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Quality and value of micro-credentials in higher education: Preparing for the future

This paper is Part B of a two-part Education Policy Perspective series on micro-credentials (See (OECD, 2021[1]) for Part A). It presents evidence on the extent to which higher education policy and practice environments are prepared to provide high-quality micro-credentials that equitably support educational and labour market aims. Key messages include the following:

- The number and diversity of micro-credential offerings have expanded substantially in recent years, accelerated by the onset of the COVID-19 pandemic.
- Institutional leaders see micro-credentials as a potentially valuable complement to existing higher education offerings. They plan to develop micro-credentials mainly by building on their institution's existing offerings or by creating completely new offerings through partnerships. Private providers are viewed both as allies and competitors, and institutions are emphatic that micro-credentials will need to be developed on an economically viable basis.
- Governments see the value of micro-credentials in upskilling and reskilling the labour force and widening access to higher education. Substantial investments have already been made by some governments across the OECD to increase the offering and uptake of micro-credentials.
- Micro-credentials can play a role in increasing the flexibility of higher education provision and promote collaboration among educational institutions and businesses. Micro-credential initiatives, property designed and targeted, can also promote greater equity of access to higher education.
- Some of the key challenges ahead for micro-credential development relate to ensuring that the benefits of micro-credentials are made available to learners across all groups of the population, providing a framework for widespread understanding and recognition of micro-credentials, and ensuring that learners have the information they need to choose micro-credentials that support their individual needs and career objectives.

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The quality and relevance of micro-credentials will depend on the actions of providers and governments

There has been an explosion of micro-credential initiatives across higher education systems in recent years. Higher education institutions have been creating and offering micro-credentials, sometimes independently, sometimes within an alliance of higher education institutions, and at other times in collaboration with firms, employers, or industry bodies. At the same time, various professional and government bodies, international organisations, researchers and working groups across the world have been developing frameworks and registries to support greater readability, portability, and especially recognition of micro-credentials. The abundance of frameworks available to policy makers and institutions has made it difficult to ensure that micro-credentials are documented in ways that are widely and commonly understood (Mah, Bellin-Mularski and Ifenthaler, 2016[2]; OECD, 2021[1]).

The actions of providers and governments in the coming years will shape the extent to which micro-credentials are offered by higher education providers, and their capacity to meet the hopes of proponents that they provide relevant, flexible and efficient means of delivering education and skills. This Education Policy Perspective examines how European higher education institutions envision the future of micro-credentials and notes current policy developments undertaken to support the successful integration of micro-credentials into higher education systems. It also reflects on the promises and challenges micro-credentials present to policy makers supporting their development.

1. Perspectives from European higher education institutions on the benefits and challenges of micro-credentials

Policy makers benefit from understanding the incentives and strategies of higher education institution leaders for developing short programmes, and their perspective on the opportunities and challenges posed by the emergence of micro-credentials. To obtain the views of institutional leaders, eight of the largest higher education institutions across Europe were selected to be interviewed (please see the Acknowledgements section for more information on the interviewees). For each of the eight institutions, individuals with leadership responsibilities in the area of teaching and learning were identified and asked a range of questions about their practices, strategies and viewpoints related to micro-credentials (Box 1). The following sections summarise the key findings from the interviews.

Box 1. OECD interview questions for higher education institution senior staff

- Does your institution plan to offer some/more targeted and short learning programmes and/or micro-credentials (or their equivalent), in the future?
  - If yes:
    - Why? What would be the benefits to learners and your institution?
    - For whom? Which learner profiles do you envisage targeting? (age, location, prior education level)
    - How? How would the development of these programmes be funded and staffed?
  - If no:
    - What factors underpin the decision not to create new short and targeted learning programmes?
- Does your institution have any practices relating to recognising credentials from micro-credentials or other short learning programmes offered by other institutions, and incorporating these into programmes?
  - If no:

  - Would it be willing to do so? What would you need to have sufficient confidence in the quality and level of a micro-credential to incorporate it into a degree study programme?
- On balance, do you see the emergence of micro-credentials as a welcome or unwelcome addition to the European Higher Education landscape?
- What would you recommend governments to do to support higher education institutions and learners?

Micro-credentials are seen as a valuable tool by institutional leaders

The interviewees in general see the emergence of micro-credentials as a welcome addition to the higher education landscape, and believe micro-credential programmes help higher education institutions accomplish their mission of supporting lifelong learning. They also think that micro-credentials can improve the responsiveness of higher education institutions to the needs of employers and learners, as these more targeted programmes allow participants to upskill and reskill in a shorter time than traditional degree programmes. Some interviewees mentioned the important role that micro-credential programmes could play in helping higher education institutions to stay connected with their alumni. Micro-credentials are envisaged as a means for institutions to maintain a continuing relationship with learners, where the learner has a high-quality experience during undergraduate study and then returns to the institution many times after graduation for further learning and to upgrade their skills.

Micro-credentials are considered complements, not alternatives, to traditional degrees

Importantly, the interviewees viewed micro-credential programmes as complementary to traditional degree programmes, rather than as substitutes for them. Some interviewees especially emphasised the enduring importance of full-time, in-person, and institutionally organised learning for younger students. Conventional degree programmes, they note, allow students to develop knowledge and skills in a coherent manner over the course of years and grow together with a group of peers. A similar value and experience cannot be realised by the accumulation of *à la carte* short learning programmes completed in a user-directed or unsystematic way. Micro-credential programmes are believed by many of the interviewees to be more suitable for mature learners seeking lifelong learning opportunities. The flexibility of these programmes can help mature learners balance studies, work and family responsibilities and allow them to focus only on the development of the specific knowledge and skills they need.

Institutions plan to build micro-credentials into their existing offerings and pursue partnerships

All the eight institutions that participated in the interviews plan to offer micro-credential initiatives in the near future, or to expand their current offer - demonstrating the traction that micro-credentials are gaining in the European higher education landscape. Interviewees described two main models for future micro-credential development: building on their existing offerings, and building completely new offerings through partnerships.

The majority of the interviewed institutions plan to integrate micro-credentials into their current offering. Some institutions are considering unbundling existing degree programmes to offer smaller chunks of learning as stand-alone learning opportunities. One of the institutions, for example, envisages unbundling existing postgraduate programmes into micro-credential programmes of a size of 7-8 European Credit Transfer and Accumulation System (ECTS) and creating a framework for credit accumulation into a degree award. Others plan to combine several existing short continuing education courses into one product. For instance, one institution plans on bundling several courses offered through its adult education office and offering them as micro-credential programmes with a size range of around 18-48 ECTS. Some also intend to continue with existing short programme models they believe are working well. For example, one institution intends to continue its current offering of certificate programmes through its lifelong learning

academy. The certificate programmes are composed of several courses and usually have an associated workload of 15 ECTS.

Beyond individual initiatives, many of the institutions are proceeding with the development of micro-credential programmes through partnerships and alliances with other higher education institutions, industry, and learning platforms. Five of the eight interviewed institutions are members of various European Universities Alliances, many of which are engaged in the process of developing micro-credential programmes as an alliance rather than as individual institutions (Box 2). Some interviewed institutions also plan to develop micro-credential programmes within the framework of digital education platforms (such as FutureLearn) in order to benefit from their infrastructure and experience of collaborating with industries.

Box 2. Developing micro-credential programmes through the European Universities Initiative

Several of the higher education institutions referred to the development of micro-credential programmes through European Universities Alliances. The European University for Well-Being (**EUniWell**), for example, is currently developing micro-credential programmes, with the aim of starting offering pilot programmes in the academic year 2021/22. The programmes will focus on well-being, and seven member institutions will collaborate in the development and delivery of these programmes. The programmes were developed after each member of the EuniWell network reviewed their offering to see how they could contribute to the EuniWell micro-credential programmes, and then subsequently mapped their offering and discussed the structure and content of the programmes.

Similarly, the **European Civic University** plans to offer micro-credential programmes on several topics, including climate change and socio-cultural heritage. Teachers across nine member higher education institutions are invited to submit a micro-credential programme proposal in these areas. Micro-credential programmes can be developed at both undergraduate and graduate levels, and the size of the programmes are expected to be around 5-15 ECTS. Cooperation among the member institutions is required for the approval of the programme proposals, for example, the involvement of lecturers from each institution. In both examples – EUniWell and the European Civic University - micro-credentials will be awarded from the alliance itself, rather than from the individual institution.

Interviewees mentioned that the European Universities Transforming to an Open Inclusive Academy for 2050 (**EUTOPIA**) and the Challenge-Driven, Accessible, Research-based and Mobile model for the co-creation of a European University aligned with the European Values, the European Green Deal and the Sustainable Development Goals (SDGs) (**CHARM-EU**) are also currently discussing joint development of micro-credential programmes.

There are other notable initiatives outside of the interviewed institutions, for example:

- The European Consortium of Innovative Universities (**ECIU**) published a white paper on micro-credentials in 2021, setting out their ongoing work on micro-credential development and their future strategy. The ECIU sees micro-credentials as a core component in their objective to provide personalised, challenge-based learning that harnesses innovative digital technologies. To achieve their objectives, the ECIU is actively developing a mechanism for recognition of micro-credentials across partner institutions and also contributing to international projects working on enhancing wider recognition of micro-credentials. As of January 2021, ECIU members had developed more than 70 micro-modules on topics related to the achievement of the SDGs, available to learners enrolled in their partner universities (ECIU, 2021[3]).
- The **EuroTeQ Engineering University** is developing micro-credentials and individual study paths for learners that will lead to either a EuroTeQ honours degree, or a "EuroTeQ professional" qualification for learners undertaking professional training and development (EuroTeQ Engineering University, 2021[4]).
- **Una Europa** is building joint micro-credentials for postgraduate education and professional training, that will be accredited by all partner institutions (Una Europa, 2021[5]).

