The UK-based Institute of Coding offers an example of a collaborative process that brings together diverse providers to design accessible and relevant courses and programmes in an area of high skills demand (Box 4).

Box 4. Large-scale multi-sector initiatives for more flexible and responsive upskilling – the Institute of Coding in the United Kingdom

The Institute of Coding was created in 2018 in response to evidence of the growing digital skills gap in the United Kingdom. The Institute is a national consortium of employers, education providers and outreach organisations, financially supported by the UK government (GBP 40 million [USD 55 million]). The consortium includes 35 universities and more than 200 private companies that collaborate on the development of programmes aiming to enhance digital skills.

To date, the Institute has created more than 150 programmes, spanning short courses, degrees and postgraduate programmes, and more than 900 000 learners have participated in the jointly developed courses and programmes. They are a mixture of fully online, campus-based and hybrid programmes, spanning different levels of education. Many of them are offered through learning platforms such as FutureLearn. Through the involvement of outreach organisations, the initiative has also been able to reach a wider and more diverse cohort of learners. An evaluation of the programme shows that 46% of the learners in the Institute of Coding programmes are women, compared to 16% in computer science courses in England. In addition, more than half of learners are over the age of 26.

Government-supported digital learning platforms

Before the pandemic, some governments had already invested in e-learning platforms, recognising the potential for wider dissemination and sharing of learning materials and Open Educational Resources (OER). Pre-pandemic examples of well-established national e-learning platforms for higher education institutions to share content include:

- France Universitaire Numerique (FUN), launched by the French Ministry of Education and Research in 2013 in order to provide a standard catalogue of online courses from French universities and other providers. In total, more than 1 300 MOOCs and certificates have been offered by 140 partner providers over the course of operation of the initiative.
- EduOpen, an online course provider funded by the Italian government that was established in 2016. It offers a range of MOOCs that can be stacked into "paths" leading to specialisation diplomas and masters programmes (Box 5).
- Campus Il, the national higher education digital learning platform of Israel, providing short courses delivered by higher education institutions across Israel. Many of the courses offer academic credit at the providing institution.

Box 5. The EduOpen digital platform

EduOpen is a digital learning platform shared by Italian universities, launched in 2014. In total, 17 higher education institutions contribute course material, and all the courses are provided free of charge. Each course on the EduOpen platform maintains some features of its home university, but is provided under a common general structure and layout. Completed courses award Certificates of Participation, Open Badges and, in some cases, ECTS credits.

The range of courses offered in the platform can be stacked into "pathways", a structured set of short courses related to a single field of study. Pathways contain "Milestone" courses – that identify the achievements of intermediate educational objectives – and "Capstone" courses – that constitute the conclusive part of the pathway (Rui, 2016[37]). Completion of the entire pathway leads to credits that can be applied to postgraduate degree programmes.

A 2019 study found that completion rates of EduOpen MOOCs were higher than MOOC completion rates on many other platforms. Completion rates were between 22% and 25%, depending on the format of the MOOC, with no statistically significant difference in completion between self-paced and tutored courses (Sannicandro et al., 2019[38]).

MOOC content is often made available as a form of OER, a means by which education institutions make course material free and reusable to all. The COVID-19 pandemic period gave rise to a sharp increase in demand for OER, accelerating a movement that had already gained traction. This could be observed in the United States, where there is a long tradition of the provision of OpenCourseWare (course material used in degree programmes) by leading higher education institutions. For example, in the first weeks of the pandemic, downloads of MIT's OpenCourseWare increased by 75% in 2020, with over 70% of visits coming from outside the United States (Rajagopal and Newton, 2020[39]). Many institutions and governments used OER to support the pivot to digital education provision during lockdowns.

Nevertheless, the pandemic exposed the lack of availability of national resources for digital learning in higher education in many jurisdictions across the OECD. While governments intervened heavily to provide supporting educational resources for schoolchildren, higher education institutions were largely left to manage the shift themselves, although there are some examples of government initiatives to create platforms, such as in Egypt and Colombia (OECD, 2021[31]). A survey of higher education institutions by the European Commission in May 2020 showed that most respondents thought that institutions that had been used to developing online courses and MOOCs were better prepared to face the pandemic (European Commission, 2020[40]).

In the future, it is likely that governments will learn lessons from the pandemic and provide more nationally supported opportunities for learners to access – and institutions to share - higher education course material, including micro-credential programmes. This move may be further supported by increased international efforts to develop OER. For example, an OER Recommendation was adopted by all UNESCO members in 2019, followed by the establishment of the OER Dynamic Coalition in 2020 to implement the actions of the Recommendation. The actions will focus on supporting policy and creating effective conditions for the widespread adoption and use of high-quality OER (UNESCO, 2021[41]).

The rise of "own-brand" learning platforms by private companies

While higher education institutions are investing in enhancing their training offers through digital learning platforms, they face increasing competition from private companies, including companies whose main business is not education and training. This can be observed particularly in the technology sector. While technology companies have a long tradition of offering certified training for users and technicians of their own technologies, many of these companies are now offering a wider range of training on topics beyond their own products, and in some cases developing their own training and certification ecosystem, as with Google (Box 6).

Box 6. Micro-credential initiatives by Google

In 2020, Google announced that it would remove the requirement for job applicants to have higher education degrees, and launched a range of professional training qualifications that it would treat as equivalent to a degree in its recruitment processes for certain roles. These "Google Career Certificates" are accessible through a Coursera subscription, take approximately six months to complete and are in areas of high employer demand, such as IT Support, Project Management, Data Analytics and User Experience (UX) Design.

The career certificates are provided on a not-for-profit basis, and scholarships are available to support access for disadvantaged students. Students are also able to access free resources for career coaching and mock interviews while studying, and upon graduating they will be included in a special candidate pool that is available to the consortium of employers participating in the initiative with Google.

Following the 2020 launch of Google Career Certificates in the United States, the programme was launched in the United Kingdom in May 2021, as a joint initiative with the Department of Work and Pensions.

