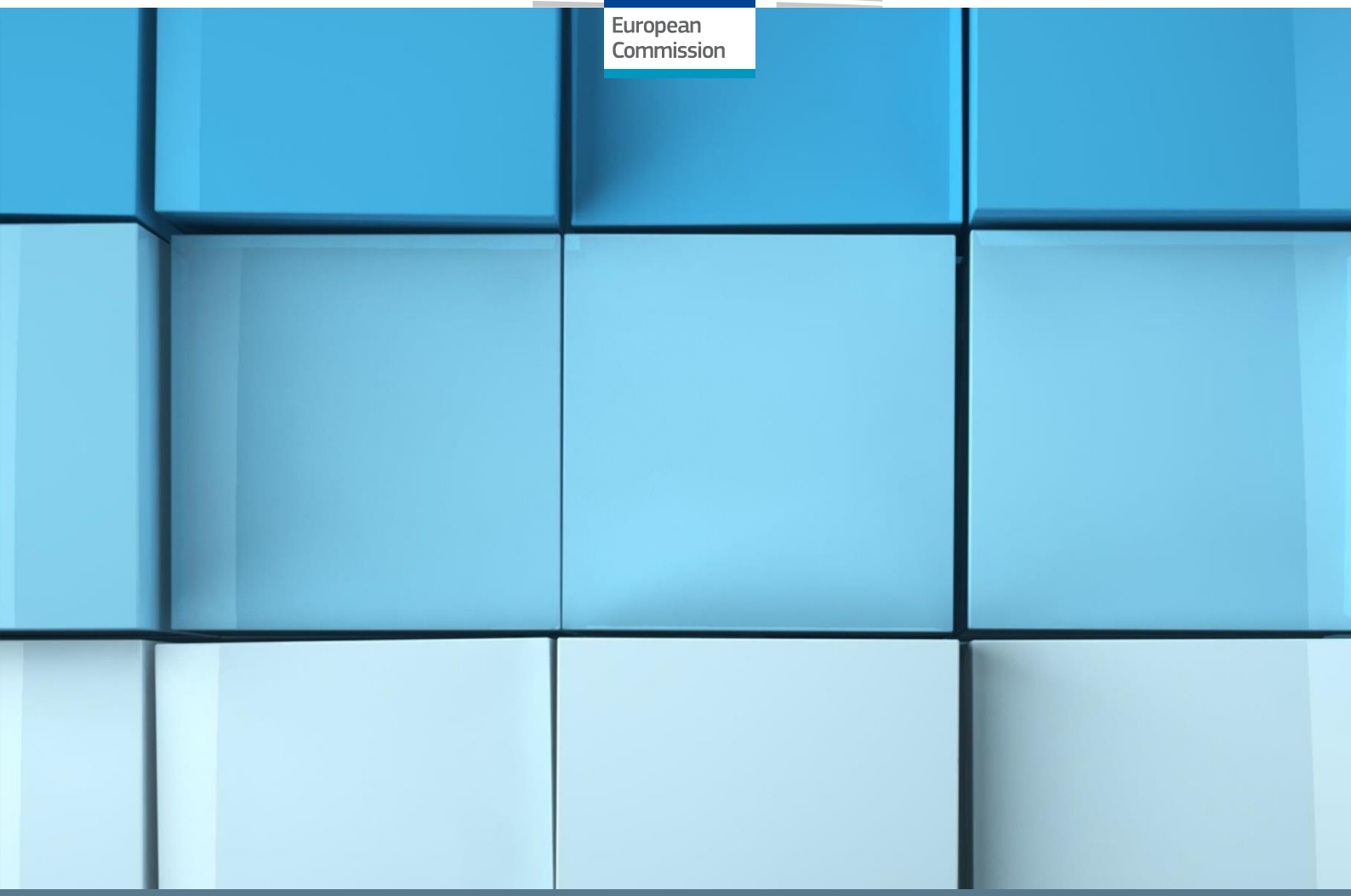

Towards a European approach to micro credentials: a study of practices and commonalities in offering micro-credentials in European higher education

Analytical report

Education and Training

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EUROPEAN COMMISSION

Towards a European approach to micro-credentials: a study of practices and commonalities in offering micro-credentials in European higher education

Analytical Report

Directorate-General for Education, Youth, Sport and Culture

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ABOUT NESET

NESET is an advisory network of experts working on the social dimension of education and training. The European Commission's Directorate-General for Education and Culture initiated the establishment of the network as the successor to NESET II (2015-2018), NESSE (2007-2010) and NESET (2011-2014). The Public Policy and Management Institute (PPMI) is responsible for the administration of the NESET network. For any inquiries please contact us at: info-neset@ppmi.lt.

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Executive summary

Micro-credentials are gaining traction

The growing use of micro-credentials is an outcome of the **changing nature of the labour market** and of growing uncertainty as to what work will look like in the future. Fewer 'jobs for life' now exist, and employers demand flexibility and quick reactions to changing circumstances. The lockdown measures introduced across the EU in the light of COVID-19 had a substantial impact on the EU labour market, with millions of workers losing their jobs or being placed under short-term work schemes. Micro-credentials are particularly useful in this situation, as they **allow for tailored, quick and accessible skills (re)development**. COVID-19 could potentially serve as an opportunity for higher education institutions to increase their offer of micro-credentials. For instance, the Coimbra Group of universities and the German Rectors' Conference (HRK) have issued collective outlooks in which they express support for more flexible and modular programmes, and for recognition by means of micro-credentials in the light of the current crisis. The use of micro-credentials by higher education providers has the potential to foster continuous learning, to fill the knowledge and skills gap, to increase the efficiency of higher education systems, to encourage innovation in provision, and to reach a diverse group of learners (BFUG, 2020).

The pandemic has increased the interest of learners in micro-credentials and massive online open courses (MOOCs), with providers seeing an immense increase in course enrolments compared with the same period in 2019. The number of sessions on MOOC platforms have also increased in March 2020 when compared to February 2020 (see below). Potential learners are looking for additional learning opportunities that are reasonably priced, of short duration and convenient to access.

Table 1. Sessions (in millions) on the most popular MOOC platforms

MOOC provider	Sessions (in millions)[1]
Coursera	45 (up by 67%)
edX	19.2 (up by 52%)
FutureLearn	6.15 (up by 116%)

Source: Class Central, 2020.

Recent years have also seen a **growth in the number of policies and initiatives that support micro-credentials**. On 30 September 2020, the European Commission presented its vision for the creation of a European Education Area by 2025[2], and announced concrete measures to achieve this along six dimensions. A European approach to micro-credentials is integral to achieving the second dimension on inclusion and gender equality.

"The Commission will work towards the development of a European Approach to micro-credentials, to help widen learning opportunities and strengthen the role of higher education and vocational education and

[1] Number of sessions during March 2020 and percentage change from February 2020.

[2] With a new Communication on the European Education Area, the Commission proposes new initiatives, more investment and stronger cooperation of Member States to help all Europeans, of all ages, benefit from the EU's rich education and training offer. For more information, please see: https://ec.europa.eu/education/sites/education/files/document-library-docs/eea-communication-sept2020_en.pdf

training institutions in lifelong learning by providing more flexible and modular learning opportunities. (…) The need for more flexible and inclusive learning paths has increased as the student population is becoming more diverse and the learning needs more dynamic (European Commission, 2020).”

On 1 July 2020, the European Commission launched the ‘New Skills Agenda for Europe’, which places skills at the heart of the EU policy agenda. The Agenda devotes one of its 12 flagship actions to the importance of micro-credentials. Within the framework of the Erasmus+ MICROBOL project, the Bologna Follow-Up Group tasked three working groups with looking at micro-credentials from the perspective of the key commitments within the Bologna Process: (1) quality assurance, (2) recognition, and (3) qualification frameworks and the European Credits Transfer and Accumulation System (ECTS). As a result, the project will explore whether and how the existing European Higher Education Area (EHEA) tools can be used or adapted to be applicable to micro-credentials. Another important development in relation to micro-credentials is the announcement of a Common Microcredential Framework (CMF) by the European MOOC Consortium, which consists of the main European MOOC platforms: FutureLearn, France Université Numérique (FUN), OpenupED, Miríadax and EduOpen.

Micro-credentials are beneficial as standalone certifications, to complement or supplement degree programmes for greater employability, and to improve the level of lifelong learning. Beyond this emerging consensus, challenges still exist in terms of scaling up the use of micro-credentials (see below).

Figure 1. Challenges to scaling up the use of micro-credentials

None of the barriers mentioned above is insurmountable, and they can all be overcome if European educators and policy makers adopt a coherent and consistent approach to micro-credentials.

In this context, **the main objective of this report is to provide a background analysis that will inform the European Commission with regard to the development, provision and recognition of micro-credentials**. This will feed into a wider consultation and analysis for a European approach to micro-credentials. The report focuses on the higher education sector, but where relevant, it also extends to other sectors.

This report aims to answer the following key research questions:

- If EU policy makers create a European approach governing and harmonising the use of micro-credentials, which aspects should fall under this approach and why? Is an EU-level approach necessary?
- What could the benefits be of the growing provision of micro-credentials?
- What notable practices exist in relation to implementing or governing the implementation of micro-credentials?
- What are the main obstacles to the provision of micro-credentials in higher education and by other education providers?

Micro-credentials to support new learning pathways

To achieve the objective of supporting new learning pathways and to answer the main research questions, the report **reviews the recent literature** that analyses the provision, recognition and impact of micro-credentials. Second, it **maps notable practices** in relation to micro-credentials. This mapping has identified a catalogue of best practices, the most interesting of which are presented in boxes throughout the report. We believe that these real-life examples of practices that have been successfully applied by higher education institutions as well as other education providers, businesses and public organisations, will allow stakeholders to move beyond abstract theoretical ideas, and will encourage the wider adoption of micro-credentials. Third, the report **provides three case studies** that analyse recent notable practices concerning the design, delivery or recognition of short learning courses and micro-credentials. The report looks at the following cases:

- Digital solutions to validate micro-credentials and provide an online visual representation for them, as created by the '**edubadges' project**. This project is led by the organisation SURF in the Netherlands.
- The inclusion of micro-credentials in the **New Zealand qualifications framework**.
- **Micro-credentialling solutions implemented under the Erasmus+ European Universities Initiative**[3]: the European Consortium of Innovative Universities (ECIU) and the Young Universities for the Future of Europe (YUFE).

[3] The aim of European Universities Initiative is to bring together a new generation of creative Europeans able to cooperate across languages, borders and disciplines to address societal challenges and skills shortages faced in Europe. For more information, please see: https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_en

Lastly, the report **presents an analytical framework** to answer the question as to the contexts in which a European approach to micro-credentials could be beneficial, depending on the possible roles and purposes of micro-credentials in higher education. The framework presents **three scenarios for the use of micro-credentials**, which are distinguished by the context in which recognition for a micro-credential is determined: (1) within one social system (e.g. the educational system); (2) within two social systems (e.g. education and the labour market); (3) within multiple systems with a high level of permeability, thus facilitating truly recognised lifelong learning.