Institutions target relatively well-educated adults for education programmes leading to micro-credentials

Leaders in some higher education institutions believe that the micro-credential programmes they offer should be open to all learners, while other leaders envisage the principal target population for higher education micro-credentials as individuals who have completed upper secondary education or a bachelor's degree. Regardless, interviewees noted that, in practice, micro-credential programmes are typically developed based upon existing higher education offerings. As a result, the complexity of skills cultivated in higher education micro-credential programmes tends to be at a similar level to the education content offered in bachelor and master programmes. The profile of learners who tend to enrol in programmes leading to micro-credentials, most of whom have previously completed a tertiary education programme, reflects this targeting of micro-credentials (OECD, 2021[1]).

Private providers of micro-credentials are viewed as helpful collaborators - and potential competitors

The higher education institution leaders interviewed are aware that private firms are expanding their micro-credential offerings, particularly firms in the ICT sector. Some higher education institutions plan to market their micro-credentials by focusing on their comparative strengths and advantages over private firms, such as being able to quickly integrate the results of cutting-edge research into education programmes, and their ability to articulate micro-credentials into credit towards degree programmes. On the other hand, some institutions perceive a limited capacity to compete with the resources available in large multi-national corporations. In a discussion on private providers, one of the interviewees observed, "*We will play this game as long as there is a space for us to play. But we will not compete with Google*".

Micro-credential programmes are expected to be a source of revenue for institutions or to run on a cost recovery basis

Interviews with institutional leaders show that new micro-credential programmes are being developed with a view to cost recovery, or even some margin of profitability. The extent to which institutions will offer micro-credentials will therefore depend on the available sources of funding to invest in their development.

The cost of micro-credential programmes or other short learning programmes is often borne by learners themselves, with employers sometimes paying on behalf of their employees (OECD, 2021[1]). Thus, access to these learning programmes may be limited to those who can afford them, or who have them paid for on their behalf. Some interviewees reported that in systems where higher education is largely publicly funded, learners are unaccustomed to paying for education and therefore reluctant to participate in fee-based upskilling and reskilling opportunities.

Institutional leaders proposed that governments can further support the development and uptake of micro-credential programmes by providing targeted funding to institutions and learners and providing financial incentives to employers. Examples of suggested support mechanisms included the provision of scholarships and learning accounts to learners and tax reductions for employers for training costs. Interviewed institutional leaders also cited examples of active labour market policies available to enhance upskilling provision by higher education institutions, such as the support of French Employment Centres (*pôle emploi*) for those taking selected short learning programmes. Similarly, the Vienna Employees Promotion Fund (*waff*) provides individuals with grants to enrol in short learning programmes supporting upskilling and reskilling.

Higher education institutions recognise that building trust is necessary for credential recognition and portability will be difficult

To achieve stackability and portability of micro-credentials, institutions need to establish recognition systems that can systematically accommodate a large volume of credentials. Interviewees reported that

currently, micro-credential programmes are often reviewed and recognised within institutions through their in-house Recognition of Prior Learning (RPL) scheme. However, this is generally not considered by interviewees to be scalable, as RPL is a manual process, where programme directors need to individually review each RPL application.

Interviewees identified two potential models for recognising micro-credentials at a larger scale. The first entails automatically allowing trust in small amounts (e.g. allowing recognition for prior learning up to 10% of a study programme). In some higher education systems and institutions, students are allowed to obtain a certain proportion of credits required to complete a degree programme, through learning outside of a programme (including micro-credentials). In Slovenia, for example, up to 10% of credits for a degree programme can be based on learning outside of the institution. Automatic recognition is granted for learning offered by Slovenian higher education institutions, although learning completed outside of the country still may require validation at the individual level.

A second model entails finding trusted partners with whom automatic recognition is possible. Provider partnerships are key for cross-recognition as well as for the development of micro-credential programmes. Members of European Universities Alliances, for example, grant automatic recognition of learning obtained at partner institutions (Box 2). Another institution interviewed has developed a partnership through the Erasmus+ mobility scheme, permitting automatic/streamlined recognition between partner institutions.

> "Micro-credentials first need to prove their value by themselves. Governments cannot do much for this… the quality of micro-credentials will be determined by employers."

There are varied views among higher education institutions about the extent to which, and how, governments should regulate micro-credentials

The interviewees provided mixed views on the role of governments in regulating micro-credential offerings. Some respondents indicated a need for guidelines from public authorities defining micro-credential programmes, and acknowledged the value of an accreditation process to maintain the quality of offerings and support recognition. Governments could also play a role in standardising some aspects of micro-credential programmes, in order to enable learners to understand and compare offerings. The Hungarian Adult Education Data Service System (*Felnőttképzési Adatszolgáltatási Rendszer*) was cited as a specific example. It is a centralised online learning portal that lists all short adult education programmes, including those offered by private providers. Learners sign up for these programmes through this portal and receive a standardised certificate issued by a training provider upon the completion of the programmes.

Others, however, stressed that regulations are currently limiting innovation, and these limitations need to be relaxed or removed. Different types of regulatory barriers were reported in each country. In some countries, an inflexible quality assurance system has been identified as a barrier that hinders higher education institutions from being innovative and developing micro-credential programmes. In federal countries, institutions may face the challenge of having different higher education regulations across federal states, limiting the portability of micro-credentials. Others find government regulations restricting the online provision of higher education programmes to be problematic.

At the same time, the interviewees did not always see governments as the key players when regulating the quality of micro-credentials. As one observed: "*micro-credentials first need to prove their value by themselves. Governments cannot do much for this… the quality of micro-credentials will be determined by employers*".

Conclusion – higher education institutions appear cautiously optimistic about micro-credentials, but highlight important challenges ahead

The micro-credential plans of European higher education institutions point to a cautious approach, bounded by available resources rather than a risk-taking orientation. The majority of the institutions plan their future micro-credential programmes by either unbundling or repackaging current in-house offerings, or building upon an existing partnership with a third-party learning platform provider. The members of the European Universities Alliances are leading the way in Europe in terms of developing new collaborative credentials. However, their development of joint micro-credentials programmes is often part of agreements linked to funding from the European Commission. Smaller higher education institutions acting alone may have still more difficulty in finding resources with which to develop their own micro-credential programmes.

Interviewees recognised that large ICT firms have financial resources, technical capacities, and global reputations within their fields that make direct competition challenging. Nevertheless, higher education leaders recognise that private firms are not only rivals, but also potentially useful collaborators. Firms may be keen to acquire learning resources from higher education institutions, or to provide technical and marketing capabilities that allow higher education institutions to reach new learners. Conversely, higher education institutions may find that firm- or industry-developed micro-credentials are attractive to their students, and opt to embed them within their programme offerings, permitting students to "top up" their degree qualifications. The small-scale, focused nature of micro-credentials can allow for innovative models of collaboration between higher education providers and industry partners to be designed and trialled, with limited risk for either party.

Higher education institutions generally have more latitude to charge fees to learners for short learning programmes. On the other hand, governments are less likely to provide funding to learners for such programmes. In the future, governments could play a stronger role in either directly supporting learners financially to enrol in micro-credential programmes or in ensuring and highlighting the value proposition of micro-credentials in order to convince learners and employers to invest in them. There are many ways that governments can support institutions to expand micro-credential offers, including revising quality assurance, redesigning recognition processes so that they can operate at scale, and ensuring learners have the information they need to make decisions about micro-credentials (see Section 3).

2. Public policy supporting micro-credential development

Governments are putting increasing value on short higher education programmes as a means of upskilling and reskilling the labour force, as well as a means of widening access to higher education. The economic disruptions of the pandemic have reinforced this trend further, and increasing numbers of governments have invested in the development of micro-credential programmes. Governments are taking a range of diverse approaches, to support local needs and integrate with or complement existing offerings.

Before the pandemic: Contrasting approaches from Ireland and New Zealand

Prior to the pandemic, several governments across the OECD had recognised the value of short higher education programmes and had invested in extending their scale and reach. Many of these investments have taken place in the context of expanding publicly funded upskilling and reskilling initiatives. However, approaches to the development of upskilling and reskilling programmes differ substantially across governments. Taking the example of two countries with similar population sizes – Ireland and New Zealand – the following paragraphs will discuss differences in characteristics of government-supported short learning programmes, such as their orientation, the role of employers, as well as their size and levels. These differences illustrate the different pathways that governments may take when designing support mechanisms for micro-credentials in higher education systems.

In 2011, the Government of **Ireland** launched Springboard (and, subsequently, Springboard+), a national upskilling and reskilling initiative offering free and heavily subsidised higher education programmes to the labour force, with priority given in many cases to unemployed individuals. Springboard+ aims to complement the provision of traditional higher education programmes and to support individuals to develop skills highly in demand in the labour market. It combines shorter and longer higher education programmes within the same initiative, recognising that reskilling and upskilling requirements may vary according to the field of study. The Springboard+ programmes are developed at different education levels (between Ireland's NFQ level 6 and 9, equivalent to International Standard Classification of Educational Qualifications (ISCED) level 5 to 7. They differ in credit size (from 10 to 100 ECTS) and can be full-time or part-time (Springboard+, 2021[6]).

New Zealand authorities also view micro-credentials as a complement to traditional higher education, although, in contrast to Ireland, their micro-credential programmes are defined as a stand-alone education offering and feature compulsory employer involvement. New Zealand has been one of the frontrunners in national policy making around micro-credentials. The New Zealand Qualifications Authority (NZQA) created a quality assurance system for micro-credentials in 2018, by defining them in specific regulations and setting their quality standards (New Zealand Qualifications Authority, 2021[7]). The New Zealand Tertiary Education Commission started providing funding to higher education providers for the development and delivery of micro-credential programmes in 2019. Fees may be charged to learners, but a maximum ceiling of NZD 60 (around USD 40) per credit is specified in regulations (New Zealand Tertiary Education Commission, 2020[8]).

Recognition of micro-credentials by the NZQA requires providers that they demonstrate their programmes do not duplicate existing higher education programmes, and address unmet skill needs in the labour market and society. The providers are also required to prove their capacity to deliver quality education. The micro-credential programmes approved by the NZQA are reviewed annually against the quality criteria. There are currently about 150 NZQA-approved micro-credential programmes offered by higher education institutions and other training providers, with the education level ranging from New Zealand Qualifications Framework (NZQF) level 2 to 8, equivalent to ISCED level 3 to 6. The workload of micro-credentials ranges between 5 and 40 credits (equivalent to 2.5-20 ECTS) (New Zealand Qualifications Authority, 2021[7]).