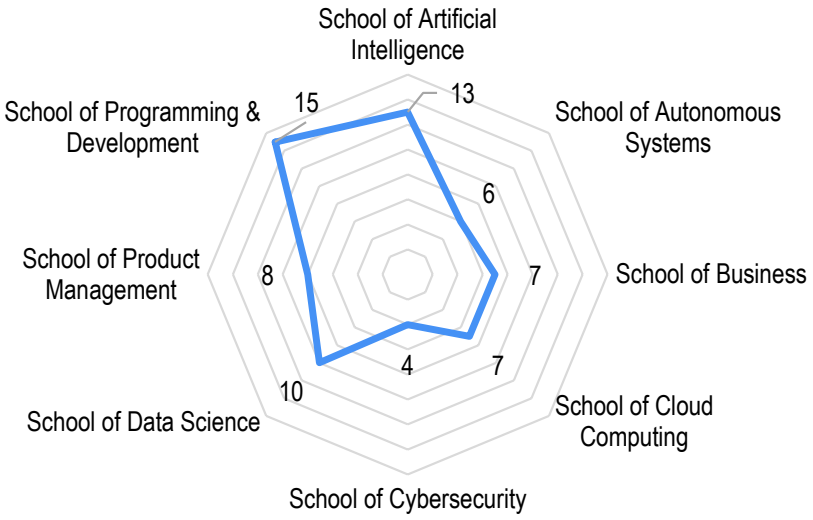
Google also offers a number of other micro-credentials related to its education software tools and technologies, such as Google Workspace for Education. Its range of teacher training micro-credentials allows teachers to use the software to become certified Google for Education Trainers, Innovators or Coaches, upon completion of a number of training modules.

In many cases, technology companies have built relationships directly with employers and governments for the provision of training, without the involvement of the traditional education sector. For example, the Amazon Web Services (AWS) re/Start initiative provides 12-week full-time courses leading to certifications in cloud computing to unemployed and under-represented populations. The initiative is active in 12 countries, and is delivered in collaboration with a range of national stakeholder organisations and non-profit agencies, such as youth associations and skills development organisations. Other technology companies are also offering their own learning platforms, integrated with other offerings. For example, LinkedIn allows users to directly access training in a range of business, creative and technical skills through the LinkedIn Learning platform using their existing profile details, and completed training certificates can be automatically integrated into LinkedIn user profiles.

In each of the above examples, a subscription-based funding model is employed, allowing the learner to earn as many micro-credentials as they are able to study for a fixed price. Other features of the "own-brand" model include standardisation and portability of the credentials earned, and the integration of the training with other technologies often already in use by the learner.

In the future, for-profit platforms may continue to grow their position as alternatives to traditional higher education. The business models of for-profit learning platforms are rapidly evolving, and many existing learning platforms are focused on scaling up their offerings and recruiting larger pools of learners. In June 2021, the education technology company 2U Inc. announced that it would buy the non-profit edX learning platform started by Harvard and MIT, turning it from a non-profit to for-profit enterprise. Udacity, a learning platform for technology education that used to offer many collaborative micro-credentials with higher education institutions, has recently pivoted to become more closely oriented towards professional training. Its programmes are now created with industry partners, rather than higher education institutions. At the same time, Udacity reorganised its micro-credentials into "schools" according to topic groups (Figure 13).

Figure 13. Udacity micro-credentials classified by "school"



Source: Adapted from Udacity (2021[36]) (as of May 2021).

4. Who pays for and who benefits from micro-credentials?

Learners in higher education micro-credential courses are likely to be wealthier, more educated, more skilled and enjoy greater employer support

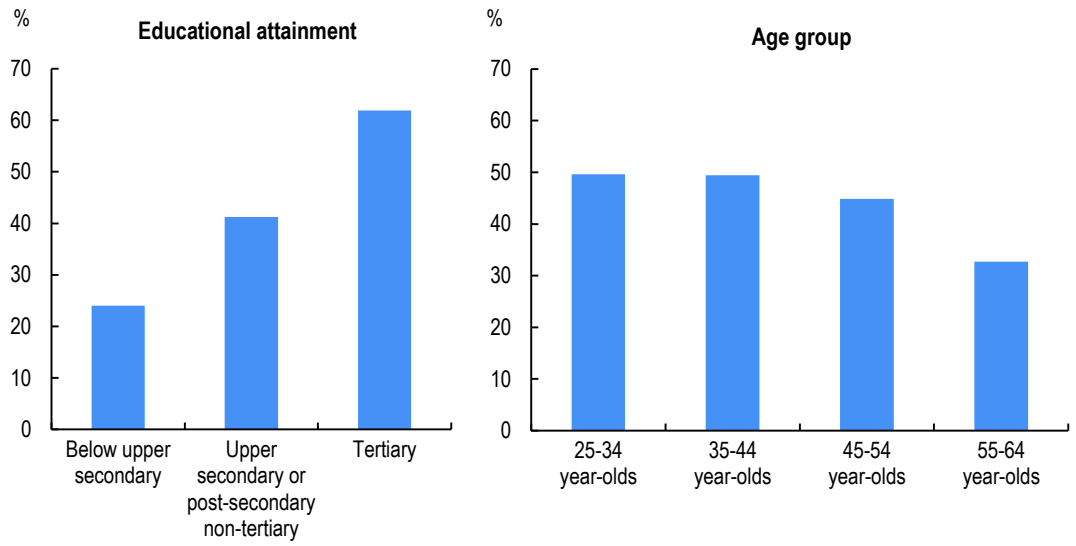
As discussed in the previous sections, micro-credential programmes are devised by higher education institutions to meet a wide range of learner needs. While internationally comparable data on micro-credential learners does not exist, the general profile of learners participating in non-formal education can provide some indicative evidence, given that programmes leading to micro-credential awards are generally classified as non-formal education within higher education systems.

Micro-credential learners can be profiled in many ways, according to their skills, their interests, their learning objectives and their previous levels of education. In terms of the level of education, existing evidence on non-formal learners shows that those with higher levels of education to begin with are more likely to seek out further education. On average across the OECD countries that participated in the Adult Education Survey, over 60% of tertiary-educated adults participated in non-formal education and training during the previous 12 months, while less than 30% of adults without upper secondary education did so (Figure 14).

Participation in non-formal education is relatively even across gender and different age groups. The share of adults who participated in non-formal education and training during the previous 12 months was around 45% for both men and women (OECD, 2019[42]). In addition, the non-formal education participation rates were at around 45-50% for those aged 25-54, while approximately 35% of 55-64 year-olds participated in non-formal education and training (Figure 14).