Box 1. Scenarios for the use of micro-credentials in higher education

Scenario 1: Recognition within one social system

Recognition among higher education institutions throughout Europe has been a clear action line of the Bologna Process. In principle, the ECTS, a common system of credit exchange, makes this easy to implement. Higher education tends to be organised in similar ways throughout Europe, i.e. by academic semester, and with all higher education institutions being subject to external quality assurance procedures. A more complex case is the recognition of prior learning, i.e. where a learner has acquired knowledge and skills before enrolling at their present higher education institution. Recognition of prior learning aims to provide learners with alternative access routes into higher education if, for instance, they have not attained the standard entrance examination or if learners wish to have prior learning acquired elsewhere recognised as part of their new course of study.

Scenario 2: Recognition within two social systems

It is vital that the labour market is able to recognise what a learner in higher education has achieved. However, these two systems typically use different forms to describe an individual's achievements. In the past, higher education has documented the achievement of an aggregate level of skills and knowledge. Criticism from employers concerning a lack of detailed information has led to the introduction of the Diploma Supplement, which is widely used within the European Higher Education Area. Micro-credentials can also be used to provide detailed information describing the skills and knowledge acquired by a learner. If they are to be understood and recognised both by educational providers and by the labour market, they need to be formulated in a common language and use common standards. The idea behind ESCO[4] and the development of the renewed Europass is to formulate such a common language.

Scenario 3: Recognition across all social systems

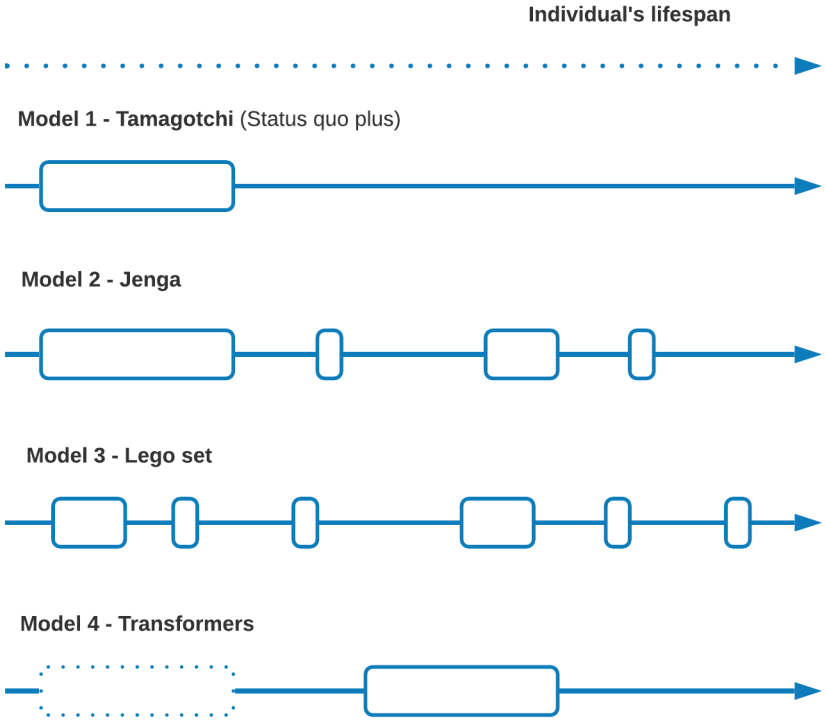
Scenario 3 will allow learners to follow more flexible pathways, moving between labour market activities, family and civic duties, and learning acquired through various providers. This scenario places high demands upon the ecosystem created around the micro-credentials, as it can only really work with a low level of friction in the recognition and communication of micro-credentials between each of these social systems. It is unlikely that this could be achieved simply through a combination of standards, technical matching and AI-powered solutions, as recognition is a social process that is highly dependent on the existence of trust-giving systems. It would require the kind of change in the culture of recognition of skills and competencies that is encapsulated by the term

[4] The ESCO classification identifies and categorises skills, competences, qualifications and occupations relevant to the EU labour market and to education and training.

'open recognition', i.e. the recognition of all learning outcomes and achievements throughout life and in all fields.

The relative likelihood of the scenarios presented above is dependent on the future higher education landscape. This landscape is determined by an individual's learning pathway throughout their life. People's lives are no longer linear, and their individual and working lives are complex, multi-stage and non-linear. Thus, higher education institutions need to provide different learning pathways that serve learners throughout the course of their lifetimes. The **analytical framework presents four learning pathway models for higher education**: (1) Tamagotchi; (2) Jenga; (3) Lego set; and (4) Transformers (see figure and box below).

Figure 2. Four learning pathway models for higher education



Box 2. Learning pathways in higher education

Model 1: Tamagotchi

The learner has typically finished secondary schooling and progresses on to higher education. They enrol in one institution and study relatively intensively for a period of 3-5 years, which leads to the completion of the higher education programme for which they enrolled. Most of the individual's learning following this first block is informal and non-formal, and not directly linked to the first study programme.

Model 2: Jenga

The learner has typically finished secondary schooling and progresses on to higher education. They study relatively intensively for a period of 3 years or less at one higher

education institution. Throughout their life, these learners will 'top up' this knowledge via short learning programmes, possibly leading to micro-credentials (which might be taken online or on-campus). Together, these activities make up a complete programme of study that balances on the one hand, foundational and transversal knowledge with – on the other – skills for upskilling and sideways-skilling, as required for the learner's chosen career pathway.

Model 3: Lego set

The learner is highly self-motivated and self-reliant, and wishes to piece together their own full study programme themselves by taking advantage of the offerings available and earning credentials from various education providers (online and on-campus). The learner might also choose to earn additional credentials to change careers or upskill in their career path.

Model 4: Transformer

There is a long break between the learner's period at school and in initial training (which may have included higher education) and a new learning period. They return to higher education either to gain new foundational knowledge and skills, or to increase the level of their formal education. They study relatively intensively for a period of 3-5 years to complete this higher education programme, with the expectation of returning to or re-entering the labour market.

Five policy considerations

Our review suggests that the success of the European approach to micro-credentials will largely depend on the extent to which it achieves the following key impacts:

- Increased **trust** in alternative credentials across all social systems: education and training, the labour market, and society.
- Enhanced **transparency** of learning outcomes achieved as a result of short-duration learning courses.
- **Educational innovation** being encouraged rather than hindered as a result of a common approach.
- **Flexibility** for all learners to choose and access the most individually suitable learning pathways.

The main conclusions of the study, outlined below, could serve as inspiration for the European Commission in designing a European approach to micro-credentials.

1. ***A European approach to micro-credentials should define the critical information items that any micro-credential must provide.***

The mapping of currently available micro-credentials revealed that they share several common characteristics:

- Limited length of learning activities leading to a micro-credential**:** in higher education, these are usually larger than a single course, but less than a full degree.
- Labour market relevance**:** focus is on the delivery of specific knowledge, skills and competences that are useful in the labour market.

- Better access to gaining skills: focus is on lifelong learning opportunities that are reasonably priced, short and convenient to access.

In terms of other characteristics, micro-credentials and related learning activities vary quite widely. A European approach to micro-credentials would benefit from a list of critical information items to be provided by all micro-credentials operating within the European framework. Having easily accessible, informative and comparable information items will create greater trust and transparency with regard to micro-credentials among employers, quality assurance agencies, qualification recognition bodies, higher education institutions, learners and other providers (e.g. private institutions, technical and vocational education and training providers, companies, government agencies, non-profit organisations, libraries and museums). The study identifies the following as a list of critical information items to be provided by micro-credentials operating within the framework of a European approach:

- ***Title*** *of the micro-credential, which precisely signals the learning outcomes.*
- ***Provider*** *of the course.*
- ***Date*** *when the micro-credential was awarded.*
- ***Description*** *of the course content and its purpose.*
- ***Learning outcomes*** *what the successful learner knows, understands and can do based on this assessed learning.*
- ***How the learner has participated*** *online, on-site, or both online and on-site.*
- ***Credits*** *number of credits provided, if credit-bearing.*
- ***Time period*** *when the learning took place.*
- ***Any prerequisites*** *that were required to begin the course.*
- ***Learning resources*** *relevant for the credential.*
- ***Type of assessment*** *testing, application of a skill, portfolio, etc.*
- ***Supervision and identity verification*** *unsupervised with no identity verification, supervised with no identity verification, supervised online, or on-site with identity verification.*
- ***Quality assurance*** *the body ensuring the quality of the course.*
- ***Outcome for a successful learner*** *admission to a degree programme, credit towards a degree programme, certification or digital badge earned, number of credits.*
- ***Integration / stackability options*** *standalone, independent course / integrated, stackable towards another credential.*

2. *In order to allow educational innovation and flexibility, a European approach should not prescribe or standardise the critical information items too narrowly.*

It may be tempting to define the critical information items in such a way that only certain types of micro-credentials will be considered in line with the European approach. At first glance, it may seem appropriate to say that the learning activities leading to micro-credentials should, for example, encompass no fewer than three and no more than 10 ECTS, and that they must be quality-assured. However, our report revealed that any such limits may hinder educational innovation and flexibility, and it is difficult to find grounds for establishing such specific requirements. We therefore suggest establishing a list of

critical items without specifying the particular values of these items. This would ensure both trust and transparency with regard to micro-credentials without hindering educational innovation and flexibility. Such an approach would also enable Member States to develop their own local approaches under this broad umbrella that align with its definitions and terminology.

3. Work towards a European digital solution to store micro-credentials.

The lack of digital solutions for the validation, recognition and storage of micro-credentials remains one of the obstacles to their wider uptake. While digital solutions have already gained momentum as a means of providing online learning, and reliable ways exist to organise its provision, digital solutions for storing micro-credentials (such as transcripts, blockchain, learner verification and potential skills matching in recruitment), are promising, but still nascent.

Creating a European digital solution to store micro-credentials would be a strong step towards the practical implementation of a European approach to micro-credentials. A secure and flexible European digital solution for storing micro-credentials would contribute significantly to their transparency and increase trust in them. Current EU initiatives such as the European Student Card Initiative[5], Europass[6] and ESCO classification[7] could be brought together to build such a digital solution, which could become the standard across Europe. It is also important to ensure that any European digital solutions for storing micro-credentials are:

- based on technologies that are secure, and which authenticate the identity of the learner and protect the certification from misuse or alterations.
- easy to share via different platforms (e.g. social media, e-mail, blog, etc.).
- developed in such a way that European higher education institutions can easily integrate them into their own institutional infrastructures.

4. Existing criteria and measures for quality assurance must be renewed and supplemented in order to be fit for micro-credentials.

The establishment of quality assurance as a key element of higher education is one of the successes of the Bologna Process. There is a consensus that quality assurance is necessary to ensure accountability, support enhancement and instil confidence in courses and modules. In general, the standards and key elements that exist for formal recognition and quality assurance in higher education can and should be applicable to any new forms of learning, certification and credentialisation.