These two examples can be considered as opposite ends of the spectrum of potential characteristics for micro-credential offerings in higher education (Table 1).

Table 1. Differences in the characteristics of government-supported upskilling micro-credentials

	Ireland (Springboard)	New Zealand (NZQA)
Typical workload	10-60 ECTS	2.5-20 ECTS
National qualifications framework level of the award	ISCED 5-7	ISCED 3-6
Oriented to education advancement	Yes	No
Oriented to labour market	Yes	Yes
Employer role in design/approval	No	Yes
Learning outcomes assessed	Yes	Yes
Labour market outcomes tracked	Yes	Unknown
Level indication	Yes (NQF)	Yes (NQF)
Workload indication	Yes (ECTS)	Yes (NZ credits)
External review of programmes/providers	Yes	Yes
Stackable (within institution)	In some cases	Possible but not common
Portable (applicable to study programmes in other institutions)	Yes	No

The Irish Springboard+ programmes are generally much larger in terms of workload (at least 10 ECTS and on average around 45 ECTS), while more than half of the NZQA authorised micro-credential programmes are at the size of 5-10 ECTS. In addition, the Irish examples are developed at ISCED level 5-7, whereas most of the New Zealand examples provide a credential at ISCED level 4. On the other hand, the NZQA authorised programmes have strong national recognition, are very heavily oriented towards meeting the labour market demand, and have stronger employer involvement, whereas the Irish Springboard+ programmes are more heavily integrated into the traditional higher education system and often provide access to other education programmes (New Zealand Qualifications Authority, 2021[9]; Springboard+, 2021[6]).

Notably, the Irish government also envisages the future development of micro-credentials as a stand-alone education product that is widely recognised across the system, and integrate industry collaboration, in a similar way to the New Zealand model. It is supporting the development of a micro-credentials model through its Human Capital Initiative. This initiative was established in 2019 in order to increase institutional capacity in the higher education sector to support the development of national priority skills (Irish Higher Education Authority, 2020[10]).

One pillar of the Human Capital Initiative aims to promote innovation in teaching and learning and funds several initiatives, including the Towards a Multi-Campus Micro-Credentials (MC2) System project. The MC2 project is led by the Irish Universities Association and aims to establish a national framework for ECTS-bearing, quality-assured micro-credentials. It runs between 2020 and 2024 and aims to develop a structured process for university-industry collaboration and an online portal for learners to access information on micro-credential offerings, as well as the creation of the national micro-credential framework. The project also contains an implementation phase of work, to support universities with the development and rollout of micro-credential programmes (Irish Universities Association, 2021[11]).

Policy directions taken since the onset of the pandemic

The COVID-19 pandemic upended the jobs market in a way that has not been seen in living memory. In the immediate aftermath of the first lockdowns, as hundreds of millions of workers across the OECD became unemployed or moved onto job retention schemes, governments moved quickly to implement upskilling and reskilling policies to support the retraining of workers. Many of these strategies made use of short learning programmes, for example, providing funding for the development and uptake of short programmes for newly unemployed workers. While the intentions of such policies were generally similar, the specific policy levers adopted varied across jurisdictions (Table 2).

While some governments funded higher education institutions and other learning providers to develop and deliver short learning programmes, others provided financial support to learners to enrol in these programmes. Some governments also developed or announced a plan to develop an information portal

that lists available short-term programmes, with the aim of helping learners make informed study choices. In addition, a limited number of governments have started extending quality assurance systems to micro-credential programmes.

Table 2. Comparison of government short programme initiatives for upskilling and reskilling launched during the COVID-19 pandemic

Country	Timing of launch	Policy levers			
		Funding providers	Funding learners	Information portals	Quality assurance
Spain (Catalonia)	February 2020				X
Australia	April 2020		X	X	
Hungary	April 2020	X	X	X	
Portugal	May 2020	X			
Costa Rica	June 2020	X			
Denmark	June 2020		X		
United Kingdom (Scotland)	October 2020	X			
Canada (Ontario)	November 2020	X	X	X	
Norway	December 2020	X			
Japan	April 2021	X		X	

The **Hungarian** Government, for instance, started offering several short online programmes free of charge to support upskilling of individuals whose employment was affected by the pandemic. This initiative is part of the Economy Protection Action Plan initiated in April 2020, and its offering includes eight-week online IT courses that enrolled approximately 37 000 individuals. Those enrolled in these short programmes are also eligible to receive interest-free loans (Hungarian Ministry for Innovation and Technology, 2020[12]). In addition, the government launched a centralised online learning portal that allows learners to access information on all short adult education programmes in September 2020 (Adult Education Reporting System, 2021[13]).

Similarly, the **Portuguese** Government launched the "Skills 4 post-Covid - Skills for the Future" project in May 2020 as a response to the pandemic. It aims to support higher education institutions to respond effectively to society's needs in the post-pandemic period through education provision and research. As part of the initiative, higher education institutions are encouraged to create micro-credential programmes that help young graduates who have trouble entering the labour market and laid-off workers to develop specialised skills that are highly demanded in the labour market (Government of Portugal, 2020[14]).

The **Danish** Government has also implemented several upskilling and reskilling measures to support laid-off workers during the pandemic. In June 2020, the government announced the first investment of DKK 730 million (around USD 120 million) to allow workers in need of upskilling and reskilling to take short job-oriented courses while keeping their entitlement to receive the unemployment benefits (Danish Ministry of Employment, 2020[15]). In December 2020, the government set aside another budget of DKK 640 million (USD 100 million) to further support the upskilling and reskilling of the labour force. The December announcement incentivises individuals to develop skills in the fields of health and green recovery, while providing extensive training support to the hardest-hit regions and small and medium-sized enterprises (Danish Ministry of Employment, 2020[16]). In February 2021, the government agreed on an additional investment of DKK 300 million (USD 50 million) to further extend the above-mentioned government support (Danish Ministry of Employment, 2021[17]).

In addition, the **Scottish** Government launched the National Transition Training Fund of GBP 25 million (approximately USD 35 million) in October 2020 with the aim of providing short labour market-relevant training opportunities to unemployed adults. Part of this funding is provided to higher education institutions in the form of Additional University Upskilling Funding to support them to develop micro-credential programmes (Scottish Funding Council, 2021[18]).

Governments outside of Europe have also taken steps to increase micro-credential offerings as a response to the COVID-19 pandemic. The **Australian** Government, for instance, released the Higher Education Relief Package in April 2020 in order to support workers displaced by the pandemic. It provided 20 000 learners with a six-month full-time online study programme in the areas of teaching, nursing, health, IT and sciences at a discounted price (Open Universities Australia, 2021[19]). In addition, in June 2020, the government announced the additional investment of AUD 4 million (USD 3 million) to establish an online portal that allows learners to compare the offering of short courses by learning outcomes, duration, mode of delivery and credit point value. The portal is currently in development and will cover approximately 340 short courses that were developed as part of the Higher Education Relief Package (Parliament of Australia, 2020[20]).

In addition, the Government of **Costa Rica** launched an upskilling and reskilling programme in collaboration with a digital learning platform, Coursera, to confront the COVID-19 crisis. It allowed 50 000 individuals to access selected Coursera programmes that support developing three priority skills – career management skills, soft skills and technical skills, such as programming, cybersecurity, sustainability, blockchain, artificial intelligence, entrepreneurship and data science, through the period of June-December 2020 (CINDE, 2020[21]).

The Government of **Ontario** also announced the investment of CAD 60 million (around USD 50 million) on the development of micro-credentials in November 2020, with the aim of supporting individuals whose employment has been affected by the COVID-19 pandemic. The government plans to support several initiatives over three years. It provides funding to postsecondary education institutions for the development of new micro-credential programmes that respond to regional labour market needs and facilitate collaboration with employers. It also offers learners financial assistance to take micro-credential programmes through the Ontario Student Assistance Programme or the Second Career Programme. In addition, the government plans to create an online portal that lists micro-credential programmes to inform individuals who are in need of upskilling and reskilling (Government of Ontario, 2021[22]).

Moreover, the Government of **Japan** set aside a budget of JPY 9 billion (around USD 80 million) for the fiscal year 2021 to support several projects that aim to strengthen the provision of recurrent education (MEXT, 2020[23]). One of their projects supports higher education institutions to develop and offer short programmes (around 60 hours in total) that target individuals who are unemployed or hold temporary contracts. Forty higher education institutions received funding to develop and offer 63 programmes in total. These programmes focus on the fields where labour market demand is high, such as IT and healthcare, are designed in collaboration with local employment offices and businesses, and are offered in a flexible manner (in terms of schedule and delivery modes) (MEXT, 2021[24]). The fiscal year 2021 budget also funds the development of an information portal that offers information on recurrent education programmes (MEXT, 2020[23]).

Other government initiatives coincided with the onset of the pandemic, even if not developed as a direct reaction to it. For instance, the **Catalan** University Quality Assurance Agency (AQU Catalunya) started a pilot programme accrediting micro-credentials on an ex-ante basis in February 2020. To improve the offer of targeted and specialised training, AQU Catalunya designed and implemented short learning programmes (SLPs) that focus on specific learning needs in the workplace identified by individuals, companies or organisations. While these SLPs are not considered formal qualifications, they are intended to become a gateway between the higher education and professional training system. To this end, SLPs are designed at the level 2 and 3 of the Catalan Higher Education Qualifications Framework (equivalent to ISCED level 6 and 7) and as independent learning units of variable size (between 5 and 60 ECTS). These programmes also lead to a certificate award, which can be recognised in existing official degree structures. The first round of the project approved over 30 SLPs in the field of ICT offered by nine Catalan universities. In the next round, AQU Catalunya plans to accredit SLPs in the fields of automotive and renewable energies (AQU Catalunya, 2021[25]).