Figure 14. Participation rate in non-formal education and training by educational attainment and age group (2016)

Average of the OECD countries that participated in the Adult Education Survey, 25-64 year-olds



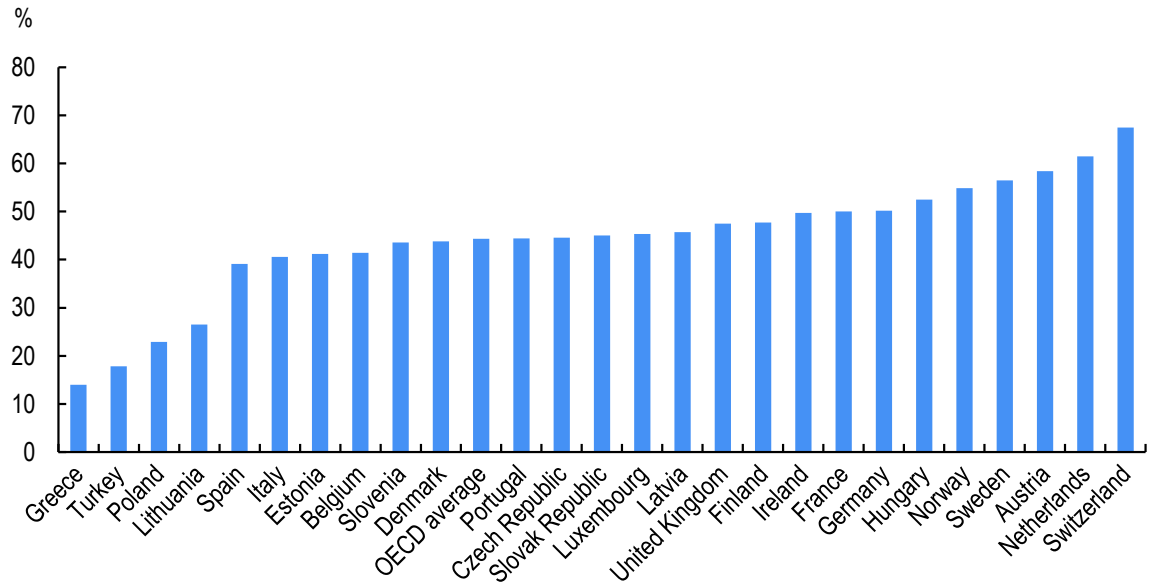
Note: Participation in non-formal education and training during the previous 12 months.
Source: OECD (2019[42]), Education at a Glance 2019: OECD Indicators, https://dx.doi.org/10.1787/f8d7880d-en.

Existing evidence also shows that some labour market status affects the likelihood of participating in non-formal education and training. According to the Survey of Adult Skills (PIAAC), 25-65 year-olds who are employed, earn the median and higher wage, and work for larger firms tend to participate in non-formal education and training more than their counterparts (Kato, Galán-Muros and Weko, 2020[2]).

In addition, Figure 15 shows that participation in non-formal education is much more of a custom in some countries than others – in Switzerland, adult participation in non-formal education and training was nearly 70% in 2016, while in Greece and Turkey the participation rate was lower than 20%. In countries where there is less of a tradition of regular participation in non-formal learning, it may be more challenging to establish and maintain a market for micro-credentials and other forms of short learning programmes. Conversely, relatively high participation rates in non-formal education might indicate that a large share of the population may be willing to participate in learning leading to micro-credentials, especially given their enhanced flexibility compared to some other forms of non-formal education. Flexible scheduling, including online and asynchronous provision, can support the needs of learners even further by allowing them to learn at a time and place compatible with work and family responsibilities. About 28% of adults do not participate in training because they lacked time due to work commitments, 15% because of family responsibilities, 16% because of a lack of financial resources and 12% because training took place at an inconvenient time and place (OECD, 2020[43]).

Figure 15. Participation in non-formal education and training by country (2016)

Adult Education Survey, 25-64 year-olds



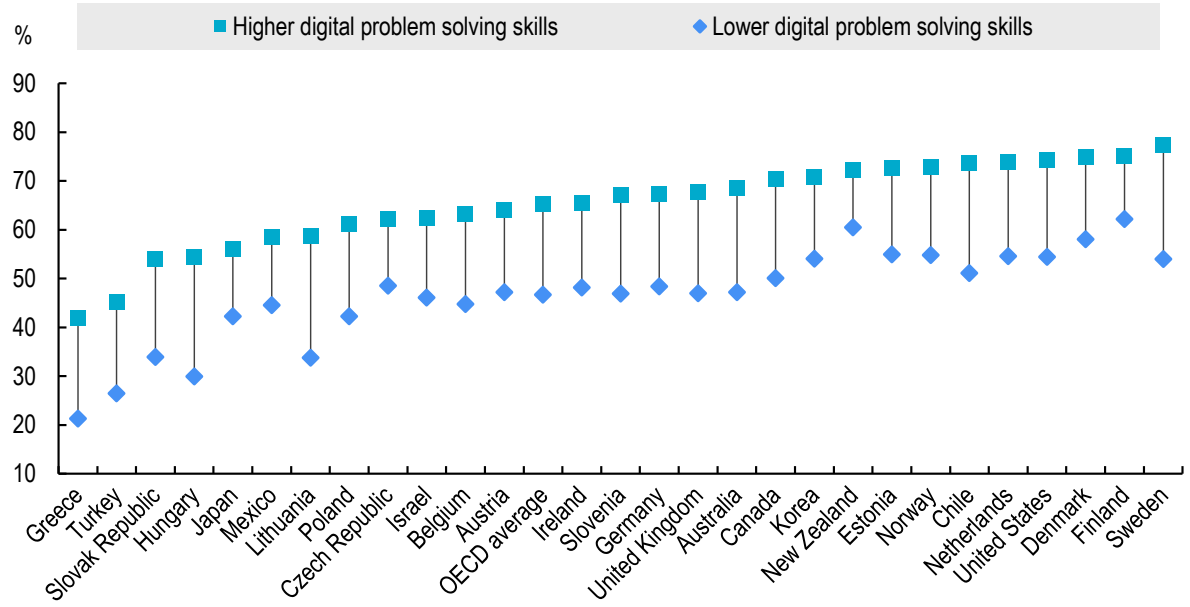
Note: Participation in non-formal education and training during the previous 12 months.
Source: OECD (2019[42]), Education at a Glance 2019: OECD Indicators, https://dx.doi.org/10.1787/f8d7880d-en.