Ideally, quality assurance of recognition procedures in the provision of higher education should be carried out both internally and externally, to ensure that internal quality assurance is in line with European standards (Nuffic, 2019). However, in some cases quality assurance procedures and regulatory frameworks have not yet been adapted to facilitate and monitor digital provision or emerging micro-credentials. The existing criteria and measures used for quality assurance must be renewed and supplemented accordingly, to

[5] The European Student Card Initiative will develop an online 'one-stop shop' via the Erasmus+ Mobile App, enabling students to manage all of the administrative steps relating to their mobility period - before, during and after their stay. For more information, please see: https://ec.europa.eu/education/education-in-the-eu/european-student-card-initiative_en

[6] Europass provides a set of online tools and information to manage learning and careers. For more information, please see: https://europa.eu/europass/en

[7] For more information, please see: https://ec.europa.eu/esco/portal/home

take appropriate account of digitalisation in teaching and learning, and to ensure security and transparency for all learner groups. In summary: all credit-bearing and stackable micro-credentials must be aligned to a standardised and accepted quality assurance process.

5. ***Seek opportunities to bring higher education institutions together with employers so that they can find the best ways of designing and delivering micro-credentials.***

We found that there are more characteristics in which currently provided micro-credentials differ, than in which they are similar. The two main characteristics that almost all micro-credentials do have in common are that they are used for fairly short courses of learning, and that they are relevant to the labour market. The latter characteristic indicates that engagement between higher education institutions and employers is crucial to ensuring that micro-credentials are valuable in the labour market. Currently, employers appear to be somewhat left out of discussions relating to the design of a European approach to micro-credentials. The European Commission, national governments and other key stakeholders should look for ways to bring in the employer perspective – for example, by organising discussions with the key employers' associations such as EUROCHAMBRES, SMEunited and Business Europe; asking for the opinion of the European Economic and Social Committee; and potentially supporting Erasmus+ projects that bring together higher education institutions and employers.

Résumé analytique

Les micro-certificats gagnent du terrain

Le recours croissant aux micro-certificats est le résultat de l'**évolution de la nature du marché du travail** et de l'incertitude croissante quant à la forme que prendra le travail à l'avenir. Il existe aujourd'hui moins « d'emplois à vie » et les employeurs exigent de la flexibilité et des réactions rapides aux changements. Les mesures de confinement introduites dans toute l'UE pour lutter contre la pandémie de COVID-19 ont eu un impact considérable sur le marché du travail européen, des millions de travailleurs ayant perdu leur emploi ou ayant été placés sous des régimes de travail à court terme. Les micro-certificats sont particulièrement utiles dans cette situation, car ils **permettent un (re)développement des compétences sur mesure, rapide et accessible**. La crise sanitaire pourrait être l'occasion pour les établissements d'enseignement supérieur d'accroître leur offre de micro-certificats. Par exemple, le Groupe d'universités de Coimbra et la Conférence des recteurs d'université allemands (HRK) ont publié des perspectives collectives dans lesquelles ils expriment leur soutien à des programmes plus flexibles et modulaires, et à la reconnaissance au moyen de micro-certificats dans le contexte de la crise actuelle. L'utilisation de micro-certificats par les prestataires d'enseignement supérieur peut permettre de favoriser la formation continue, combler le déficit de connaissances et de compétences, accroître l'efficacité des systèmes d'enseignement supérieur, encourager l'innovation en termes d'offre et atteindre des groupes d'apprenants divers (BFUG, 2020).

La pandémie a accru l'intérêt des apprenants pour les micro-certificats et les cours en ligne ouverts et massifs (MOOC, de l'anglais Massive Online Open Courses). Les prestataires ont constaté une augmentation considérable des inscriptions aux cours par rapport à la même période en 2019. Le nombre de sessions sur les plateformes de MOOC a également augmenté en mars 2020 par rapport à février 2020 (voir Tableau 2). Les apprenants potentiels recherchent des possibilités d'apprentissage supplémentaires à un prix raisonnable, de courte durée et faciles d'accès.

Tableau 2. Sessions (en millions) des plateformes de MOOC les plus populaires

Prestataire de MOOC	Sessions (en millions)[8]
Coursera	45 (+ 67 %)
edX	19,2 (+ 52 %)
FutureLearn	6,15 (+ 116 %)

Source : Class Central, 2020.

Ces dernières années ont également vu une **augmentation du nombre de politiques et d'initiatives en faveur des micro-certificats**. Le 30 septembre 2020, la Commission européenne a présenté sa vision pour la création d'un espace européen de l'éducation d'ici 2025[9], et a annoncé des mesures concrètes déclinées en six axes. L'élaboration d'une approche européenne des micro-certificats fait partie intégrante du deuxième axe, à savoir l'inclusion et l'égalité des genres.

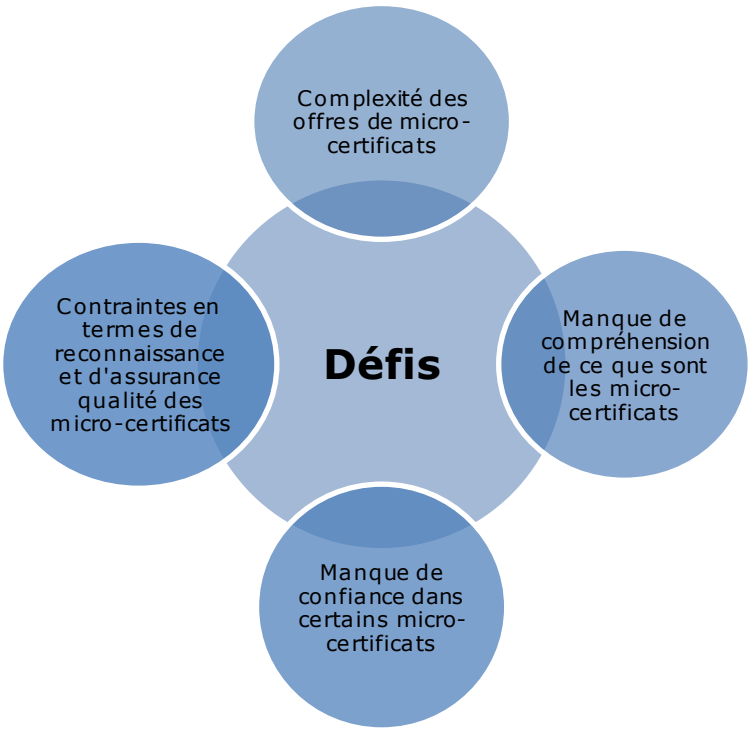
[8] Nombre de sessions au cours du mois de mars 2020 et évolution en pourcentage par rapport à février 2020.
[9] Dans une nouvelle communication sur l'espace européen de l'éducation, la Commission propose de nouvelles initiatives, davantage d'investissements et une coopération renforcée des États membres pour aider les Européens de tous âges à bénéficier de la richesse de l'offre d'enseignement et de formation de l'UE. Pour plus d'informations : https://ec.europa.eu/education/sites/education/files/document-library-docs/eea-communication-sept2020_en.pdf

« La Commission va travailler à l'élaboration d'une approche européenne des micro-certificats, afin de contribuer à étendre les possibilités d'apprentissage et à renforcer le rôle des établissements d'enseignement supérieur et de formation professionnelle dans l'apprentissage tout au long de la vie, en offrant des possibilités d'apprentissage plus flexibles et modulaires. (...) Le besoin de parcours d'apprentissage plus flexibles et plus inclusifs s'accroît à mesure que la population étudiante se diversifie et que les besoins d'apprentissage deviennent plus dynamiques (Commission européenne, 2020). »

Le 1er juillet 2020, la Commission européenne a lancé la « nouvelle stratégie en matière de compétences pour l'Europe », qui place les compétences au cœur de l'agenda politique de l'UE. Cette stratégie consacre l'une de ses 12 actions phares à l'importance des micro-certificats. Dans le cadre du projet Erasmus+ MICROBOL, le Groupe de suivi de Bologne a chargé trois groupes de travail d'examiner les micro-certificats sous l'angle des engagements clés du processus de Bologne : (1) l'assurance qualité, (2) la reconnaissance et (3) les cadres de certification et le Système européen de transfert et d'accumulation de crédits (ECTS). En conséquence, le projet examinera si et comment les outils existants de l'Espace européen de l'enseignement supérieur (EEES) peuvent être utilisés ou adaptés pour être applicables aux micro-certificats. Autre développement important en relation avec les micro-certificats, l'annonce d'un cadre commun de micro-certificats (CMF, de l'anglais *Common Microcredential Framework*) par l'European MOOC Consortium, qui réunit les principales plateformes européennes de MOOC : FutureLearn, France Université Numérique (FUN), OpenupED, Miríadax et EduOpen.

Les micro-certificats sont utiles en tant que certifications autonomes, pour compléter ou enrichir les programmes diplômants pour une plus grande employabilité, et pour améliorer le niveau de l'apprentissage tout au long de la vie. Au-delà de ce consensus émergent, des défis subsistent quant à l'accroissement de l'utilisation des micro-certificats (voir ci-dessous).

Figure 3. Défis à relever pour accroître l'utilisation des micro-certificats



Aucun des obstacles mentionnés ci-dessus n'est insurmontable, et ils peuvent tous être franchis si les enseignants et les décideurs politiques européens adoptent une approche cohérente et constante des micro-certificats.

Dans ce contexte, **l'objectif principal de ce rapport est de fournir une analyse de fond qui informera la Commission européenne concernant l'élaboration, la délivrance et la reconnaissance des micro-certificats.** Cette analyse s'inscrira dans le cadre d'une consultation et d'une analyse plus larges en vue d'une approche européenne des micro-certificats. Le rapport se concentre sur le secteur de l'enseignement supérieur, mais le cas échéant, il s'étend également à d'autres secteurs.

Ce rapport vise à répondre aux principales questions de recherche suivantes :

- Si les décideurs politiques de l'UE créent une approche européenne régissant et harmonisant l'utilisation des micro-certificats, quels aspects devraient relever de cette approche et pourquoi ? Une approche au niveau de l'UE est-elle nécessaire ?
- Quels pourraient être les avantages d'une offre croissante de micro-certificats ?
- Quelles pratiques notables existent en matière de mise en œuvre ou de gouvernance de la mise en œuvre des micro-certificats ?
- Quels sont les principaux obstacles à la délivrance de micro-certificats dans l'enseignement supérieur et par d'autres prestataires de services éducatifs ?

Des micro-certificats pour soutenir les nouveaux parcours d'apprentissage

Pour atteindre l'objectif de soutenir de nouveaux parcours d'apprentissage et pour répondre aux principales questions de recherche, le rapport **passe en revue la littérature**

récente qui analyse la délivrance, la reconnaissance et l'impact des micro-certificats. Puis, il **dresse la carte des pratiques notables** en matière de micro-certificats. Cette cartographie a permis d'identifier un catalogue de bonnes pratiques, dont les plus intéressantes sont présentées dans des encadrés tout au long du rapport. Nous pensons que ces exemples concrets de pratiques appliquées avec succès par des établissements d'enseignement supérieur ainsi que par d'autres prestataires de services éducatifs, des entreprises et des organisations publiques, permettront aux parties prenantes de dépasser les idées théoriques abstraites et encourageront une plus large adoption des micro-certificats. Le rapport **fournit ensuite trois études de cas** qui analysent les pratiques notables récentes en matière d'élaboration, de délivrance ou de reconnaissance de formations de courte durée et de micro-certificats. Le rapport se penche sur les cas suivants :

- Des solutions numériques pour valider les micro-certificats et leur fournir une représentation visuelle en ligne, à l'exemple des **« edubadges »**. Ce projet est mené par l'organisation SURF aux Pays-Bas.
- L'inclusion de micro-certificats dans le **cadre néo-zélandais de qualifications**.
- **Des solutions de micro-certification mises en œuvre dans le cadre de l'initiative Erasmus+ « Universités européennes »**[10] : le Consortium européen d'universités innovantes (ECIU, de l'anglais *European Consortium of Innovative Universities*) et l'Alliance des jeunes universités pour l'avenir de l'Europe (YUFE, de l'anglais *Young Universities for the Future of Europe*).