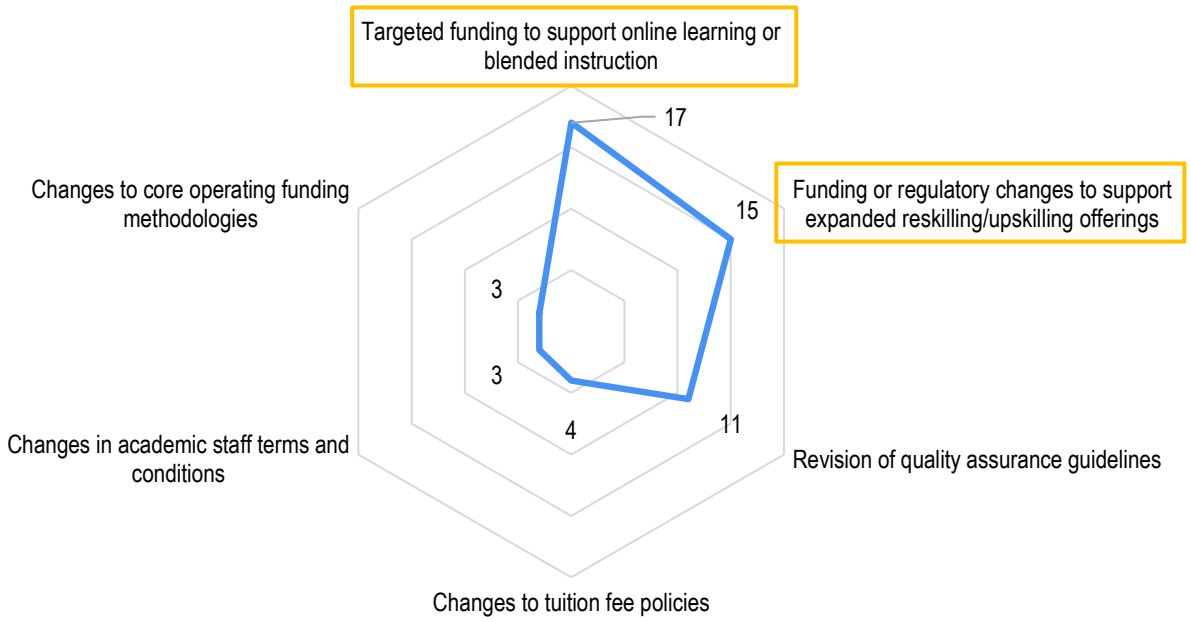
Similarly, the **Norwegian** Agency for International Cooperation and Quality Enhancement in Higher Education (Diku) and Competence Norway announced the investment of NOK 132 million (USD 15 million)

to support flexible further education offerings in December 2020. Norwegian higher education institutions can apply for grants to develop flexible further education programmes that allow learners who cannot enrol in a full degree programme, due to their location and their work and life commitments, to access higher education (Diku, 2020[26]).

Further policies are currently in development. According to the MICROBOL survey, the results of which were published in February 2021, some form of micro-credentials are offered in 22 countries and are being developed in another 3 out of the 35 European responding countries (Lantero, Finocchietti and Petrucci, 2021[27]). Following the pandemic, a number of jurisdictions are planning new initiatives related to upskilling/reskilling and digital education, as well as changes to quality assurance guidelines, all of which can improve the policy environment for micro-credential development. The OECD Higher Education Policy Survey (HEPS) 2020 indicated that 15 jurisdictions are actively considering funding or regulatory changes to support expanded upskilling and reskilling opportunities (56% of all responding jurisdictions) while 17 jurisdictions are discussing the provision of targeted funding to support online learning or blended instruction (63% of all responding jurisdictions) (Figure 1).

Figure 1. Higher education policy initiatives planned by governments following the COVID-19 pandemic (2020)

In answer to the question "What additional policy measures are under discussion or consideration in response to the impact of COVID-19 in your jurisdiction?"



Note: Total responding jurisdictions: 27.
Source: OECD Higher Education Policy Survey 2020.

This proliferation of policy activity, catalysed by the pandemic, provides ample opportunities for governments to innovate and learn from each other as the post-pandemic period begins to unfold. The pandemic has accelerated many of the transformations that were already in progress across economies worldwide, and given new impetus to the policy agenda for lifelong learning (OECD, 2021[28]). Micro-credential policies, when well-designed and widely implemented, can play an important role in boosting participation in lifelong learning.

3. The future of micro-credentials: possibilities, challenges, and potential solutions

Micro-credentials have considerable potential to support a more flexible, diversified, learner-oriented, and relevant higher education provision. Nonetheless, for their potential to be fully realised, there are a range of challenges that educators and governments must address. Below, we briefly note the potential of micro-credentials, and then turn our focus to challenges ahead. We conclude by noting some measures that public officials may wish to consider as they move forward with policy related to micro-credentials.

The potential of micro-credentials

Micro-credentials can increase the flexibility of education and training provision, and improve its alignment to labour markets

As discussed in the previous sections, micro-credentials are increasingly recognised by institutions as a means to deliver more flexible and personalised pathways for learners to upskill and reskill throughout life. Governments see them as a tool for reducing unemployment and labour market mismatch, as they support learners who cannot enrol in a full degree programme, due to their location and/or work and life commitments, to access an expanded range of upskilling and reskilling opportunities.

There are ways in which micro-credentials may be even more suited than traditional higher education programmes to fill the needs of some categories of learners and employers. Research suggests that further increasing educational attainment rates may not be the best solution for labour market mismatch, since existing skills of workers are often not recognised or utilised, and active identification of skills gaps can also be a healthy inception point for acquiring new skills (Cedefop, 2018[29]).

Micro-credentials have the advantage of speed – they can be rapidly developed and deployed, especially when delivered digitally. As a result, micro-credentials have the potential to permit rapid correction of minor labour market imbalances. For example, micro-credentials can provide a solution in cases where a prospective employee is generally qualified for a role but has a deficit in one particular required skill. Moreover, micro-credentials can also be useful for surfacing and signalling existing skills. When delivered in the context of a trusted and well-recognised framework, they can offer a way for individuals to convey the extent of their skillset to current and prospective employers, and open up new career opportunities as a result.

Micro-credentials can also mitigate against the obsolescence of skills in many professions by providing professionals with the opportunity to continuously upskill in small amounts. Where employers identify an emerging skill that is important to cultivate across their workforce, micro-credentials could be employed to quickly remedy the gap in expertise. Given their focus on the acquisition of specific skills, micro-credentials have also been characterised as a means of 'disciplining' the classification and framing of the higher education curriculum to better align it with the requirements of the workplace (Wheelahan and Moodie, 2021[30]).

The flexibility of micro-credentials could play an integral part in supporting smoother pivots and transitions in the labour market for all adults, not just those requiring upskilling or reskilling. Evidence indicates that prime-age workers of today are much less likely than earlier generations to follow linear career paths, and are increasingly likely to seek job and career changes throughout their lives (City & Guilds Group, 2021[31]). Micro-credentials can offer a way for learners to test a new subject or career field before committing to a job change or more comprehensive retraining, reducing the risk associated with career pivots. According to a study conducted by Statistics Canada, two-thirds of recent bachelor's graduates who completed an additional short-term credential earned it in a field of study different from their bachelor's degree (Ntwari and Fecteau, 2020[32]).

Micro-credentials can widen and deepen collaboration among educational institutions, professional bodies, and firms

Multi-actor collaboration is increasingly recognised as one of the most important general drivers of innovation (Torfing, 2019[33]). Employer-supported courses and continuing professional education provided by higher education institutions to enterprises are a type of informal collaboration and a means of knowledge transfer between higher education institutions and industry (OECD, 2019[34]). If micro-credential programmes are systematically co-created as partnerships between higher education institutions, professional bodies and industry, their learning content can simultaneously reflect both the latest research and professional best practices. Thus, collaborative micro-credential initiatives have the potential to provide effective and efficient means of improving skills and supporting excellence within professions.

As an example, Digital Promise, a non-profit organisation in the United States, brings together over 400 micro-credentials for educators, covering a range of skills, and offers a promising model for research-based professional development in the field of education (Box 3).

Box 3. The Digital Promise collaborative micro-credentials initiative

Digital Promise is a not-for-profit, US-based organisation founded to accelerate innovation and excellence in the field of education that has been operating micro-credentials since 2014. The organisation offers customised professional development opportunities on specific competencies with real-world applications.

Currently, Digital Promise offers over 450 research-backed micro-credentials relevant to early childhood education, school education, higher education and adult learning. Educators who participate can earn subject-specific digital badges that may count as continuing education credits in their respective states, and/or districts. Over 50 partners, ranging from higher education institutions to non-profit organisations, collaborate with Digital Promise to create its research-based content, aid in assessing submissions and help to award badges. Compared to traditional “sit and git” professional development programme, benefits are threefold:

- Personalised: The customised structure of the programme puts the professional in control of choosing relevant, research-based content best aligned to career goals and professional development requirements.
- Flexible: The programme is flexible as courses of study are offered on demand. Educators have the choice to work alone or join a learning community.
- Mastery-based: Demonstrated performance of the subject matter is required to earn a micro-credential. Evaluation criteria are clearly outlined for each submission, and each submission is subjected to rigorous assessment and feedback (Digital Promise, 2021[35]).

An evaluation of micro-credentials for educators by New America (Tooley and Hood, 2021[36]) found that micro-credentials have many advantages over traditional continuing professional development opportunities, giving educators more empowerment and flexibility over their professional development and being less costly in terms of time and financial outlay. However, more research is necessary to fill many gaps in knowledge about micro-credentials for educators, including a lack of general understanding on their quality and impact. Other challenges also exist, related to accreditation, widespread understanding and clear articulation of the credentials, and improving awareness of and motivation to undertake micro-credential programmes among educators. Nevertheless, states are increasingly embedding micro-credentials through legislation or as policy developed by their Department of Education (Digital Promise, 2021[37]).

Similarly, the Queensland Government's Micro-credentialing Pilots Programme, supports strategic partnerships in priority industries. Their funded projects include a collaboration between the Queensland Tourism Industry Council and the National Disability Insurance Scheme that offers micro-credential programmes on tourism and hospitality to 1 750 individuals with disabilities (Government of Queensland, 2021[38]).