However, while the flexibility of online learning can provide more opportunities to adults to participate in learning experiences leading to micro-credentials, learners also need to have adequate skills to avail of the opportunities. Available evidence suggests that individuals with higher digital and information

processing skills are more likely to participate in non-formal education and training than those with lower skills. For example, on average across OECD countries that participated in PIAAC, approximately 65% of adults with high digital problem-solving skills participated in non-formal education and training in the previous 12 months, while less than 50% of those with low digital problem-solving skills did so (Figure 16). Adults with higher literacy skills are also more likely to participate in non-formal education than their counterparts with lower skills (Kato, Galán-Muros and Weko, 2020[2]).

Figure 16. Participation in non-formal education and training, by level of digital problem-solving skills (2012, 2015 or 2018)

OECD Survey of Adult Skills, 25-65 year-olds



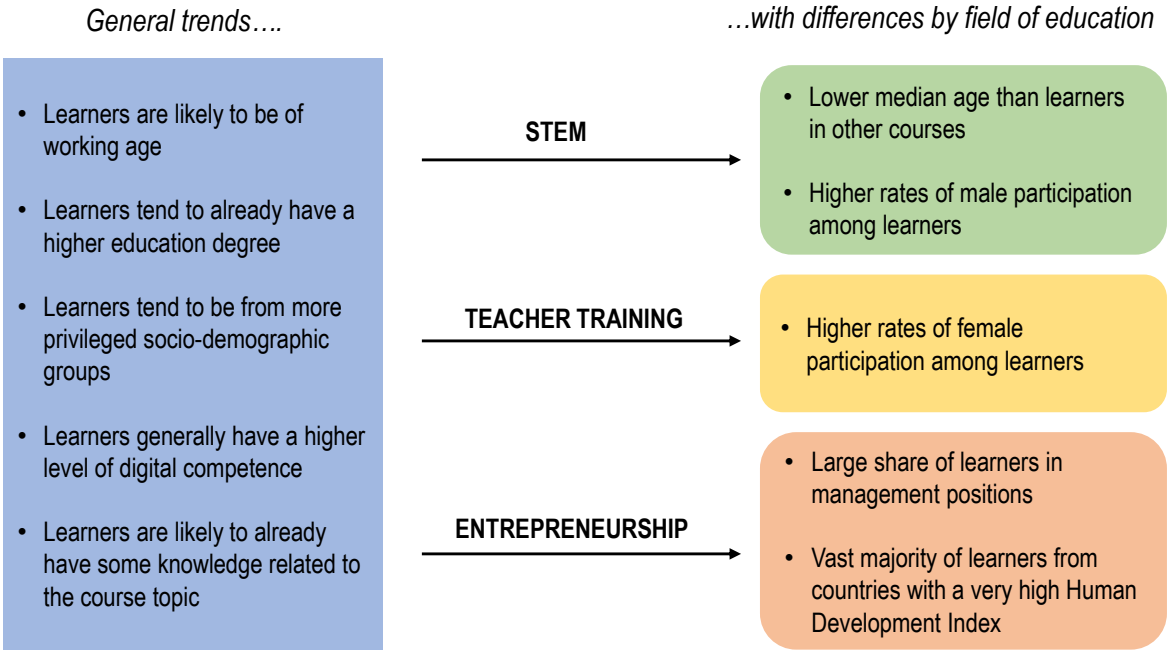
Note: Participation in non-formal education and training during the previous 12 months.
Digital problem solving refers to problem solving in technology-rich environments as assessed in the Survey of Adult Skills (PIAAC). Proficiency in this domain is measured in four levels (below level 1 to level 3). Individuals who reach level 2 or 3 of the PIAAC proficiency scale are labelled as those with "higher" skills, while those who scored level 1 or below are categorised as those with "lower" skills.
Each country or economy participated in one (or two) of the three rounds of PIAAC in 2012, 2015 or 2018.
Belgium: Data refers to the Flemish Community. The United Kingdom: Data refers to England and Northern Ireland.
Source: Adapted from OECD (2021[44]), Survey of Adult Skills (PIAAC), https://www.oecd.org/skills/piaac/.

Studies on MOOCs show similar findings on learners' profiles. A survey of respondents that had completed MOOC-based micro-credential programmes carried out between January 2018 and October 2019 reported that the average age of respondents was 36 and that most of them already had at least an undergraduate degree (85%). In addition, about 80% of respondents claimed to already have either advanced or intermediate level knowledge in a short course topic associated with a high level of English proficiency (Hollands and Kazi, 2019[45]).

In addition, data on MOOC participants suggests that differences in learner profiles in short courses by field of study often mirror differences in learner profiles by field in longer, more traditional education programmes. A survey of 2 755 participants who enrolled in seven editions of different STEM MOOCs

courses (including experimental physics, energy, mathematics and digital technology) reported that 70% of the enrollees were men (Viana and Moura Santos, 2018[46]). Similarly, female learners in computer sciences online courses represented only 14% of MIT artificial intelligence students and 20% of Coursera's computer science courses in 2017 (Bali and Torcivia Prusko, 2017[47]). Another study profiling engineering MOOC students also found higher rates of male participation (75%) (Hennis et al., 2016[48]). Conversely, teaching training short courses tend to have higher rates of female participation (Castaño Muñoz, Punie and Inamorato dos Santos, 2016[49]), while a study of learner profiles on multiple iterations of an entrepreneurship MOOC found that most learners were employed in management positions, and overwhelmingly from the most economically developed countries (Cisel et al., 2015[50]).

Figure 17. What does research tell us about micro-credential learners?