Enfin, le rapport **présente un cadre analytique** afin de déterminer dans quels contextes une approche européenne des micro-certificats pourrait être bénéfique, en fonction des rôles et objectifs possibles des micro-certificats dans l'enseignement supérieur. Le cadre présente **trois scénarios pour l'utilisation des micro-certificats**, qui se distinguent par le contexte dans lequel la reconnaissance d'un micro-certificat est déterminée : (1) au sein d'un même système social (par exemple, le système éducatif) ; (2) au sein de deux systèmes sociaux (par exemple, l'enseignement et le marché du travail) ; (3) au sein de systèmes multiples avec un niveau élevé de perméabilité, facilitant ainsi un apprentissage tout au long de la vie véritablement reconnu.

Encadré 3. Scénarios relatifs à l'utilisation des micro-certificats dans l'enseignement supérieur

Scénario 1 : Reconnaissance au sein d'un même système social

La reconnaissance parmi les établissements d'enseignement supérieur dans toute l'Europe a constitué une ligne d'action claire du processus de Bologne. En principe, l'ECTS, un système commun d'échange de crédits, facilite sa mise en œuvre. L'enseignement supérieur tend à être organisé de manière similaire dans toute l'Europe, c'est-à-dire par semestre universitaire, et tous les établissements d'enseignement supérieur sont soumis à des procédures externes d'assurance qualité. Le cas de la reconnaissance des acquis antérieurs, c'est-à-dire lorsqu'un apprenant a acquis des connaissances et des compétences avant de s'inscrire dans son établissement d'enseignement supérieur actuel, s'avère plus complexe. La reconnaissance des acquis

[10] L'objectif de l'initiative « Universités européennes » est de réunir une nouvelle génération d'Européens créatifs capables de coopérer dans différentes langues, au-delà des frontières et des disciplines, afin de relever les défis sociétaux de l'Europe et de combler les pénuries de compétences auxquelles elle est confrontée. Pour plus d'informations : https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_fr

antérieurs vise à offrir aux apprenants des voies d'accès alternatives à l'enseignement supérieur si, par exemple, ils n'ont pas réussi l'examen d'entrée standard ou s'ils souhaitent faire reconnaître des acquis antérieurs dans le cadre de leur nouveau programme d'études.

Scénario 2 : Reconnaissance au sein de deux systèmes sociaux

Il est essentiel que le marché du travail soit en mesure de reconnaître les acquis d'un apprenant de l'enseignement supérieur. Toutefois, ces deux systèmes utilisent généralement des formes différentes pour décrire les qualifications d'un individu. Dans le passé, l'enseignement supérieur a documenté l'acquisition d'un niveau global de compétences et de connaissances. Les critiques des employeurs concernant le manque d'informations détaillées ont conduit à l'introduction du supplément au diplôme, qui est largement utilisé dans l'Espace européen de l'enseignement supérieur. Les micro-certificats peuvent également être utilisés pour fournir des informations détaillées décrivant les compétences et les connaissances acquises par un apprenant. Afin qu'ils soient compris et reconnus à la fois par les prestataires de services éducatifs et par le marché du travail, ils doivent être formulés dans un langage commun et utiliser des normes communes. L'idée qui sous-tend l'ESCO[11] et le développement du nouvel Europass est de formuler un tel langage commun.

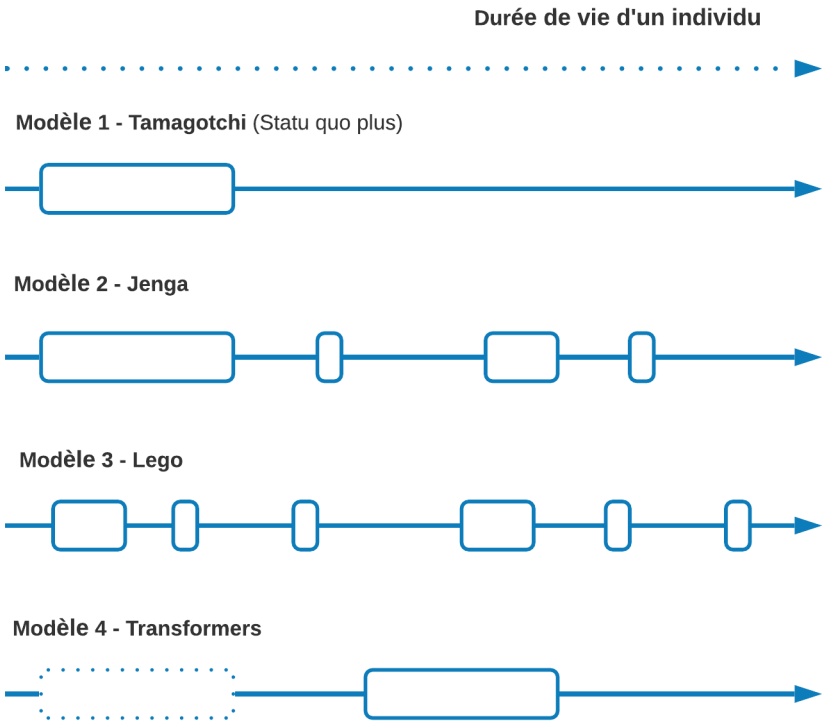
Scénario 3 : Reconnaissance au sein de tous les systèmes sociaux

Le scénario 3 permettra aux apprenants de suivre des parcours plus flexibles, conjuguant les activités du marché du travail, les devoirs familiaux et civiques, ainsi que l'apprentissage acquis auprès de divers prestataires. Ce scénario impose des exigences élevées à l'écosystème créé autour des micro-certificats, car il ne peut réellement fonctionner qu'avec un faible niveau de friction quant à la reconnaissance et la communication des micro-certificats entre chacun des systèmes sociaux. Il est peu probable que ceci puisse être réalisé par une simple combinaison de normes, d'appariement technique et de solutions basées sur l'IA, car la reconnaissance est un processus social qui dépend fortement de l'existence de systèmes de confiance. La mise en place de ce scénario nécessiterait une évolution de la culture de reconnaissance des aptitudes et des compétences vers ce que l'on appelle la « reconnaissance ouverte », c'est-à-dire la reconnaissance de tous les résultats et réalisations de l'apprentissage tout au long de la vie et dans tous les domaines.

La probabilité relative des scénarios présentés ci-dessus dépend du futur paysage de l'enseignement supérieur. Ce paysage est déterminé par le parcours d'apprentissage d'un individu tout au long de sa vie. La vie privée et professionnelle n'est plus linéaire, elle est devenue complexe et multi-étape. Les établissements d'enseignement supérieur doivent donc proposer différents parcours d'apprentissage qui soient utiles aux apprenants tout au long de leur vie. Le **cadre analytique présente quatre modèles de parcours d'apprentissage pour l'enseignement supérieur** : (1) Tamagotchi ; (2) Jenga ; (3) Lego ; et (4) Transformers (voir figure et encadré ci-dessous).

[11] La classification ESCO recense et catégorise les aptitudes, les compétences, les certifications et les professions pertinentes pour le marché du travail, l'enseignement et la formation au sein de l'UE.

Figure 4. Quatre modèles de parcours d'apprentissage pour l'enseignement supérieur



Encadré 4. Parcours d'apprentissage dans l'enseignement supérieur

Modèle 1 : Tamagotchi

L'apprenant a généralement terminé ses études secondaires et progresse vers l'enseignement supérieur. Il s'inscrit dans un établissement et étudie de manière relativement intensive pendant une période de 3 à 5 ans, ce qui lui permet de terminer le programme d'enseignement supérieur auquel il s'est inscrit. L'essentiel de l'apprentissage individuel à l'issue de ce premier bloc est informel et non formel, et n'est pas directement lié au premier programme d'études.

Modèle 2 : Jenga

L'apprenant a généralement terminé ses études secondaires et progresse vers l'enseignement supérieur. Il étudie de manière relativement intensive pendant une période de 3 ans ou moins dans un établissement d'enseignement supérieur. Tout au long de sa vie, cet apprenant « enrichit » ses connaissances par le biais de programmes d'apprentissage de courte durée, pouvant déboucher sur des micro-certificats (qui peuvent être obtenus en ligne ou sur site). Ensemble, ces activités constituent un programme d'études complet qui équilibre, d'une part, les connaissances fondamentales et transversales et, d'autre part, les compétences nécessaires à l'amélioration des compétences et à l'acquisition de compétences transversales, en fonction du parcours professionnel choisi par l'apprenant.

Modèle 3 : Lego

L'apprenant est très motivé et autonome, et souhaite élaborer lui-même son propre programme d'études complet en profitant des offres disponibles et en obtenant des certificats auprès de différents prestataires de services éducatifs (en ligne et sur site). L'apprenant peut également choisir d'obtenir des certificats supplémentaires pour changer de carrière ou améliorer ses compétences dans son parcours professionnel.

Modèle 4 : Transformers

L'apprenant marque une longue pause entre sa période de scolarisation et de formation initiale (enseignement supérieur compris) et une nouvelle période d'apprentissage. L'apprenant retourne dans l'enseignement supérieur soit pour acquérir de nouvelles connaissances et compétences de base, soit pour augmenter le niveau de son enseignement formel. Il étudie de manière relativement intensive pendant une période de 3 à 5 ans pour terminer ce programme d'enseignement supérieur, dans l'espoir de retourner sur le marché du travail ou de le réintégrer.

Cinq considérations politiques

Notre étude suggère que le succès de l'approche européenne en matière de micro-certificats dépendra largement de la portée des impacts clés suivants :

- **Confiance** accrue dans les certificats alternatifs au sein de tous les systèmes sociaux : enseignement et formation, marché du travail et société.
- Plus grande **transparence** des résultats d'apprentissage obtenus par le biais de formations de courte durée.
- Encouragement plutôt qu'entrave de l'**innovation en matière d'enseignement** grâce à une approche commune.
- **Flexibilité** permettant à tous les apprenants de choisir et d'accéder aux parcours d'apprentissage les mieux adaptés à leurs besoins.

Les principales conclusions de l'étude, présentées ci-dessous, pourraient servir d'inspiration à la Commission européenne dans l'élaboration d'une approche européenne des micro-certificats.