Challenges ahead for micro-credentials

There is a risk that micro-credential innovations will deepen existing inequalities in access to higher education and lifelong learning

Learners who avail of non-formal education and training opportunities are not evenly distributed throughout the population. Participants in many forms of non-formal education and training are disproportionately drawn from groups of the population that already enjoy comparative labour market advantages, such as tertiary education graduates, those with strong digital skills, males (in some fields), those with the means to fund expensive course fees, and those with financial or social support from employers (OECD, 2021[1]). Without concerted policy effort, there is a real risk that expanding micro-credential offerings will create a similar dynamic as many other forms of lifelong learning, becoming primarily a means of accumulating educational advantage for some population groups rather than a tool for remediating missed opportunities for education and skill development (van Damme, 2014[39]).

Comprehensive public financial supports can help to improve access to micro-credentials for learners in less advantaged circumstances. However, currently, financial support for learners to acquire micro-credentials – at least through established higher education financial support policies – appears far from comprehensive. The 2020 OECD HEPS results showed that financial supports for learners are mostly available for traditional higher education programmes and modes of study. While a majority of jurisdictions reported that student loans or grants are available to support learners enrolled in higher education, financial supports are far more likely to be available for traditional full-time bachelors programmes than short, non-degree programmes. Such supports tend to be inaccessible for modes of study and modes of delivery that are typically used to deliver micro-credential programmes, i.e. part-time and online learning (Table 3).

Thus, the flexible and targeted non-degree learning opportunities in higher education are often fee-based, funded by either learners or their employers, rather than public financial support programmes. Consequently, there is a risk that the swift expansion of micro-credential opportunities will further widen gaps in skills and advancement, permitting relatively affluent learners employed in firms with generous support for reskilling to capitalise on micro-credential opportunities that others lack.

Table 3. Number of jurisdictions providing grant and loan support by programme type

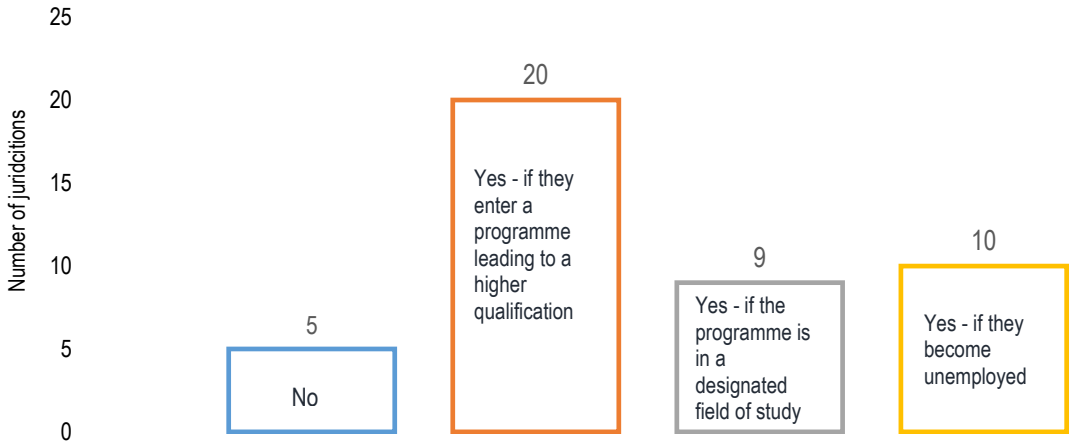
	Grant support				Loan support for tuition fees				Loan support for living expenses			
	Short programmes less than 2 years	Short-cycle programmes	Bachelor programmes	Master or equivalent programme	Short programmes less than 2 years	Short-cycle programmes	Bachelor programmes	Master or equivalent programme	Short programmes less than 2 years	Short-cycle programmes	Bachelor programmes	Master or equivalent programme
Full-time	8	19	28	24	8	15	21	20	8	15	21	21
Part-time	4	10	16	14	7	10	17	15	5	9	15	15
Blended learning	4	11	17	13	6	10	16	15	5	9	15	15
Fully online	5	9	15	12	5	8	13	13	5	8	12	11

Note: The total number of responding jurisdictions was 28 for grant support and 23 for loan support.
Source: OECD Higher Education Policy Survey 2020.

Moreover, despite increasing government focus on lifelong learning, existing financial supports are often designed to fund one continuous period of higher education, which generally takes place during young adulthood, rather than facilitating a lifelong habit of engaging in shorter learning, upskilling and reskilling experiences. The 2020 OECD HEPS examined the extent to which learners who have already received funding for a higher education degree are eligible to obtain additional student financial assistance to re-enter higher education (Figure 2). The results show that targeted funding is most commonly available for learners who can enrol in a programme leading to an advanced qualification.

Figure 2. Availability of targeted funding for previous higher education learners to re-enrol

In answer to the survey question: "Are there circumstances in which adults who have previously received student financial support for a first higher education qualification receive student financial support again if they re-enter higher education?"

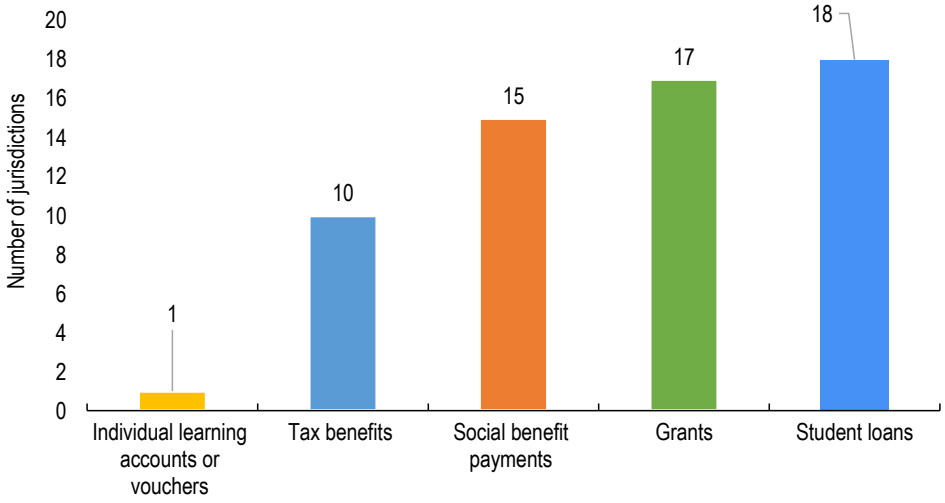


Note: Total responding jurisdictions: 28.
Source: OECD Higher Education Policy Survey 2020.

When public financial support for upskilling and reskilling is available, it is provided in different forms. According to the OECD HEPS 2020, student loans, grants and social benefit payments are the most commonly used forms of support across OECD countries and economies (Figure 3). Some jurisdictions also offer tax benefits to support upskilling and reskilling. Only one of the responding jurisdictions reported that funding mechanisms that are aligned to lifelong learning, such as individual learning accounts or vouchers, were available as a means of funding learners' upskilling and reskilling efforts. Individual learning accounts appear to be well-suited to supporting learner access to targeted learning programmes on an as-needed basis throughout their lives, although research and existing policy and practice show that a number of important design considerations need to be taken into account when implementing individual learning account initiatives (Box 4).

Thus, some elements of the current funding mechanisms for higher education learners may need thoughtful redesign, so that they may more appropriately support equitable access to the educational and labour market opportunities provided by micro-credentials, and be more coherent with government objectives on lifelong learning.

Figure 3. Types of public financial support available for upskilling and reskilling



Note: Total responding jurisdictions: 28.
Source: OECD Higher Education Policy Survey 2020.

Box 4. Lessons from OECD research on individual learning schemes to support lifelong learning

Individual learning schemes – "*training schemes that are attached to individuals (rather than to a specific employer or employment status) and which are at their disposal to undertake continuous training along their working lives and at their own initiative*" - exist around the world. Within the OECD, France is the only example of an individual learning scheme permitting each labour force participant a savings-like account in which accumulated credits can be used at any stage of professional life. Created in 2015, the *Compte personnel de formation* (CPF) allows all labour force participants who are likely to change their job or their employment status to access training financed through a compulsory training levy on firms using their account credits.

In other jurisdictions, individual learning schemes do not create individual learning accounts, but instead permit individuals to access public funds for the support of training throughout life, often with a contribution from the individual**.** In Scotland, for example, Individual Learning Accounts allow labour force participants with an income below a certain threshold to obtain up to GBP 200 towards a single course per year in areas relevant for the labour market. The Upper Austria *Bildungskonto* covers 30% of vocationally oriented training fees up to a maximum of EUR 2 000, with a special focus on the medium-level skilled workers and women returning from parental leave.

On a similar basis, Individual Training Accounts in the states of Michigan and Washington in the United States allow learners to receive financial support for eligible training programmes related to in-demand occupations and linked to priority curriculum areas. In Singapore, the SkillsFuture Credit encourages skills development and lifelong learning among all citizens aged 25 and above by providing them with SGD 500 in an account that can then be used for any training programmes approved by the government agency.

Designing equitable and effective individual learning schemes has proven challenging. One major issue is generating participation among under-represented groups of participants, including persons with low education, workers in low-skill occupations, in non-standard contracts or small firms, or women returning from parental leave. Low participation rates among these groups result, in part, from low levels of prior skills and expectations of limited wage gains. For example, among those in France who are eligible to

receive CPF funding, employers in managerial occupations are three times more likely than blue-collar workers to participate in CPF training.

In light of modest wage gains for short-duration training among low-skilled learners, raising rates of participation appears to require substantial learner financial support. Strong quality-assurance arrangements are also advisable, including relevant and up-to-date information on the quality of different training providers and programmes through certificates or quality labels. This can be accompanied, as French policy makers have proposed, by permitting participants to rate their training programme and provider, and making this information publicly available.

Source: OECD (2019[40]), Individual Learning Accounts: Panacea or Pandora's Box?, https://dx.doi.org/10.1787/203b21a8-en.