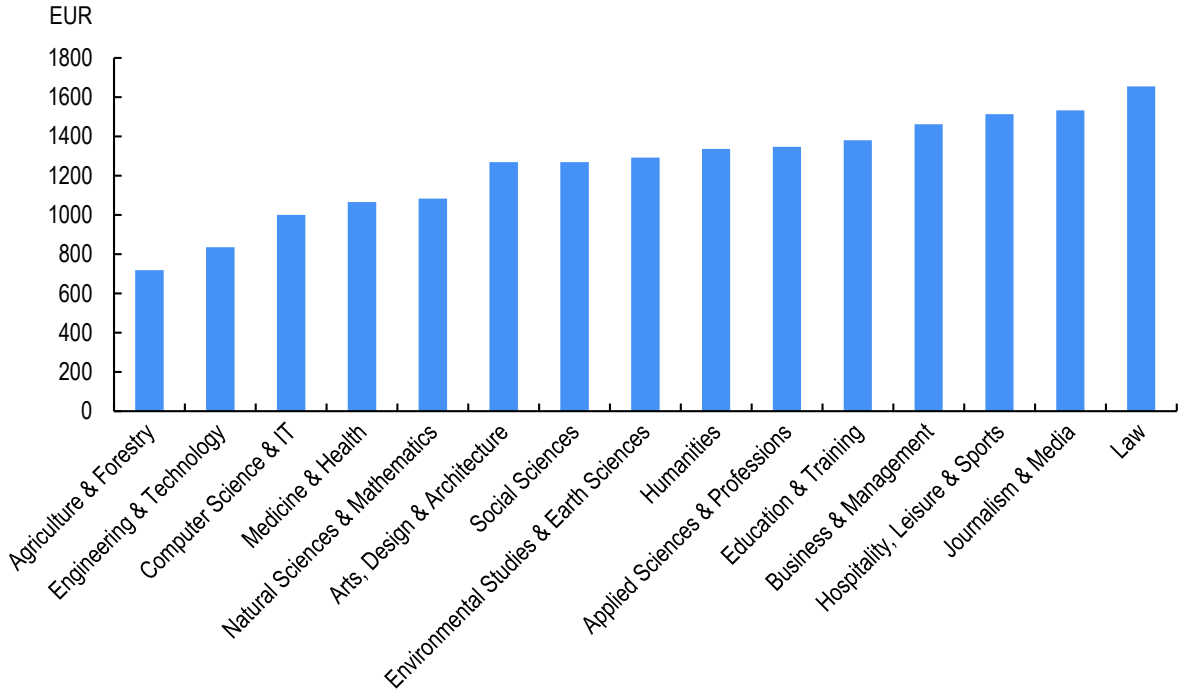
Source: Cisel et al. (2015[50]), Castaño Muñoz, Punie and Inamorato dos Santos (2016[49]), Hennis et al. (2016[48]), Bali and Torcivia Prusko (2017[47]), Viana and Moura Santos (2018[46]) and Hollands and Kazi (2019[45]).

Language competency among learners can also promote or inhibit their access to courses and micro-credentials on digital learning platforms. According to Class Central, an online aggregator of MOOCs and micro-credentials, while programmes on the main learning platforms are available in 30 languages, in total, 81% of courses are offered in English, followed by Spanish (7%), French (3%), Russian and Portuguese (2%) (Class Central, 2021[51]). This provides an obvious advantage in access to learning for those who are competent in English. While English is the most widely spoken language in the world, in many countries, only a small share of adults are proficient enough to access educational content in English. For example, a 2012 Eurobarometer report showed that the share of the population able to hold a conversation in English was below 30% in many European countries (Eurobarometer, 2012[52]).

The cost of micro-credentials, and the extent of financial support available for learners, also tends to vary according to programme and learner profile. Postgraduate, CPD and professional training programmes

provided by higher education institutions are generally offered on a full-cost basis to the learner. The cost of these courses can be substantial, particularly for advanced and specialist courses in certain professions. Data from Studyportals, an aggregator of short courses available mainly from higher education institutions shows that the average advertised tuition fee for short courses ranges from EUR 700 for agriculture and forestry courses to more than EUR 1 600 for short courses in law (Figure 18).

Figure 18. Average advertised tuition fees for short courses by field of study (2021)



Notes: Data are based on the advertised tuition fees of 5 778 short courses provided by higher education institutions and private training companies.
Source: Adapted from Studyportals (2021[53]) (as of March 2021).

A limited number of learners on non-degree learning programmes benefit from employer support. In a survey of respondents who had completed Coursera and edX courses in 2018 and 2019, it was found that employers paid the fees for 4% of respondents and contributed towards the fees of another 1% (Hollands and Kazi, 2019[45]). In another survey conducted in 2019 in the United States, about 17% of respondents received support from their employers either through fees reimbursement, time off to participate in the course, or both. Moreover, according to the same survey, managers and executives representing only 5% of the US workforce consume between 32% and 35% of training budgets (Hamori, 2019[54]).

Given this evidence, a picture emerges in higher education of short learning programmes largely being targeted towards learners who already have existing qualifications, who can afford to pay large tuition fees (either directly or through employer funding) and who may enjoy other forms of support to allow them to integrate further study with existing commitments. Many short learning and continuing education programmes, particularly professional training programmes and those offered by business schools, provide important revenue streams for higher education institutions. Moreover, as higher education attainment continues to rise, this is a stream of revenue with substantial growth potential, since learners who already

have higher education are the most likely to avail of further education and lifelong learning, and higher education institutions can also market short learning programmes directly to their increasing alumni base.

Limited evidence exists on the economic and social benefits of shorter learning programmes

In many jurisdictions, governments tend to more lightly regulate short postgraduate and professional programme provision, and institutions have more autonomy to charge learners higher fees. This is the case for many reasons; a belief that learners at the postgraduate level have greater knowledge and are more empowered to make beneficial choices, and the tendency for postgraduate and professional training learners to have greater access to funding, for example, from employers. This is also the case despite limited evidence on the extent to which the costs and benefits of short professional training and development programmes measure up. While short courses in higher education have existed for decades, there is very limited evidence on their benefits to learners and the wider society. For example, little is known about the completion rates of non-degree programmes delivered by higher education institutions, and how they compare with traditional higher education programmes.