1. ***Une approche européenne des micro-certificats devrait définir les éléments d'information essentiels que tout micro-certificat doit fournir.***

La cartographie des micro-certificats actuellement disponibles a révélé que ceux-ci partagent plusieurs caractéristiques communes :

- Durée limitée des activités d'apprentissage menant à un micro-certificat : dans l'enseignement supérieur, ces activités sont généralement plus importantes qu'un seul cours, mais moins qu'un diplôme complet.
- Pertinence par rapport au marché du travail : l'accent est mis sur la transmission de connaissances, d'aptitudes et de compétences spécifiques qui sont utiles sur le marché du travail.
- Meilleur accès à l'acquisition de compétences : l'accent est mis sur les possibilités d'apprentissage tout au long de la vie, à un prix raisonnable, de courte durée et faciles d'accès.

Pour ce qui est des autres caractéristiques, les micro-certificats et les activités d'apprentissage associées affichent des divergences importantes. Une approche européenne des micro-certificats bénéficierait d'une liste d'éléments d'information essentiels à fournir par tous les micro-certificats opérant dans le cadre européen. Le fait de disposer d'éléments d'information facilement accessibles, informatifs et comparables créera une plus grande confiance et une plus grande transparence vis-à-vis des micro-certificats parmi les employeurs, les agences d'assurance qualité, les organismes de reconnaissance des qualifications, les établissements d'enseignement supérieur, les apprenants et les autres prestataires (par exemple, les institutions privées, les prestataires d'enseignement et de formation techniques et professionnels, les entreprises, les agences gouvernementales, les organisations à but non lucratif, les bibliothèques et les musées). L'étude identifie les éléments suivants comme une liste d'informations essentielles à fournir par les micro-certificats opérant dans le cadre d'une approche européenne :

- ***Intitulé*** *du micro-certificat, signalant précisément les résultats de l'apprentissage.*
- ***Prestataire*** *du cours.*
- ***Date*** *d'obtention du micro-certificat.*
- ***Description*** *du contenu du cours et de son objectif.*
- ***Résultats de l'apprentissage*** *: ce que l'apprenant sait, comprend et est capable de réaliser sur la base de l'apprentissage évalué.*
- ***Mode de participation de l'apprenant*** *: en ligne, sur site, ou à la fois en ligne et sur site.*
- ***Crédits*** *: nombre de crédits fournis, le cas échéant.*
- ***Période*** *au cours de laquelle l'apprentissage a eu lieu.*
- ***Éventuels pré requis*** *nécessaires pour suivre le cours.*
- ***Ressources d'apprentissage*** *pertinentes pour le certificat.*
- ***Type d'évaluation****, application d'une compétence, portfolio, etc.*
- ***Supervision et vérification d'identité*** *: non supervisé sans vérification d'identité, supervisé sans vérification d'identité, supervisé en ligne ou sur site avec vérification d'identité.*
- ***Assurance qualité*** *: organisme qui assure la qualité du cours.*
- ***Résultat obtenu par l'apprenant*** *: admission à un programme diplômant, crédit pour un programme diplômant, certification ou badge numérique obtenu, nombre de crédits.*
- ***Intégration / options de cumul*** *: cours autonome, indépendant / intégré, cumulable pour un autre certificat.*

2. *Afin de permettre l'innovation et la flexibilité en matière d'enseignement, une approche européenne ne devrait pas prescrire ou standardiser les éléments d'information essentiels de manière trop restrictive.*

Il peut être tentant de définir les éléments d'information essentiels de manière à ce que seuls certains types de micro-certificats soient considérés conformes à l'approche européenne. À première vue, il peut sembler approprié de dire que les activités d'apprentissage menant à des micro-certificats devraient, par exemple, comprendre pas moins de trois et pas plus de 10 ECTS, et qu'elles doivent faire l'objet d'une assurance qualité. Cependant, notre rapport révèle que de telles limites peuvent entraver l'innovation et la flexibilité en matière d'enseignement, et qu'il est difficile de justifier l'établissement

d'exigences aussi spécifiques. Nous suggérons donc d'établir une liste d'éléments essentiels sans préciser les valeurs particulières de ces éléments. Ceci garantirait à la fois la confiance et la transparence vis-à-vis des micro-certificats, sans entraver l'innovation et la flexibilité en matière d'enseignement. Une telle approche permettrait également aux États membres de développer leurs propres approches locales au sein d'un cadre définitionnel et terminologique commun.

3. *Travailler à une solution numérique européenne pour stocker les micro-certificats.*

Le manque de solutions numériques pour la validation, la reconnaissance et le stockage des micro-certificats reste un obstacle à leur adoption à grande échelle. Alors que les solutions numériques ont déjà pris de l'ampleur en tant qu'outils d'apprentissage en ligne et qu'il existe des moyens fiables d'organiser l'offre, les solutions numériques pour le stockage des micro-certificats (relevés de notes, blockchain, vérification de l'apprenant et adéquation des compétences pour le recrutement) sont prometteuses, mais encore naissantes.

La création d'une solution numérique européenne pour le stockage des micro-certificats serait un pas important vers la mise en œuvre pratique d'une approche européenne des micro-certificats. Une solution numérique européenne sécurisée et flexible pour le stockage des micro-certificats contribuerait de manière significative à leur transparence et augmenterait la confiance en eux. Les initiatives actuelles de l'UE, telles que la carte d'étudiant européenne[12], l'Europass[13] et la classification ESCO[14], pourraient être réunies pour mettre en place une telle solution numérique, qui pourrait devenir la norme dans toute l'Europe. Il est également important de veiller à ce que toute solution numérique européenne de stockage des micro-certificats soit :

- basée sur des technologies sécurisées qui authentifient l'identité de l'apprenant et protègent la certification contre les abus ou les altérations.
- facile à partager via différentes plateformes (par exemple les médias sociaux, le courrier électronique, les blogs, etc.).
- développée de telle sorte que les établissements d'enseignement supérieur européens puissent facilement l'intégrer dans leurs propres infrastructures institutionnelles.

4. *Les critères et mesures existants en matière d'assurance qualité doivent être renouvelés et complétés afin d'être adaptés aux micro-certificats.*

L'établissement de l'assurance qualité comme élément clé de l'enseignement supérieur est l'un des succès du processus de Bologne. Il existe un consensus sur le fait que l'assurance qualité est nécessaire pour garantir la responsabilité, soutenir l'amélioration et inspirer confiance dans les cours et les modules. De manière générale, les normes et les éléments clés existants pour la reconnaissance formelle et l'assurance qualité dans l'enseignement

[12] L'initiative relative à la carte d'étudiant européenne développera un « guichet unique » en ligne via l'application mobile Erasmus+, permettant aux étudiants de gérer toutes les démarches administratives relatives à leur période de mobilité - avant, pendant et après leur séjour. Pour plus d'informations : https://ec.europa.eu/education/education-in-the-eu/european-student-card-initiative_fr

[13] Europass fournit un ensemble d'outils et d'informations en ligne pour gérer l'apprentissage et la vie professionnelle. Pour plus d'informations : https://europa.eu/europass/fr

[14] Pour plus d'informations : https://ec.europa.eu/esco/portal/home

supérieur peuvent et devraient être applicables à toute nouvelle forme d'apprentissage, de certification et de délivrance de titres.

Idéalement, l'assurance qualité des procédures de reconnaissance dans l'offre d'enseignement supérieur devrait être réalisée à la fois en interne et en externe, afin de garantir sa conformité aux normes européennes (Nuffic, 2019). Toutefois, dans certains cas, les procédures d'assurance qualité et les cadres réglementaires n'ont pas encore été adaptés pour faciliter et contrôler l'offre numérique ou les micro-certificats émergents. Les critères et mesures existants utilisés pour l'assurance qualité doivent être renouvelés et complétés en conséquence, afin de prendre en compte de manière appropriée la numérisation de l'enseignement et de l'apprentissage, et garantir la sécurité et la transparence pour tous les groupes d'apprenants. En résumé : tous les micro-certificats porteurs de crédits et cumulables doivent être alignés sur un processus d'assurance qualité standardisé et accepté.

5. Chercher des possibilités de mettre en contact les établissements d'enseignement supérieur et les employeurs afin qu'ils puissent trouver les meilleurs moyens de concevoir et de délivrer des micro-certificats.

Nous avons constaté que les micro-certificats actuellement délivrés présentent davantage de caractéristiques divergentes que de caractéristiques similaires. Les deux principales caractéristiques communes à la grande majorité des micro-certificats sont leur utilisation dans des apprentissages assez courts et leur pertinence pour le marché du travail. Cette dernière caractéristique indique que l'engagement entre établissements d'enseignement supérieur et employeurs est crucial pour garantir la valeur des micro-certificats sur le marché du travail. Actuellement, les employeurs semblent être quelque peu laissés de côté dans les discussions relatives à l'élaboration d'une approche européenne des micro-certificats. La Commission européenne, les gouvernements nationaux et les autres acteurs clés devraient chercher des moyens d'intégrer la perspective des employeurs – par exemple, en organisant des discussions avec les principales associations d'employeurs telles qu'EUROCHAMBRES, SMEunited et Business Europe ; en sollicitant l'avis du Comité économique et social européen ; et éventuellement en soutenant les projets Erasmus+ qui réunissent établissements d'enseignement supérieur et employeurs.

Kurzfassung

Micro-Credentials im Aufwind

Der **Arbeitsmarkt befindet sich im Wandel** und die Unsicherheit, wie Arbeit in Zukunft aussehen wird, nimmt zu. Deshalb setzen immer mehr Menschen auf Micro-Credentials. Heute gibt es weniger „lebenslange Jobs" und Arbeitgeber verlangen Flexibilität und die schnelle Anpassung an Veränderungen. Die Lockdown-Maßnahmen, die in der gesamten EU aufgrund der COVID-19-Pandemie ergriffen wurden, haben den europäischen Arbeitsmarkt hart getroffen und dafür gesorgt, dass Millionen Arbeitnehmer ihre Arbeit verloren haben oder in Kurzarbeit gehen mussten. Micro-Credentials sind in dieser Situation besonders hilfreich, weil sie eine **maßgeschneiderte, schnelle und zugängliche Fort- und Weiterbildung ermöglichen**. Den Hochschuleinrichtungen bietet die COVID-19-Pandemie die Chance, ihr Angebot im Bereich der Micro-Credentials auszubauen. So haben beispielsweise die Coimbra-Gruppe und die Hochschulrektorenkonferenz (HRK) gemeinsame Empfehlungen veröffentlicht, in denen sie sich angesichts der aktuellen Krise für flexiblere und stärker modular aufgebaute Studiengänge und die Anerkennung von Kompetenzen durch Micro-Credentials aussprechen. Wenn Hochschuleinrichtungen Micro-Credentials anbieten, kann dies lebenslanges Lernen fördern, Qualifikations- und Kompetenzlücken schließen, die Effizienz des Hochschulbildungssystems verbessern, Innovationen ermutigen und eine vielfältigere Gruppe von Lernenden erreichen (BFUG, 2020).