Learners lack information about micro-credential offerings and benefits

Governments and higher education institutions will need to ensure that learners can easily access micro-credentials in order to ensure that investment in their creation pays off. Currently, learners lack basic and easily accessible information about which micro-credentials are available and how they compare. While web portals of higher education offerings (both government-sponsored and commercial) are now a common feature of the higher education landscape (Hofer, Zhivkovikj and Smyth, 2020[41]), these generally do not incorporate micro-credentials. Online digital learning platforms do present information on a range of offerings and providers in a comparable way, and learners are certainly becoming increasingly familiar with these platforms, and engaging with them in greater numbers (OECD, 2021[1]). At the same time, online learning platforms account for only a small fraction of the overall offer of short learning programmes, and learners are unable to compare offerings across learning platforms systematically.

Learners also have little or no information about either the educational or the labour market benefits of micro-credentials. Learners who seek a micro-credential with the aim of having it recognised as part of a wider academic programme typically do not have information about the prospects of their micro-credential being recognised by a higher education institution and stackable into a degree programme. Furthermore, there is a lack of information about the labour market outcomes of micro-credentials (OECD, 2021[1]). Micro-credentials are not integrated into labour force or household surveys, into population censuses, graduate tracking surveys, or adult education and training surveys. The common practice of linking labour market outcomes to educational records and using this to feed consumer information portals (Hofer, Zhivkovikj and Smyth, 2020[41]) does not extend to micro-credentials.

Identifying the labour market outcomes associated with micro-credentials is a much more difficult task than it is for degrees. Providers often develop micro-credential programmes without public subsidies, limiting the ability of public authorities to mandate the collection of data from them. Many micro-credentials recognise learning experiences of such brevity – a few ECTS – that the identification of wage and employment effects will prove difficult, as it has been for many job-training interventions (Lechner and Melly, 2007[42]).

It is also unclear to what extent higher education institutions are maintaining records about learners on their micro-credential programmes, particularly for programmes offered through online platforms. The degree to which higher education institutions are following the progress of micro-credential learners (for example, by monitoring their completion rates and including them in graduate survey samples) is also unclear.

In addition, micro-credential programmes are intended to be flexible and responsive means of meeting learner and labour market needs. This means that micro-credentials will be more swiftly created, revised and terminated than academic degree programmes, and, on balance, will be more variable from one provider to another. For providers, maintaining updated information for learners and public authorities about micro-credentials will be more burdensome than is the case for more stable degree programmes.

As a result, it is likely that meaningful comparisons of the effects of micro-credentials will present a persistent challenge for learners and policy makers.

Widespread recognition of micro-credentials by academic institutions is not yet well-established, limiting their portability and stackability

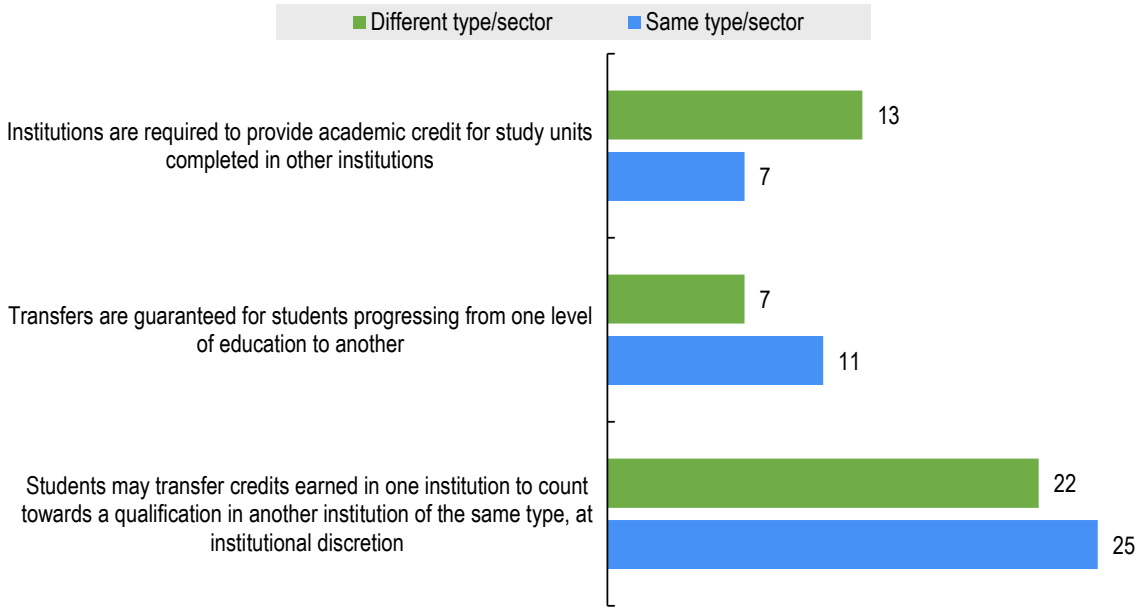
A basic benefit of micro-credentials - in principle - is that they provide learners with a credential widely recognised by other education institutions, making them portable (from one provider to another) and stackable into an academic degree. If digitally awarded – and stored using blockchain technology – the micro-credential is envisioned to be not only portable and stackable, but also a learner-owned and easily shareable qualification (OECD, 2021[1]).

Recognition of learning is a work in continuous progress, even within the framework of conventional academic degree programmes. Evidence from the OECD HEPS 2020 shows that the recognition of learning undertaken in conventional academic degree programmes is far from automatic. While institutions have discretion to accept transferred credits from another institution in most jurisdictions, in most jurisdictions they are not required to do so, and transfer pathways are not guaranteed for students seeking to progress from one level to another (Figure 4).

Progress towards ensuring widespread recognition of traditional degree programmes between institutions has been slow, despite numerous supportive national and supranational policy initiatives. As discussed in Section 2, the development of infrastructures that may eventually provide for the efficient recognition of micro-credential-based learning has commenced. However, given the lack of supporting infrastructure in the wider higher education system, working towards wide-ranging recognition of learning from micro-credentials will likewise be a continuous, long-term undertaking. There are two important aspects of this recognition barrier: the challenge of equivalence and the challenge of quality. Below, we discuss each of these challenges in turn.

Figure 4. Transfer pathways available to students following traditional higher education programmes

Number of jurisdictions confirming the existence of each of the following transfer pathways



Note: Total responding jurisdictions: 27.
Source: OECD Higher Education Policy Survey 2020.

Micro-credentials and the challenge of equivalence

To recognise a learning experience from a micro-credential and incorporate it into a degree programme, higher education institutions must first solve a problem of equivalence: what is this learning experience equivalent to in our curriculum?

Higher education systems with the long-standing modularised organisation of the curriculum typically have a highly developed infrastructure for establishing the equivalence of learning. Elements of this infrastructure may include a qualification framework, common credit metric (e.g. the European Credit Transfer and Accumulation System (ECTS)), and, in some jurisdictions, transfer and articulation agreements: formal and published agreements among higher education institutions about the equivalence of courses in their curricula.

Policy makers and education providers across Europe and the OECD have begun to extend the infrastructure of academic degree recognition and equivalence to micro-credentials. In a few jurisdictions, national qualification frameworks have incorporated micro-credentials (see Section 2). It is also already commonplace for higher education institutions to express the study load associated with micro-credentials using a national or European credit metric (OECD, 2021[1]). These are important first steps, identifying the level at which learning has taken place and the amount of learning activity (or, workload), respectively. These are also necessary steps to ensure the eventual cross-border recognition of micro-credentials. However, these steps alone do not provide educators with the full set of information needed to establish the equivalence of learning activities.

One solution to establishing the equivalence of learning represented by micro-credentials is for providers to share in the development of courses, and jointly award and recognise micro-credentials, as in the case of the European Universities (Box 2). Jointly developed and awarded micro-credentials offer a complete solution to the equivalence challenges among consortium membership, creating “islands of trust”. However, collaboration within alliances does not solve the equivalence problem at scale. Thus, a host of other organisations have focused on the development of scalable solutions. Most of these solutions focus solely on the creation of common standards with respect to the description, validation and sharing of credentials, including micro-credentials (Table 4).

Table 4. Selected standards for describing and sharing micro-credentials

	Creator/Owner	Description
Credential Transparency Description Language	Credential Engine	It provides a common, unified, consistent and transparent vocabulary for describing credentials, making it possible to compare that credential’s data across all other credentials in the registry (Credential Engine, 2021[43]).
Credentify	MicroHE Consortium	It is an API service that enables universities and students to issue and receive micro-credentials that can be stacked into ECTS (Credentify, 2021[44]).
Digital Credentials Initiative	Consortium of universities coordinated by MIT (United States)	It is a central platform for storing students’ achievement records based on key infrastructures, public ledgers and blockchains that aims to become the standard for storing and verifying the authenticity of credentials (Orr, Pupinis and Kirdulytė, 2020[45]).
Digitary	Digitary	It is an online platform used to verify the authenticity of degrees, transcripts, or other academic records (Digitary, 2021[46]).
Diploma Supplement	Council of Europe, European Commission and UNESCO	It is designed as an aid to support the recognition of academic qualifications. It contains information such as the holder of the qualification, the qualification type, the content and the results of the qualification, as well as some details on the national higher education system) (European Commission, 2021[47]).
Europass Digital Credentials Infrastructure (EDCI)	European Commission	It is a set of standards, services and software that allow institutions to issue digital, tamper-proof qualifications and other learning credentials within the European Education Area (Orr, Pupinis and Kirdulytė, 2020[45]).
Open Education Passport	OEPass Consortium	It is a standard format for describing open education and virtual mobility experiences in terms of ECTS using a project segmented in five steps (Open Education Passport, 2021[48]).

In Europe, the MICROBOL Working Group on Recognition has outlined an ambitious standard for the description and sharing of micro-credentials, which includes:

> *"…Identification of the learner; title of the micro-credential; country/region of the issuer; awarding body; date of issuing; notional workload needed to achieve the learning outcomes (in ECTS, wherever possible); level (and cycle, if applicable) of the learning experience leading to the micro-credential (European Qualifications Framework (EQF) and/or national qualifications framework); learning outcomes and form of participation in the learning activity (online, onsite or blended, volunteering, work experience)." (MICROBOL, 2021, p. 3[49]).*

They note that further elements might include:

> *"…prerequisites needed to enrol in the learning activity; type of assessment (testing, application of a skill, portfolio, recognition of prior learning, etc.); supervision and identity verification during assessment (unsupervised with no identity verification, supervised with no identity verification, supervised online or onsite with identity verification); quality assurance of the credential and, where relevant, of the learning content; grade achieved and integration/stackability options (stand-alone, independent micro-credential / integrated, stackable towards another credential)." (MICROBOL, 2021, p. 3[49]).*

While it is a promising development that resources are being invested in the creation of common standards, there is a risk that the international proliferation of common standard initiatives will risk further complicating, rather than simplifying, the issue of equivalence. Micro-credential providers need the clarity and ease that comes with developing credentials aligned to one common standard – or at least with clear interoperability standards. Learners and employers, too, will derive more benefit from micro-credentials if described and shared using common standards.