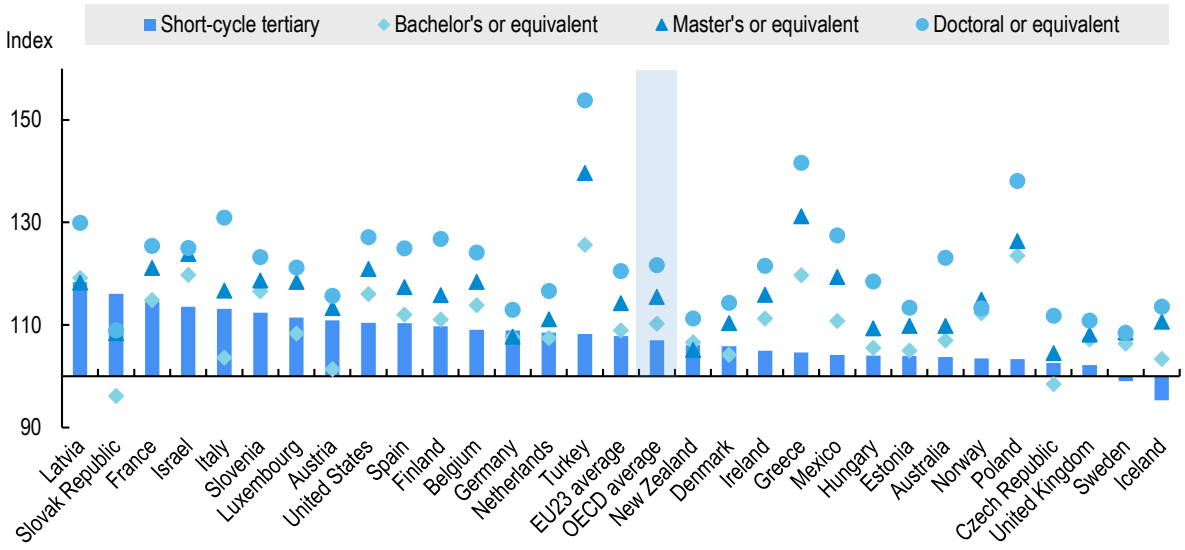
One area where some evidence on completion does exist is with respect to MOOCs, where a number of studies indicate poor completion rates. While open online platforms report a large number of students (76 million learners for Coursera, 33 million for edX and 10 million for FutureLearn in 2020), it is important to note that for each course, the number of registrants usually far exceeds the number of commencers, which in turn also exceeds the number of enrolees who complete the course (Oliver, 2019[55]). A study by Jung and Lee reports poor completion rates for MOOCs, typically between 3 and 6% on average (Jung and Lee, 2018[56]), while another study shows a current average completion rate for MOOC of 15%, with variation depending on the examination type (Jordan, 2015[57]). Recent research also indicates the high churn rate for first-time MOOC users – less than 10% of all learners who first registered on the edX platform between 2012 and 2017 were still active on the platform in 2018 (Reich and Ruiperez-Valiente, 2019[58]).

> Little is known about the outcomes of micro-credential programmes for learners, and how they compare with other higher education programmes. Policy makers need this information.

Limited evidence also exists that would allow policy makers and learners to anticipate the economic benefits of undertaking a course leading to a micro-credential. In general, investment in education brings favourable economic outcomes. OECD data show increasing employment and wage benefits according to the levels of education completed. On average across OECD countries, the employment rate advantage of 25-64 year-olds with higher education compared to those with upper secondary education is 7% for those with short-cycle tertiary education, 10% for bachelor's graduates, 15% for master's graduates and 22% for doctorate holders (Figure 19). Similarly, the average graduate earning premium is 19% for those with short-cycle tertiary education programmes, 43% for bachelor's graduates, and 89% for master's and doctoral holders (Figure 20).

Figure 19. Relative employment rates of tertiary-educated adults compared to employment rates of adults with upper secondary education (2018)

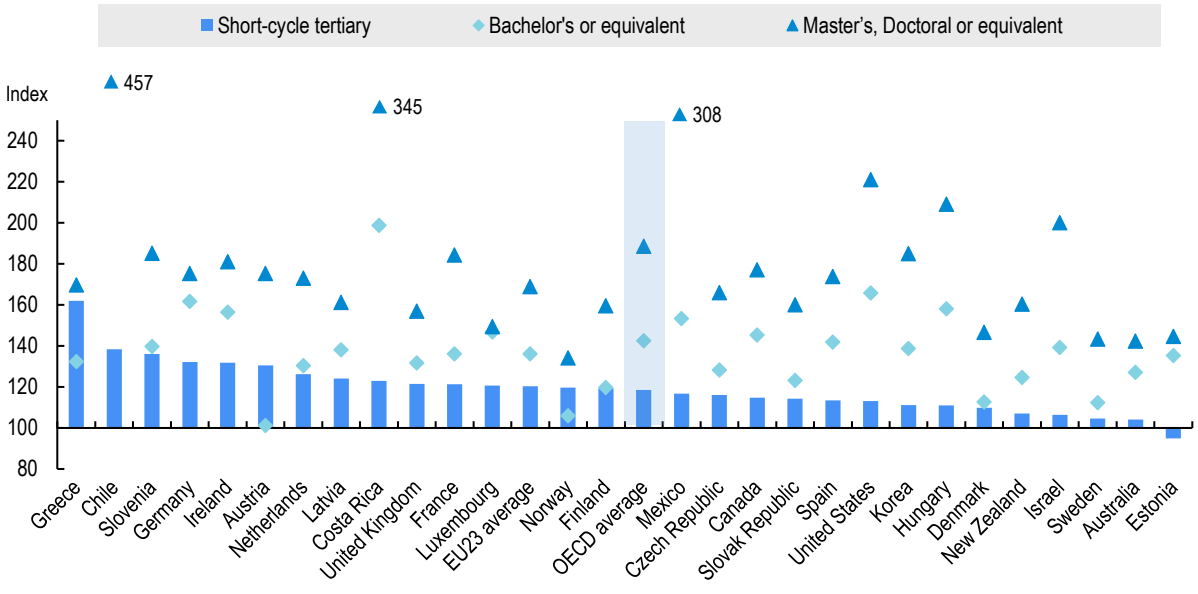
25-64 year-olds; upper secondary education = 100



Note: The United Kingdom: Data for upper secondary attainment include completion of a sufficient volume and standard of programmes that would be classified individually as completion of intermediate upper secondary programmes (12% of adults aged 25-64 are in this group).
Source: Adapted from OECD (2020[18]), Education at a Glance 2020: OECD Indicators, https://dx.doi.org/10.1787/69096873-en.

Figure 20. Relative earnings of tertiary-educated adults compared to earnings of adults with upper secondary education (2018)

25-64 year-old workers (full-time full-year workers); upper secondary education = 100



Note: Canada, Chile, Finland, France and Spain: Year of reference differs from 2018. Refer to the source for details.
Czech Republic and Slovak Republic: Index 100 refers to the combined ISCED levels 3 and 4 of the educational attainment levels in the ISCED 2011 classification.
Latvia, Luxembourg, Mexico: Earnings net of income tax.
Source: OECD (2020[18]), Education at a Glance 2020: OECD Indicators, https://dx.doi.org/10.1787/69096873-en.