Durch die Pandemie interessieren sie Lernende verstärkt für Micro-Credentials und offene Online-Lehrveranstaltungen (MOOC), was sich auch in einem starken Nutzeranstieg bei den Anbietern im Vergleich zum gleichen Zeitraum im Jahr 2019 zeigt. Noch deutlicher ist der Anstieg der Nutzung von MOOC-Plattformen zwischen Februar 2020 und März 2020 (siehe Tabelle 3). Potenzielle Lernende suchen nach zusätzlichen Lernangeboten, die nicht zu viel kosten und von kurzer Dauer und leicht zugänglich sind.

Tabelle 3. Abrufe von Lerninhalten (in Millionen) auf den beliebtesten MOOC-Plattformen

MOOC-Anbieter	Abrufe von Lerninhalten (in Millionen)[15]
Coursera	45 (Steigerung um 67%)
edX	19,2 (Steigerung um 52%)
FutureLearn	6,15 (Steigerung um 116%)

Quelle: Class Central, 2020.

In den letzten Jahres gab es außerdem **immer mehr politische Maßnahmen und Initiativen, die Micro-Credentials fördern**. Am 30. September 2020 stellte die Europäische Kommission ihre Vision zur Vollendung des europäischen Bildungsraums bis 2025 vor[16] und kündigte dazu konkrete Maßnahmen in sechs Dimensionen an. Dabei spielt ein europäischer Ansatz im Bereich der Micro-Credentials insbesondere bei der Umsetzung der zweiten Dimension „Inklusion und Gleichstellung der Geschlechter" eine wesentliche Rolle.

[15] Anzahl der Abrufe im März 2020 und prozentuale Veränderung zum Februar 2020.

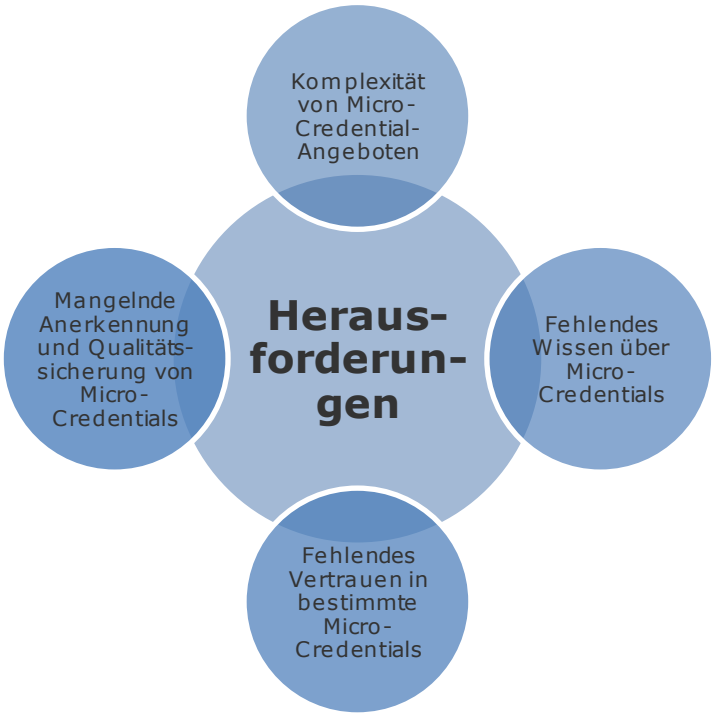
[16] In der neuen Mitteilung zum europäischen Bildungsraum schlägt die Kommission neue Initiativen, mehr Investitionen und einer verstärkte Zusammenarbeit der Mitgliedstaaten vor, die es Europäern jeden Alters erleichtern, die reichhaltigen Angebote der allgemeinen und beruflichen Bildung in der EU zu nutzen. Weitere Informationen unter: https://eur-lex.europa.eu/legal-content/DE/TXT/HTML/?uri=CELEX:52020DC0625&from=EN

„Die Kommission wird (...) auf die Entwicklung eines europäischen Ansatzes für Micro-Credentials hinarbeiten, um dazu beizutragen, die Lernmöglichkeiten zu erweitern und die Rolle der Hochschul- und Berufsbildungseinrichtungen beim lebenslangen Lernen durch flexiblere und modulare Lernoptionen zu stärken. (...) Der Bedarf an flexibleren und inklusiveren Bildungswegen ist gestiegen, da die Population der Studierenden immer vielfältiger wird und die Lernbedürfnisse dynamischer werden" (Europäische Kommission, 2020)

Am 1. Juli 2020 stellte die Kommission die „Neue Europäische Kompetenzagenda" vor, die das Thema Kompetenzen ins Zentrum der politischen Agenda der EU rückt. Eine der 12 Leitinitiativen der Agenda beschäftigt sich mit der Bedeutung von Micro-Credentials. Im Rahmen des durch Erasmus+ geförderten Projekts „MICROBOL" hat die Bologna Follow-Up-Gruppe drei Arbeitsgruppen damit beauftragt, Micro-Credentials aus der Perspektive der wichtigsten Ziele des Bologna-Prozesses zu untersuchen: (1) Qualitätssicherung, (2) Anerkennung, (3) Qualifikationsrahmen und das Europäische System zur Anrechnung von Studienleistungen (ECTS). Das Projekt soll untersuchen, ob und wie die bestehenden Instrumente des Europäischen Hochschulraums (EHR) für Micro-Credentials genutzt oder an diese angepasst werden können. Eine weitere wichtige Entwicklung in Bezug auf Micro-Credentials ist die Ankündigung eines Gemeinsamen Rahmens für Micro-Credentials (CMF) durch das Europäische MOOC-Konsortium, dem die größten europäischen MOOC-Plattformen angehören, nämlich FutureLearn, France Université Numérique (FUN), OpenupED, Miríadax und EduOpen.

Micro-Credentials sind sinnvoll als eigenständige Kompetenznachweise, zur Ergänzung oder Vervollständigung von Studiengängen, die die Beschäftigungsfähigkeit verbessern, und für mehr Qualität beim lebenslangen Lernen. Obwohl sich diese Erkenntnis derzeit durchsetzt, ist die breitflächigen Umsetzung von Micro-Credentials weiterhin schwierig (siehe unten).

Abb. 5. Herausforderungen bei der großflächigen Verwendung von Micro-Credentials



Keines der oben genannten Hindernisse ist unüberwindlich. Sie alle lassen sich beseitigen, wenn europäische Bildungsträger und Politiker in Bezug auf Micro-Credentials einen stimmigen und einheitlichen Ansatz verfolgen.

In diesem Zusammenhang **besteht das wichtigste Ziel dieses Berichts darin, eine Hintergrundanalyse zu erstellen, die der Europäischen Kommission bei der Entwicklung, Bereitstellung und Anerkennung von Micro-Credentials als Faktengrundlage dienen kann**. Seine Ergebnisse fließen darüber hinaus in die allgemeine Diskussion und Analyse eines europäischen Ansatzes in Bezug auf Micro-Credentials ein. Der Bericht konzentriert sich auf den Hochschulbereich, berücksichtigt aber auch relevante Aspekte in anderen Sektoren.

Der Bericht orientiert sich an den folgenden Forschungsfragen:

- Wenn die EU-Politik einen europäischen Ansatz entwickelt, mit dem die Verwendung von Micro-Credentials reguliert und harmonisiert wird, welche Aspekte sollte dieser Ansatz regulieren und warum? Ist ein Ansatz auf EU-Ebene erforderlich?
- Welche Vorteile hätte es, wenn mehr Micro-Credentials angeboten würden?
- Welche beachtenswerten Verfahren zur Umsetzung oder Regulierung von Micro-Credentials gibt es?
- Was sind die wichtigsten Hindernisse für die Verwendung von Micro-Credentials an den Hochschulen und bei anderen Bildungsanbietern?

Micro-Credentials zur Förderung neuer Lernwege

Um die Förderung neuer Lernwege zu ermöglichen und die genannten Forschungsfragen zu beantworten, **fasst der Bericht die aktuelle Forschungsliteratur zusammen**, die Angebot, Anerkennung und Auswirkungen von Micro-Credentials analysiert. Zweitens

kartografiert er bestehende Verfahren in Bezug auf Micro-Credentials. Das Ergebnis der Kartografierung ist ein Katalog bewährter Verfahren, von denen die interessantesten in verschiedenen Abschnitten des Berichts in Textfeldern vorgestellt werden. Wir glauben, dass diese Praxisbeispiele, die von Hochschulen und anderen Bildungsanbietern, Unternehmen und öffentlichen Einrichtungen bereits erfolgreich eingesetzt wurden, es betroffenen Akteuren erlauben, abstrakte Ideen praktisch umzusetzen und verstärkt Micro-Credentials zu nutzen. Drittens enthält der Bericht **drei Fallstudien**, die aktuelle Verfahren bei der Entwicklung, Umsetzung und Anerkennung von kurzen Lehrgänge und Micro-Credentials analysieren. Der Bericht untersucht die folgenden Fallbeispiele:

- Die vom **Projekt „edubadges"** entwickelten digitalen Lösungen, mit denen sich Micro-Credentials bestätigen und online visuell darstellen lassen. Das Projekt wird von der niederländischen Organisation SURF geleitet.
- Die Eingliederung von Micro-Credentials in den **Qualifikationsrahmen in Neuseeland**.
- **Die Lösungen zur Nutzung von Micro-Credentials, die im Rahmen der Initiative „Europäische Hochschulen" des Programms Erasmus+ umgesetzt wurden**[17]: European Consortium of Innovative Universities (ECIU) und Young Universities for the Future of Europe (YUFE).

Abschließend stellt der Bericht **einen Analyserahmen** vor, der zeigt, in welchem Kontext ein europäischer Ansatz in Bezug auf Micro-Credentials hilfreich wäre, je nachdem in welcher Funktion und zu welchem Zweck Micro-Credentials in der Hochschulbildung genutzt werden. Der Rahmen identifiziert **drei Szenarien für die Nutzung von Micro-Credentials**, die sich darin unterscheiden, in welchem Kontext über die Anerkennung von Micro-Credentials entschieden wird: (1) innerhalb eines gesellschaftlichen Systems (z. B. dem Bildungssystem), (2) in zwei gesellschaftlichen Systemen (z. B. Bildung und Arbeitsmarkt); (3) in mehreren Systemen mit einer hohen Durchlässigkeit, die eine echte Anerkennung von lebenslangem Lernen ermöglicht.