Arguably, the least challenging feature of common standard initiatives is the development of technical criteria for transmitting, storing, and verifying micro-credentials. While emerging technologies such as blockchain offer a promising means for storing and sharing credentials, they do not provide a panacea for the establishment of equivalence, as the challenge is more social than technological in nature (Box 5).

Box 5. Blockchain for storing and sharing higher education qualifications

A blockchain is a distributed ledger that allows records to be continuously appended, creating an irreversible timeline of transactional data. Unlike traditional databases, data are stored in "blocks" rather than tables, and appended onto other blocks in a chain formation. Before data is appended to the blockchain, it must first be verified by consensus by a distributed network of participants in the blockchain. The resulting data structure is a secure ledger of transactions that cannot be altered and does not depend on any central authority.

Blockchain is a rapidly maturing technology that might eventually transform education credentialling. It has been heralded as "*a reliable, user-friendly credentialing system that can replace lumpy and expensive degrees, and help unbundle the institutional monopolies that often come with them…. If everybody….can upskill and reskill and have blockchain-verified qualifications at their fingers, job-changing will be faster and more fluid, and much less anxiety-ridden*." While blockchain has been promoted as a means to permit automatic credit recognition between institutions, recent research has found that the barriers to automatic credit recognition are mainly social rather than technological – the main hurdle is building consensus among actors in education systems, rather than a lack of digital means to conduct the transfer.

Nevertheless, blockchain is a potentially useful technology to ensure the persistence of education credentials even where the provider of credentials ceases to exist. Recent OECD research stresses the need for blockchain technology to be combined with widely agreed open digital standards, to avoid

siloisation of credential databases and maximise interpretability of credentials data stored in blockchains. If blockchain technology is widely adapted in conjunction with open common standards for credentialling, it has the potential to make credential verification substantially quicker and less administratively intensive (and therefore cheaper). It also potentially provides more security, eliminating credentials fraud and forgery. Moreover, blockchain technology enables direct ownership of digital credentials by both issuers and recipients, avoiding the need for constant revalidation of credentials by issuers.

Blockchain technologies have been trialled in education systems worldwide, and their use is likely to grow exponentially in the coming years as education systems seek to combat fraud and reduce costs associated with issuing and verifying increasing numbers of credentials, including micro-credentials.

Source: OECD (2021[50]), OECD Digital Education Outlook 2021: Pushing the Frontiers with Artificial Intelligence, Blockchain and Robots, https://dx.doi.org/10.1787/589b283f-en.

Micro-credentials and the challenge of quality

Even if common standards make it possible to assess the equivalence of level, workload, and stated learning outcomes associated with a micro-credential, a key question remains unanswered: has the learner achieved these stated learning outcomes at a level that is sufficient to merit recognition – and the application of their micro-credential to an academic degree programme?

Higher education quality assurance systems in the European Higher Education Area have mature procedures to assure the quality of provision leading to the award of academic degrees. However, these procedures do not fully extend to micro-credentials. A survey conducted by the MICROBOL project identified six countries with provisions for micro-credential quality assurance through external quality assurance programmatic accreditation, and seven countries in which institutional accreditation encompassed micro-credentials. An additional fifteen countries reported that micro-credentials are not explicitly mentioned in the quality assurance system, but implicitly fall within its purview (Lantero, Finocchietti and Petrucci, 2021[27]).

There will be a sustained period of adaptation on the part of quality assurance systems as they begin to assimilate micro-credentials. External quality assurance regimes were developed to assure the quality of face-to-face provision, and external assurance agencies often have not yet fully adapted to the online and hybrid modes of delivery through which micro-credentials are typically offered. Higher education institutions that develop and manage micro-credential programmes bear responsibility for the quality of learning that they recognise when awarding micro-credentials. However, in light of the brief experience many higher education institutions have with micro-credential offerings, mature institutional-quality policies that are adapted to the learners and target competencies are yet unlikely to be widely in place. Additionally, firms, as well as conventional higher education institutions, may eventually become key providers of micro-credentials, and as such function outside the purview of national quality assurance bodies.

These quality challenges put greater emphasis on the role of assessment and the description of learning outcomes for micro-credentials. Indeed, the most important and difficult element of the common standards for micro-credentials proposed by various bodies may be the description of learning outcomes and the method of assessment used to measure those outcomes. Establishing the equivalence of learning achieved requires finer-grained information than NQF level and ECTS units, and descriptions of learning outcomes are intended to fill this gap. However, much work remains if learning outcomes are to become an effective and efficient step in establishing equivalence and recognition. Left unstructured, the descriptors of learning outcomes created by each provider can overwhelm the exchange of information, and make search and comparison impossibly costly. An agreed taxonomy of learning outcomes – or an artificial intelligence solution – appears to be a prerequisite for progress.

There is wide agreement among bodies engaged in the development of quality standards for micro-credentials that learning assessment should be a key feature of common standards (Kato, Galán-Muros and Weko, 2020[51]). There is an emerging shared view that assessment will play an important role in underpinning recognition, stacking and portability. Going further, some actors envisage a future where micro-credentials could be awarded by institutions based on assessment only, without having an associated learning experience provided by the institution. This highlights the central role that robust assessment plays within higher education systems in generating widely trusted evidence of learning outcomes.

In degree programmes that prepare graduates for entry into regulated or licensed professions (e.g. law, medicine, nursing, and architecture), assessments at the end of a programme will normally be compulsory. Outside of – but linked to – higher education, assessment frameworks play a key role in providing evidence of learning outcomes. Industry-recognised certifications, such as Cisco or Microsoft certifications, rely upon assessments as a basis for the award of their credentials. The strength of these assessment frameworks lies in the fact that they measure achievement against a set of constructs, and they generate sufficient predictive validity and meaning that firms and education institutions confidently use them to take decisions about employment, advancement, or the award of academic credit. An example of such a framework is the Common European Framework of Reference for Languages, with its familiar structure of A1 to C2 competency levels.

In summary, the common standards proposed for the use and reporting of summative assessments will provide evidence that assessments have taken place, and been conducted under conditions of testing integrity. However, they are unlikely to be sufficient to generate trusted evidence of learning outcomes similar to what is achieved through the widely recognised assessment frameworks used in professional licensing and industry certification. Some micro-credential initiatives may, in time, develop widely recognised assessment frameworks, or incorporate those developed by industries or professions. However, many micro-credential programmes are unlikely to do so. The development of robust assessment frameworks for learning outcomes is suited to stable educational offerings delivered at a large scale. Many micro-credentials offerings will be locally developed or swiftly revised to meet changing learner needs, and are likely to be poor candidates for the establishment of robust associated learning outcome assessments.

Policy options for micro-credentials

The challenges raised in the previous section, and by the interviewed higher education institution leaders, will require concerted policy action on a number of fronts if micro-credentials are to meet their potential. At the same time, solutions to address barriers to recognition and quality assurance of micro-credentials need to be proportionate to the scale and importance of micro-credentials within higher education systems. Above all, policy solutions need to lead to workable processes for providers and bodies responsible for quality assurance. We conclude by briefly noting some promising policy options to promote better information for and about micro-credential learners, to support the recognition, portability and stackability of micro-credentials and to establish micro-credentials as a tool that can promote inclusion.

Information portals can support learner decisions about micro-credentials

In most countries, learners do not yet have a trusted source of public information that permits them to compare systematically the key features of micro-credentials offered by higher education institutions (or, indeed, other providers). In the United States, a voluntary and foundation-supported initiative, Credential Engine, has sought to build a credential registry “to house information about all credentials, a common description language to enable credential comparability, and a platform to support customized applications to search and retrieve information about credentials” (Credential Engine, 2021[43]). It has succeeded in assembling a standardised record for approximately 30 000 unique credentials (out of an estimated one million unique credentials in total across the United States). However, as a voluntary initiative populated by the input of credential providers, it has proven difficult to achieve a scope of coverage and

depth of information sufficient to serve as a consumer-facing information resource for micro-credential learners.

Australia has embarked upon a different and more modest initiative, committing to the creation of a one-stop-shop online marketplace for micro-credentials, the purpose of which is to provide a nationally consistent platform to help students compare micro-credentials using common criteria such as course outcomes, duration, mode of delivery and credit point value (Australian Government, 2021[52]).

Information about the labour market outcomes associated with the acquisition of micro-credentials will not be included in the Australian platform, and may prove infeasible to assess more generally, as discussed in the previous section. In the absence of such information, other means of assessing the programmes could be considered. For example, permitting verified learning participants to rate their programme and provider, and making this information publicly available to prospective micro-credential learners, may introduce a helpful alternative. Within traditional higher education programmes, over-reliance on student evaluations of teaching quality and instructors has been shown to be problematic, due to their poor correlation with other measures of teaching quality, and their incorporation of various biases (Heffernan, 2021[53]). However, it may be more justifiable to rely on student evaluations in the case of short learning programmes, where the stakes are lower and the learning experience to be evaluated is more specific. Moreover, given the poor prospects for systematically gathering information on the outcomes of micro-credentials, learners themselves may be best placed to report on their perceived value and on their subsequent experience with using the micro-credential for the labour market or educational benefit.