Thus, the available data shows that completion of short-cycle higher education programmes (generally equivalent to 120 ECTS workload) can bring labour market rewards, though the size of the reward varies according to the specific jurisdiction and associated labour market. The evidence supporting the economic benefits of higher education programmes with a shorter workload (of 60 ECTS or less) is limited and sometimes provides conflicting messages. This reflects a lack of common understanding and definition for these programmes across institutions and jurisdictions, limiting the potential for data about their outcomes to be systematically collated. The lack of harmony in short programmes across different settings also creates difficulty in drawing more general conclusions from studies relating to individual micro-credential programmes or courses.

Therefore, it is premature to draw conclusions about the economic benefits of micro-credential programmes. Nevertheless, some key findings from existing research on shorter higher education programmes of one year or less in North America serve as a starting point for a wider discussion of the potential benefits of micro-credentials.

Available evidence suggests that while short-term credentials provide economic value to learners, their value added is modest and may even only provide a temporary benefit in comparison with longer entry-level higher education credentials, such as associate degrees. In the United States, the Centre for Analysis of Postsecondary Education and Employment (CAPSEE) examined economic returns to postsecondary certificates (ISCED level 4, often for the duration of one year) and associate degrees (ISCED level 5, often for the duration of two years) by using administrative datasets in eight US states. The CAPSEE reports that while certificate holders make earning gains of USD 2 100 (male) and USD 3 000 (female) per annum over those not completing their study programmes, associate degree holders realise earning gains of USD 4 600 (male) and USD 7 200 (female). The study also indicated the economic returns for certificates wane within a few years after receipt, while those of associate degrees persist over time (Belfield and Bailey, 2017[59]).

Data from several studies also indicate that the longer micro-credential programmes are, the higher their economic value becomes. According to the above-mentioned CAPSEE study, in several US states (but not all the examined states), earning gains increase with the number of required credits for the study programmes (Belfield and Bailey, 2017[59]). Another study that examined the labour market value of seven US government-funded non-degree programmes reports that the completion of these credentials has a statistically significant, positive association with employment rates, with longer ones (six months to less than two years) having a stronger impact than shorter ones (less than six months). The wage benefits of these programmes are less consistent across the seven sample programmes – three out of seven datasets show a statistically significant gain in wages for longer programmes and one out of five for shorter programmes (Lewis Valentine and Clay, 2019[60]).

In addition, the content of study programmes appears to impact the associated economic outcomes. The CAPSEE study reports that although the average economic returns for certificates are positive, some programmes find negative or statistically insignificant returns. Certificates with vocational orientations, such as health, tend to have higher returns than those with academic orientations (Belfield and Bailey, 2017[59]). A study that examined the economic value of certificates by using the 2016 US Adult Training and Education Survey data also shows that, in general, certificates in engineering, mechanical or technical

areas or law enforcement lead to higher income in comparison with a high school diploma, while those in cosmetology and culinary services do not pay off (Baum, Holzer and Luetmer, 2020[61]). Burning Glass Technologies also reports that in career fields that value industrial certifications, such as automotive and ICT, these credentials provide a wage premium of approximately 18% (Burning Glass Technologies, 2017[62]). Moreover, Ositelu, McCann and Laitinen highlight heterogeneity even within the same field. For example, some short programmes in the field of health bring positive labour market outcomes (such as registered nursing), while others do not bring any wage gains (such as certified nursing assistant) (Ositelu, Mc Cann and Laitinen, 2021[63]).

Stacking short-term credentials appears to lead to more favourable labour market outcomes

While evidence on the economic impact of accumulating credentials over time is limited, some evidence from North America suggests stacking short-term credentials improves learners' labour market performance. In the United States, Meyer, Bird and Castleman examined the effect of stacking community college credentials (short-term certificates, long-term certificates or associate degrees) by using a dataset of Virginia Community College System graduates. They estimate that individuals who obtained multiple credentials within the same field of study between 2000 and 2019 are four percentage points more likely to be employed and earn USD 570 more in quarterly wages than those who only completed one credential during the same period. The economic impact of stacking differs across fields of study – stacking in health results in the increase of five percentage points in employment, while that in business leads to the increase of ten percentage points. In addition, Meyer, Bird and Castleman report that individuals who first completed a short-term certificate have the highest and most consistent employment and wage returns to stacking, compared to those who obtained a long-term certificate or associate degree as their first credential (Meyer, Bird and Castleman, 2020[64]).

In Canada, Ntwari and Fecteau examined the economic benefits of short-term credentials among bachelor's degree holders by using administrative data. Their study shows that among graduates who completed a short-term credential, the share of individuals employed in low value-added service industries decreased from 22% two years before completing a programme to 10% two years after. In addition, the median income of the short-term credential holders grew faster than their cohort not pursuing a short-term credential. At the same time, it should be noted that the median income of the short-term credential holders was lower than their counterpart not holding a short-term credential two years before completing the credential, and still was below that of their counterpart two years after (Ntwari and Fecteau, 2020[65]).

These studies on stacking also indicate that learners tend to use micro-credentials to explore or upskill in topics not directly related to their original field of study. Ntwari and Fecteau report that, among bachelor's graduates who obtained a short-term credential after graduation, two-thirds of them earned a short-term credential in a field of study different from their bachelor's degree. Around one-third of graduates from social sciences and arts and humanities bachelor's programmes who have additional short-term credentials, for example, took short programmes in the field of business and administration (Ntwari and Fecteau, 2020[65]).

In addition, studies of non-completers suggest that increments of college study lead to a higher wage after graduation. The CAPSEE study, for instance, indicates that for non-completers, an increase in the number of credits accumulated leads to earning gains. This also reflects evidence carried out in the European context that found that non-completers who have achieved some higher education can still achieve greater rewards in the labour market than those who never enrolled at all in higher education (Schnepf, 2014[66]). However, the CAPSEE study also found that accumulating the number of credits required for an associate degree is not as valuable as completing an associate degree programme (Belfield and Bailey, 2017[59]).