Textfeld 5. Szenarien für die Nutzung von Micro-Credentials in der Hochschulbildung

Szenario 1: Anerkennung in einem gesellschaftlichen System

Die wechselseitige Anerkennung zwischen Hochschulen in ganz Europa gehört schon immer zu den klaren Wirkungsweisen des Bologna-Prozesses. Grundsätzlich lässt sich dies durch die ECTS, das einheitliche System zur Übertragung von Studienleistungen, leicht umsetzen. Die Hochschulbildung ist in ganz Europa recht ähnlich organisiert, z. B. in akademischen Semestern und mit Verfahren zur externen Qualitätskontrolle aller Hochschuleinrichtungen. Komplizierter ist dagegen die Anerkennung früherer Lernleistungen, z. B. der Fähigkeiten und Kompetenzen, die Lernende bereits vor der Aufnahme in die Hochschule erworben haben. Durch die Anerkennung frühere Lernleistungen sollen Lernenden alternative Wege in die Hochschulbildung eröffnet werden, wenn sie beispielsweise nicht die reguläre Prüfung zur Hochschulreife abgelegt

[17] Ziel der Initiative „Europäische Hochschulen" ist es, eine neue Generation kreativer Europäerinnen und Europäer zusammenzubringen, die in der Lage sind, in verschiedenen Sprachen, über Länder- und Fachgebietsgrenzen hinweg zusammenzuarbeiten, um die großen gesellschaftlichen Herausforderungen und den Fachkräftemangel, mit denen Europa konfrontiert ist, zu bewältigen. Weitere Informationen unter: https://ec.europa.eu/education/education-in-the-eu/european-education-area/european-universities-initiative_de

haben oder bereits erworbene Kompetenzen als Teil ihres neuen Studiengangs anerkennen lassen wollen.

Szenario 2: Anerkennung in zwei gesellschaftlichen Systemen

Es ist äußerst wichtig, dass der Arbeitsmarkt erkennen kann, was der Lernende in der Hochschulbildung erreicht hat. Allerdings verwenden die beiden Systeme in der Regel unterschiedliche Formate, um die Kompetenzen eines Menschen zu beschreiben. Früher haben Hochschulen bestätigt, dass der Lernende ein Gesamtniveau an Kompetenzen und Wissen erreicht hat. Weil die Arbeitgeber das Fehlen detaillierter Informationen kritisiert haben, wurde der Diplomzusatz eingeführt, der im europäischen Hochschulraum inzwischen weit verbreitet ist. Auch Micro-Credentials können dazu verwendet werden, detaillierte Informationen über die von dem Lernenden erworbenen Kompetenzen und Kenntnisse zu vermitteln. Wenn sie sowohl von Bildungsanbietern als auch vom Arbeitsmarkt verstanden und anerkannt werden sollen, müssen sie in einer einheitliche Terminologie formuliert sein und einheitliche Standards nutzen. Die Idee hinter der ESCO-Klassifikation[18] und der Entwicklung des neuen Europass ist es, eine solche einheitliche Terminologie zu definieren.

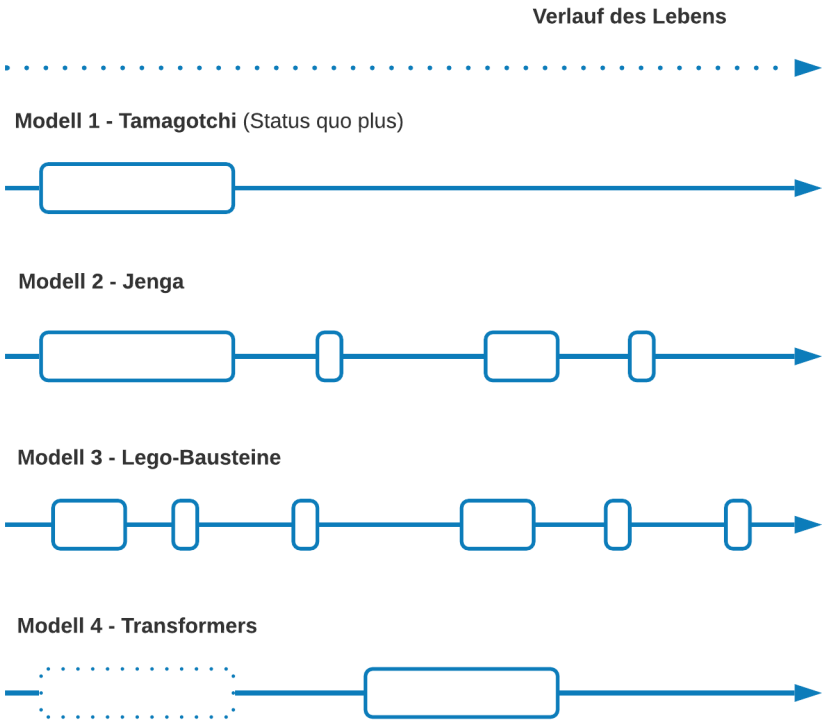
Szenario 3: Anerkennung in allen gesellschaftlichen Systemen

Das Szenario 3 eröffnet Lernenden besonders flexible Lernwege und ermöglicht es ihnen, zwischen Tätigkeiten auf dem Arbeitsmarkt, der Familie und staatsbürgerlichen Pflichten zu wechseln und Kompetenzen bei unterschiedlichen Anbietern zu erwerben. Bei diesem Szenario muss das für Micro-Credentials entwickelte Ökosystem besonders hochwertig sein, weil es nur dann richtig funktionieren kann, wenn die Anerkennung und Kommunikation von Micro-Credentials zwischen den einzelnen Systemen möglichst reibungslos erfolgt. Da Anerkennung ein sozialer Prozess ist, der stark von der Existent vertrauensbildender Systeme abhängt, ist es unwahrscheinlich, dass dies nur durch eine Kombination aus Standards, technischem Abgleich und KI-gestützte Lösungen erreicht werden kann. Dazu müsste sich die Kultur der Anerkennung von Fähigkeiten und Kompetenzen auf eine Weise ändern, die sich im Begriff „offene Anerkennung" zusammenfassen lässt, d. h. die Anerkennung aller Lernergebnisse und -leistungen im Verlauf des gesamten Lebens und in allen Lebensbereichen.

Wie wahrscheinlich die oben skizzierten Szenarien sind, hängt von der künftigen Entwicklung der Hochschullandschaft ab. Diese Landschaft ist vom Lernweg jedes Einzelnen über sein gesamten Leben geprägt. Das persönliche und berufliche Leben der Menschen ist nicht mehr linear, sondern komplex, mehrstufig und nicht linear. Deshalb müssen die Hochschulen unterschiedliche Lernwege anbieten, die Lernende in jeder Lebensphase beschreiten können. Der **analytische Rahmen beschreibt vier verschiedene Modelle für die Lernwege in der Hochschulbildung**: (1) Tamagotchi, (2) Jenga, (3) Lego-Bausteine und (4) Transformer (siehe die Tabelle und das Textfeld unten).

[18] ESCO kategorisiert die Fähigkeiten, Kompetenzen, Qualifikationen und Berufe, die für den Arbeitsmarkt und die allgemeine und berufliche Bildung in der EU relevant sind.

Abb. 6. Vier Lernwegmodelle für die Hochschulbildung



Textfeld 6. Lernwege in der Hochschulbildung

Modell 1: Tamagotchi

Der Lernende hat in der Regel die Sekundarstufe abgeschlossen und wechselt in die Hochschulbildung. Er schreibt sich an einer Hochschule ein und studiert 3-5 Jahre lang relativ intensiv, wodurch er den Studiengang, in dem er sich eingeschrieben hat, abschließen kann. Der Großteil der Lernergebnisse, die er nach diesem ersten Block erzielt, sind informell bzw. nicht-formalisiert und ohne direkte Verbindung mit dem ersten Studiengang.

Modell 2: Jenga

Der Lernende hat in der Regel die Sekundarstufe abgeschlossen und wechselt in die Hochschulbildung. Er studiert für 3 Jahre oder kürzer relativ intensiv an einer Hochschule. Das ganze Leben lang füllt der Lernende durch kurze Lehrgänge (die online oder an einer Einrichtung stattfinden können) Wissen nach und erhält dafür womöglich Micro-Credentials. Zusammen bilden diese Aktivitäten einen vollständigen Studiengang, der in gleichem Maß Grundkenntnisse und Allgemeinwissen einerseits und Kompetenzen für die Fort- und Weiterbildung andererseits vermittelt, die für die beruflichen Ziele des Lernenden erforderlich sind.

Modell 3: Lego-Bausteine

Der Lernende hat eine hohe Eigenmotivation und Eigenständigkeit und will einen eigenen Studiengang zusammenstellen, indem er die Angebote unterschiedlicher Bildungsanbieter (online und an der Einrichtung) nutzt und bei diesen Kompetenznachweise erwirbt. Genauso können Lernende zusätzliche Kompetenznachweise erwerben, um sich neue berufliche Wege zu erschließen oder sich in ihrem Beruf fortzubilden.

Modell 4: Transformer

Es gibt eine lange Pause zwischen der Schulzeit und ersten beruflichen Bildung (die auch an der Hochschule erfolgt sein kann) und einer neuen Lernphase. Der Lernende geht entweder wieder an die Hochschule, um neue Grundkenntnisse und Kompetenzen zu erwerben oder um einen höheren formalen Bildungsabschluss zu erwerben. Er studiert 3-5 Jahre lang relativ intensiv, um den entsprechenden Studiengang abzuschließen und plant die Rückkehr oder den erneuten Eintritt in den Arbeitsmarkt.

Fünf politische Denkanstöße

Unser Literaturüberblick zeigt, dass der Erfolg eines europäischen Ansatzes in Bezug auf Micro-Credentials zu einem großen Teil davon abhängt, ob dieser Ansatz die folgenden wichtigen Ziele erreicht:

- Mehr **Vertrauen** in alternative Kompetenznachweise in allen gesellschaftlichen Systemen schaffen: allgemeine und berufliche Bildung, Arbeitsmarkt und Gesellschaft.
- Die **Transparenz** der Lernergebnisse erhöhen, die durch kurze Studiengänge erzielt werden.
- Gewährleisten, dass ein gemeinsamer Ansatz **Innovationen in der Bildung** erleichtert und nicht behindert.
- Für alle Lernende mehr **Flexibilität** bei der Auswahl und Nutzung der am besten geeigneten Lernwege ermöglichen.

Die wichtigsten Ergebnisse der Studie, die nachfolgende skizziert werden, könnten der Europäischen Kommission als Inspirationsquelle bei der Entwicklung eines europäischen Ansatzes in Bezug auf Micro-Credentials dienen.

1. ***Ein europäischer Ansatz in Bezug auf Micro-Credentials sollte die wichtigsten Informationen definieren, die Micro-Credentials enthalten müssen.***

Die Kartografierung der derzeit verfügbaren Micro-Credentials hat gezeigt, dass sie alle bestimmte Merkmale gemeinsam haben:

- Begrenzte Dauer der Lernaktivität, die zu dem Micro-Credential führt**:** in der Hochschulbildung dauern sie in der Regel länger als ein einzelner Kurs, jedoch kürzer als ein vollständiger Studiengang.
- Relevanz für den Arbeitsmarkt**:** Der Schwerpunkt liegt auf der Vermittlung von konkreten Kenntnissen, Fähigkeiten und Kompetenzen, die für den Arbeitsmarkt wertvoll sind.
- Besserer Zugang zum Kompetenzerwerb: Der Schwerpunkt liegt auf Möglichkeiten zu lebenslangem Lernen, die nicht zu teuer, kurz und bequem zugänglich sind.