Publicly supported information portals about micro-credentials are likely to be more dynamic in nature than information portals about traditional higher education programmes. Micro-credentials may be initiated at various points of the academic year, and the planning and development process will be much shorter than for degree programmes. Therefore, the usual methods of data collection that public bodies tend to use (for example, mandated annual or biannual data returns from providers) will not provide timely information, and could impose an onerous administrative burden. Consequently, high-quality public information portals on micro-credentials may require experimentation with new ways of collecting and aggregating data from higher education providers. For example, if providers publish an agreed, standardised set of information about micro-credential offers on their websites, information portals could implement an automated process of direct information retrieval. Alternatively, public information portals could enter into licencing agreements with commercial data aggregators.

Finally, as learners enter and move within the labour market, they will benefit from a credential platform that permits them to access their full range of qualifications – academic degrees, micro-credentials, and industry credentials. Here, too, Australia offers an initiative potentially interesting to other jurisdictions: a National Credentials Platform (NCP) that allows students to access their tertiary academic records, and is being expanded to include non-AQF (Australian Qualification Framework) credentials, including micro-credentials and industry-recognised credentials (Australian Government, 2020[54]).

Common micro-credential standards have the best chance of widespread implementation if they start from the most scalable options available

As discussed in the previous section, initiatives to develop and implement shared parameters for the description and sharing of micro-credentials are well underway, and hold promise to foster widely recognised, portable, and stackable micro-credentials. Many of these initiatives have similar objectives, and commonalities and overlaps can be observed in the standards they are proposing. Therefore, a sensible way forward may be to identify the set of standards with the greatest potential for scalability and align other existing frameworks to it, either directly or by defining interoperability criteria.

An approach that appears to offer a promising opportunity to achieve equivalence and recognition at scale is the Common Microcredential Framework (CMF) of the European Massive Open Online Courses (MOOC) Consortium. It proposes common standards with respect to the description and sharing of micro-credentials - and with respect to their structure, stipulating rules with respect to workload, level, and

assessment method. To meet the requirements of the CMF, micro-credentials offered by its platforms (FutureLearn, FUN, MiríadaX, EduOpen, and OpenupEd) and its network of participating higher education institutions must meet the following specifications:

a. Has a total workload (or study time) of 100-150 hours, including revision for, and completion of, the summative assessment.

b. Be levelled at Levels 6-7 in the European Qualification Framework or the equivalent levels in the university's national qualification framework, or be levelled at Level 5 and fulfil the criteria of the ECTS.

c. Provides a summative assessment that awards academic credit, either directly following successful completion of the micro-credential or via recognition of prior learning upon enrolment as a student on a university's course of study.

d. Uses a reliable method of ID verification at the point of assessment that complies with the recognised university's policies and/or is widely adopted across the platforms authorised to use the CMF.

e. Provides a transcript that sets out the learning outcomes for a micro-credential, total study hours required, EQF level, and number of credit points earned (European MOOC Consortium, 2021[55]).

The CMF proposed a compact set of standards that are feasible for a wide range of higher education institutions to implement, and that are similar in nature to standards proposed by many other organisations and researchers. However, the CMF has the benefit of an already-existing wide base of participating higher education institutions and firms. In total, more than 400 higher education institutions and firms participate in the initiative (European MOOC consortium, 2021[56]), implying that it has promising potential for scale.

The one feature of the CMF that merits re-examination before carrying forward to other settings is its restriction with respect to the total workload (or study time) of micro-credential programmes, since experience across many systems demonstrates the viability (and actual existence) of a wider workload range. Furthermore, a wider range of possible workload models provides maximum scope for innovation. Governments that wish to accelerate the use of the (ideally, modified) CMF in the design and management of micro-credentials have the option to link these standards to public funding for micro-credential providers or learners, or to quality assurance procedures.

Governments will need to act to ensure that micro-credentials contribute to inclusion rather than deepening existing inequities

As has been discussed, one of the main challenges of existing higher education micro-credentials is that they are taken up in greater numbers by learners who have already achieved higher education, and who have greater financial resources and access to better support systems. In Europe, evidence suggests that short non-degree learning programmes offered by higher education institutions are rarely targeted at supporting increased participation in higher education, with the notable exception of the Nordic countries (OECD, 2021[1]). Thus, there is a clear risk that micro-credentials may exacerbate existing inequities in higher education access and completion. This is a particularly concerning issue, given that existing inequities are likely to already have been further deepened by the swift pivot to digitalised provision during the pandemic period (OECD, 2021[57]).

Yet well-designed micro-credential policies have considerable potential to lead to more equitable higher education participation, and could support improved outcomes for learners. Below, we propose some pathways that governments could potentially support to harness the strengths of micro-credentials (i.e. their short, targeted and flexible nature) to improve access to higher education.

Micro-credentials are already being used to support newly unemployed workers to return swiftly to work, and could help to address structural policy challenges in education systems and labour markets

As shown in Section 2 of this paper, since the pandemic, governments have quickly moved to support micro-credentials as a labour market activation measure, providing unemployed workers with the means to quickly upskill or reskill and return to employment. These programmes generally form part of a wider support package, allowing unemployed workers to keep existing social benefits or benefit from additional supports while availing of the education opportunity.

Recent government programmes have naturally tended to focus on supporting newly unemployed workers to pivot towards new opportunities. Going forward, governments could give further consideration to designing micro-credential programmes specifically to address more structural labour force challenges (for example, young people who are not in employment, education or training (NEETs) and long-term unemployment) and to support broader access to higher education among under-represented groups of the population. These groups often have specific characteristics, such as lower motivation to seek education and training opportunities. Short learning packages such as micro-credentials can encourage renewed engagement for disconnected population groups, and support their greater access to additional education and training opportunities. There are growing calls to use micro-credentials for this purpose (European Public Health Alliance, 2021[58]; European Students' Union, 2021[59]).

Governments have many policy levers at their disposal to encourage take-up of micro-credentials in specific groups of the population, including direct funding of participation by learners from these groups, ensuring that all learners can access high-quality information about micro-credential offerings, and developing mechanisms to support articulation of the skills and knowledge acquired through micro-credentials to employers.

Micro-credentials could be employed to support the transition from upper secondary to tertiary education

Micro-credentials in higher education are generally envisaged as a co-creation between partner institutions, or collaborations between higher education institutions and industry or professions. However, there is also scope for micro-credentials to be developed as partnerships between the upper secondary and higher education sectors. Governments are showing a renewed interest in the design of upper secondary curricula, and in supporting more effective transitions between school and higher education (OECD, forthcoming[60]). Micro-credentials could be developed as introductory "taster" courses for upper secondary students or graduates to experiment in their field of interest before committing to a degree programme, perhaps by adapting material commonly taught in the first year of bachelor's programmes. Artesis Plantijn University College of Antwerp in Belgium, for instance, offers parts of a bachelor's degree in applied psychology as "micro-degrees" in the size of around 3-6 ECTS each. Students receive a certificate upon the completion of a micro-degree, and when enrolling in the bachelor's degree programme, the certificate will be recognised as credits (Artesis Plantijn University College of Antwerp, 2021[61]). The Norwegian "one-year" programme (*aarsenhet*) has a similar purpose: allowing students to explore a topic of interest before committing to a full degree programme (OECD, 2021[1]).

Micro-credentials could also play a role in supporting the transition of students into higher education by embedding credit-bearing learning into the upper secondary curriculum. Various dual-enrolment models have been implemented in the United States and, when designed with equity principles in mind, have been credited with improving access to higher education among a wider group of students (Mehl et al., 2020[62]; Poetry in America and National Education Equity Lab, 2020[63]).

Micro-credentials could be used to support the completion of degree programmes

Non-completion of higher education degrees remains a persistent challenge for higher education systems worldwide, often leading to wasted learning and resources (OECD, 2019[64]). Micro-credentials, if

integrated into traditional degree programmes, could help to keep students engaged and incentivised to move towards completion (Sood et al., 2020[65]). In the United States, emerging evidence suggests that embedding micro-credentials into degree programmes has a positive impact on student retention, which in turn improves the rate of degree completion (Giani and Fox, 2017[66]; McCartney and Rick, 2021[67]). In addition, for students who have dropped out of higher education, micro-credentials may offer a second chance for them to complete their educational pathway by taking programmes that are linked to (or allow a coherent pivot from) their previous field of study.

Although limited examples exist of micro-credentials being used in this way, an emerging qualification in the United States provides a promising use case. The University System of Georgia has introduced "Nexus degrees" – a new type of micro-credential focused on experiential learning and industry connection in high-demand career fields. The Nexus degree will become part of the standard portfolio of qualifications awarded by the university system, and will stack into an associate's degree and onwards to a bachelor's degree. The first Nexus degree graduations took place in December 2020 (University System of Georgia, 2021[68]).

The bottom line: Micro-credentials can be integrated in diverse and flexible ways into higher education systems to support a range of policy goals.

The evidence presented in this paper shows that governments and higher education institutions across the OECD have been actively developing frameworks to provide quality micro-credentials that are recognised in both higher education and labour markets. Many promising developments are underway that have the potential to provide more clarity and coherence to micro-credential offers.

At the same time, it must be recognised that many of the challenges micro-credentials are facing - such as mutual recognition and equity - are the same as the challenges in traditional degrees that have existed for a longer time. Policy makers and educators need to take a long-term perspective, ensuring that micro-credentials can be properly aligned with, and integrated into, the wider higher education landscape.

Micro-credentials have considerable potential to meet evolving learner and labour market needs. Nevertheless, there remain many challenges to overcome, including difficulties with navigating the proliferation of emerging frameworks and standards, and developing robust approaches for assessment, recognition and quality. Such solutions need to be tailored to the dynamic nature of micro-credential development, and strike the correct balance between scalability and proportionality.

One of the important risks associated with micro-credentials is that they will perpetuate, and even deepen, existing inequities of access to higher education. Governments can combat this risk by actively designing micro-credential policies to support inclusion, as well as labour-market relevance. Policy options that appear promising for investment by governments include:

- Supporting the creation of information portals for learners to allow them to compare options and report on their experience with micro-credential platforms.
- Incentivising micro-credential providers to align their offerings to a common standard framework, through either targeted funding or quality assurance procedures.
- Designing micro-credential programmes that can foster inclusion and ensure that learners from all groups of society can access their benefits, including NEETs, long-term unemployed, upper secondary school-leavers and higher education students at risk of non-completion.

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