Learners' profile also appears to influence the outcomes of shorter-duration credentials

Available evidence from the United States also shows that the economic outcomes of short-term credentials appear to be different depending on learners' gender, age, educational attainment, and race. Several studies report male short-term credential holders earn significantly more than female counterparts following completion of short-term credentials. For example, the Urban Institute examined the economic value of certificates by using the 2016 US Adult Training and Education Survey data, and reported that earning premium was higher for men than women (i.e. certificate holders earn 13% and 7% more than high school graduates, respectively) (Baum, Holzer and Luetmer, 2020[61]). However, the gender gap appears to be often related to occupational fields, with short-term credentials in more female-dominated occupations earning less than those in more male-dominated occupations, and some studies show higher earning gains for women than for men (for example, Belfield and Bailey (2017[59])).

In addition, other learner characteristics appear to have an impact on the value-adding of short-term credentials. The Urban Institute study, for example, reports a higher earning premium among younger learners (aged 25-44) than older ones (aged 45-64) (14 and 9 percentage points respectively) (Baum, Holzer and Luetmer, 2020[61]). Moreover, the Council for Community and Economic Research reports that the economic impact of completing industrial certifications and licences is larger among workers without a higher education degree than those with a degree, based on analysis using data from the US Bureau of Labor Statistics' Current Population Survey. While the weekly earnings of full-time workers with a degree increase by USD 68 with the completion of certifications and licenses (from USD 1 161 to USD 1 229), earnings of those without a degree raise by USD 104 (from USD 692 to USD 796) (Winkler, 2019[67]). The study on the economic impact of stacking credentials also shows that while white students enjoy high wage returns from accumulating multiple credentials, black students do not receive significant wage benefit from stacking (Meyer, Bird and Castleman, 2020[64]).

The bottom line: More work is needed to bring coherence and interpretability to the micro-credential space, and to illuminate the benefits of micro-credential programmes.

The evidence presented in this paper gives a snapshot of current micro-credential offerings in higher education, in terms of who is providing them, how they are evolving, and who is likely to benefit from them.

The analysis shows that while there are many innovative developments taking place, some fundamental actions are needed to fully unlock the potential of micro-credentials. Most fundamental of all is the need to promote widespread understanding and knowledge of higher education micro-credentials across systems, so that providers and governments can learn from each other's actions. Governments can play a role in promoting this understanding and knowledge by seeking to ensure that micro-credential offers (both new and existing) are coherent with each other, and that learners and employers are able to understand their characteristics and benefits.

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Higher Education Policy Team

This document was authored by Gillian Golden, Shizuka Kato and Thomas Weko of the Higher Education Policy Team at the OECD Directorate for Education and Skills. Research support was provided by Lisa Troy, editorial support by Stephen Flynn and Rachel Linden, and overall guidance by Paulo Santiago.

The Higher Education Policy Team carries out analysis on a wide range of higher education systems and policies. Its work is advised by the Group of National Experts on Higher Education, which assists the Education Policy Committee in guiding the OECD's work on higher education policy.

For more information

Contact: Gillian Golden (gillian.golden@oecd.org)

See: https://www.oecd.org/education/higher-education-policy/

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Annex A. Institutions reviewed for the study presented in section 2

Table A.1 provides a list of European institutions that were reviewed for the study in Section 2. The institutions were selected based on the 2016 edition of the European Tertiary Education Register (ETER). Mergers and institution reclassifications that have taken place subsequent to 2016 are noted in brackets next to the institution name.

Table A.1. European institutions reviewed

Country	Institution name
Austria	FH Campus Wien
	University of Applied Sciences Upper Austria
	University of Vienna
	Vienna University of Technology
Belgium (Flanders)	Artevelde University of Applied Sciences
	Ghent University
	KU Leuven
	University College Ghent
Czech Republic	Charles University
	College of Business in Prague
	Institute of Technology and Business in Ceské Budejovice
	Masaryk University
Denmark	Aarhus University
	Metropolitan University College
	University of Copenhagen
	VIA University College
Estonia	Estonian Entrepreneurship University of Applied Sciences
	Tallinn University of Applied Sciences
	Tallinn University of Technology
	University of Tartu
Finland	Aalto University
	Haaga-Helia University of Applied Sciences
	Metropolia University of Applied Sciences
	University of Helsinki
France	Aix-Marseille University
	Lille University
	Paris Dauphine University
	University of Lorraine
Germany	Baden-Wuerttemberg Cooperative State University
	FOM University of Applied Sciences
	University of Cologne

	University of Hagen
Greece	Aristotle University of Thessaloniki
	National and Kapodistrian University of Athens
	Piraeus University of Applied Sciences (now merged into the University of West Attica)
	Technological Educational Institute of Athens (now merged into the University of West Attica)
Hungary	Budapest Business School
	Budapest University of Technology and Economics
	Eötvös Loránd University
	Eszterházy Károly University
Ireland	Cork Institute of Technology (now merged into Munster Technological University)
	Dublin Institute of Technology (now merged into the Technological University of Dublin)
	University College Cork
	University College Dublin
Netherlands	Amsterdam University of Applied Sciences
	Fontys University of Applied Sciences
	University of Amsterdam
	Utrecht University
Norway	Oslo and Akershus University College of Applied Sciences (now merged into the Oslo Metropolitan University)
	South-Eastern Norway University College
	University of Bergen
	University of Oslo
Poland	Jagiellonian University in Cracow
	University of Warsaw
	Warsaw University of Technology
	Wroclaw University of Science and Technology
Portugal	Polytechnic Institute of Porto
	Polytechnical Institute of Lisbon
	University of Lisbon
	University of Porto
Slovak Republic	Comenius University in Bratislava
	Pan-European University
	Slovak University of Technology in Bratislava
	St. Elizabeth University of Health and Social Work in Bratislava
Slovenia	Alma Mater Europaea - European Centre Maribor
	DOBA Business School
	University of Ljubljana
	University of Maribor
Spain	Complutense University of Madrid
	University of Barcelona
	University of Granada
	University of Seville
Sweden	Mälardalen University
	Malmö University
	Stockholm University
	University of Gothenburg
Switzerland	Federal Institute of Technology Zurich
	University of Geneva
	University of Zurich
	Zurich University of Applied Sciences
United Kingdom	Manchester Metropolitan University

	University College London
	University of Birmingham
	University of Manchester

Source: Selected from the ETER 2016 edition (ETER, 2021[68])