Was ihre anderem Merkmale angeht, gibt es zwischen verschiedenen Micro-Credentials bzw. ähnlichen Lernangeboten große Unterschiede. Für einen europäischen Ansatz in Bezug auf Micro-Credentials wäre eine Liste wichtiger Informationen hilfreich, die alle Micro-Credentials, die innerhalb des europäischen Rahmens angeboten werden, enthalten müssen. Leicht zugängliche, aussagekräftige und vergleichbare Informationen würden zu mehr Transparenz führen und bei Arbeitgebern, Qualitätssicherungsagenturen, den Stellen, die Qualifikationen anerkennen, Hochschuleinrichtungen, Lernenden und anderen Anbietern (z. B. privaten Institutionen, Anbietern von technischer oder berufliche Bildung, Unternehmen, Behörden, gemeinnützigen Organisationen, Bibliotheken und Museen) Vertrauen schaffen. Die Studie hat die folgende Liste wichtiger Informationen identifiziert, die Micro-Credentials, die im Rahmen eines europäischen Rahmens angeboten werden, enthalten sollten:

- ***Titel*** *des Micro-Credentials mit präzisen Hinweisen zu den Lernergebnissen*
- ***Anbieter*** *des Kurses.*
- ***Datum****, an dem der Micro-Credential vergeben wurde.*
- ***Beschreibung*** *von Inhalt und Zweck des Kurses.*
- ***Lernergebnisse****, was der erfolgreiche Teilnehmer auf der Grundlage geprüfter Lernaktivitäten weiß, kennt und kann.*
- ***Form der Teilnahme:*** *online, persönlich oder sowohl online als auch persönlich.*
- ***Credits:*** *gegebenenfalls Anzahl der erworbenen Credits.*
- ***Zeitraum****, in dem die Lernaktivität erfolgt ist.*
- ***Voraussetzungen****, die für die Teilnahme an Kurs gegeben sein mussten.*
- ***Lernmittel****, die für den Kompetenznachweis relevant sind.*
- ***Art der Prüfung:*** *Tests, praktische Prüfung, Arbeitsmappe usw.*
- ***Aufsicht und Identitätsprüfung*** *unbeaufsichtigt ohne Identitätsprüfung, beaufsichtigt ohne Identitätsprüfung, unter Aufsicht online oder persönlich mit Identitätsprüfung.*
- ***Qualitätssicherung:*** *die Stelle, die die Qualität des Kurses gewährleistet.*
- ***Ergebnis für erfolgreiche Teilnehmer:*** *Zulassung zu einem Studiengang, Credits für einen Studiengang, Kompetenznachweis oder digitaler Badge, Anzahl der Credits.*
- ***Optionen zur Integration /Anrechnung:*** *eigenständiger, unabhängiger Kurs / integriert, für weitere Studiennachweise anrechenbar.*

2. *Um Innovationen und eine gewisse Flexibilität zu ermöglichen, sollte ein europäischer Ansatz die Kerninformationen, die enthalten sein müssen, nicht zu eng vorgeben oder standardisieren.*

Man könnte versucht sein, die Kerninformationen so zu definieren, dass nur bestimmte Arten von Micro-Credentials dem europäischen Ansatz entsprechen. Auf den ersten Blick scheint es vielleicht angemessen vorzuschreiben, dass die Lernaktivitäten für Micro-Credentials beispielsweise mindestens drei und höchstens 10 ECTS umfassen dürfen und eine Qualitätssicherung durchlaufen müssen. Wie unser Bericht zeigt, könnte derartige Beschränkungen jedoch bildungspolitische Innovationen behindern und die Flexibilität einschränken; außerdem ist es schwierig, eine Basis für derart spezifische Anforderungen zu finden. Wir schlagen daher vor, eine Liste von Kerninformationen zu erstellen ohne die konkreten Werte der einzelnen Informationen vorzugeben. Dies würde Vertrauen bilden

und die Transparenz von Micro-Credentials gewährleisten, ohne Innovationen und Flexibilität einzuschränken. Außerdem würde es dieser Ansatz den Mitgliedstaaten ermöglichen, innerhalb der von diesem breiten Rahmen vorgegebenen Definitionen und Begriffe eigene Ansätze zu entwickeln.

3. *Es sollte eine europäische digitale Lösung zur Speicherung von Micro-Credentials entwickelt werden.*

Dass Micro-Credentials nicht häufiger genutzt werden, liegt auch darin, dass es noch keine digitalen Lösungen zu ihrer Überprüfung, Anerkennung und Speicherung gibt. Digitale Lösungen als Plattformen für Online-Lernangebote sind bereits gut etabliert und es gibt zuverlässige Verfahren für deren Bereitstellung. Erste digitale Lösungen für die Speicherung von Micro-Credentials (z. B. Studienbücher, Blockchain, Identitätsprüfungen und Möglichkeiten zum Abgleich von Kompetenzen bei der Auswahl von Stellenbewerbern) sind vielversprechend, stecken jedoch noch in den Kinderschuhen.

Die Schaffung einer europäischen digitalen Lösung zur Speicherung von Micro-Credentials wäre ein bedeutender Schritt bei der Umsetzung eines europäischen Ansatzes. Eine sichere und flexible europäische digitale Lösung zur Speicherung von Micro-Credentials würde deren Transparenz wesentlich verbessern und Vertrauen schaffen. Neue EU-Initiativen, wie die Initiative für einen europäischen Studentenausweis[19], Europass[20] und die ESCO-Klassifikation[21] könnten in diese digitale Lösung, die als Standard für ganz Europa fungieren könnte, integriert werden. Außerdem muss gewährleistet sein, dass die europäische digitale Lösung zur Speicherung von Micro-Credentials folgenden Kriterien erfüllt:

- sie stützt sich auf sichere Technologien, die die Identität des Lernenden überprüfen und den Kompetenznachweis vor Missbrauch und Änderungen schützen.
- die Micro-Credentials lassen sich einfach über verschiedene Plattformen anzeigen (z. B. soziale Medien, E-Mail, Blog usw.).
- sie ist so entwickelt, dass europäische Hochschuleinrichtungen sie einfach in ihre eigene Infrastruktur integrieren können.

4. *Die bestehenden Kriterien und Maßnahmen der Qualitätssicherung müssen überarbeitet und ergänzt werden, damit sie sich auch für Micro-Credentials eignen.*

Dass Qualitätssicherung inzwischen als wichtiges Element der Hochschulbildung etabliert ist, stellt einen der größten Erfolg des Bologna-Prozesses dar. Es herrscht Einigkeit, dass Qualitätssicherung notwendig ist, um Rechenschaft zu gewährleisten, Verbesserungen anzustoßen und Vertrauen in die Studiengänge und Module zu schaffen. Grundsätzlich können und sollten die Standards und Kernelemente für die formale Anerkennung und Qualitätssicherung in der Hochschulbildung auch für neue Formen des Lernens und der Bescheinigung von Lernergebnissen genutzt werden.

[19] Die Initiative für einen europäischen Studentenausweis will Studierenden in Form der Erasmus+-App eine zentrale Online-Funktion zur Abwicklung der gesamten Mobilitätsphase bieten — im Vorfeld, während des Aufenthalts und danach. Weitere Informationen unter: https://ec.europa.eu/education/education-in-the-eu/european-student-card-initiative_de

[20] Europass stellt eine Reihe von Online-Tools und Informationen zur Planung des Bildungswegs und der beruflichen Laufbahn bereit. Weitere Informationen unter: https://europa.eu/europass/de

[21] Weitere Informationen unter: https://ec.europa.eu/esco/portal/home

Im Idealfall sollte die Qualität der Anerkennungsverfahren in der Hochschulbildung sowohl intern aus auch durch externe Stelle kontrolliert werden, damit gewährleistet ist, dass die interne Qualitätssicherung den europäischen Standards entspricht (Nuffic, 2019). In vielen Fällen wurden die Verfahren und regulatorischen Rahmen der Qualitätssicherung jedoch noch nicht an digitale Formen der Lehre oder neue Micro-Credentials angepasst. Daher müssen die bisherigen Kriterien und Maßnahmen der Qualitätssicherung überarbeitet und ergänzt werden, damit sie die Digitalisierung von Lehre und Lernen angemessen berücksichtigen und Sicherheit und Transparenz für alle Lernenden gewährleisten. Kurz gesagt, alle Micro-Credentials, die Credits beinhalten und anrechenbar sind, müssen zu einem standardisierten und anerkannten Prozess der Qualitätssicherung passen.

5. *Es sollten Möglichkeiten geschaffen werden, wie Hochschuleinrichtungen und Arbeitgeber gemeinsam die besten Verfahren zur Gestaltung und Umsetzung von Micro-Credentials finden können.*

Unsere Ergebnisse zeigen, dass bei Micro-Credentials derzeit die Unterschiede die Gemeinsamkeiten überwiegen. Fast allen Micro-Credentials ist gemeinsam, dass sie nur für relativ kurze Lehrgänge genutzt werden und dass sie für den Arbeitsmarkt relevant sind. Das letztgenannte Merkmal zeigt, dass die Hochschuleinrichtungen sich unbedingt mit Arbeitgebern abstimmen sollten, um zu gewährleisten, dass Micro-Credentials auf dem Arbeitsmarkt etwas wert sind. Derzeit sind die Arbeitgeber an der Diskussion über die Gestaltung eines europäischen Ansatzes in Bezug auf Micro-Credentials kaum beteiligt. Die Europäische Kommission, nationale Regierungen und andere wichtige Interessengruppen sollten nach Möglichkeiten suchen, die Perspektive der Arbeitgeber zu berücksichtigen, beispielsweise durch Gespräche mit den wichtigsten Arbeitgeberverbänden, wie Eurochambres, SMEunited und BusinessEurope. Ferner sollten der Europäische Wirtschafts- und Sozialausschuss und die Erasmus+-Projekte konsultiert werden, die Kontakte zwischen Hochschuleinrichtungen und Arbeitgebern aufbauen.

1. Introduction

1.1 Purpose of the report

The **purpose** of this report is to provide a background analysis that will inform the European Commission regarding the development, provision and recognition of micro-credentials with a view to elaborating a European approach. This study will also assist the European Commission by mapping the current practices of:

- higher education institutions and other education providers, in offering micro-credentials.
- national authorities, including recognition and quality assurance bodies, in defining the frameworks that govern and recognise the provision and quality of micro-credentials.

The report reviews the main drivers and benefits of, and obstacles to, the provision of micro-credentials. It analyses the methods used to design courses that lead to micro-credentials as well as looking at the current role and significance of higher education institutions, other education providers and the world of work, in designing and delivering courses that lead to micro-credentials. In addition, it analyses ways of assuring the quality of micro-credentials and the possibility of embedding them into European and national qualifications frameworks.

The report aims to answer the following **research questions**:

- If EU policy makers create a European approach governing and harmonising the use of micro-credentials, which aspects should fall under this approach and why? Is an EU-level approach necessary?
- What could the benefits be of the growing provision of micro-credentials?
- What notable practices exist in relation to implementing or governing the implementation of micro-credentials?
- What are the main obstacles to the provision of micro-credentials in higher education and by other education providers?

The report is based mainly on a **review of recent literature** that analyses the provision, recognition and impact of micro-credentials. In some instances, the report also refers to findings that stem from more general pedagogical and psychological research, in order to answer relevant questions concerning the impact of learning activities in alternative higher education[22].

The report also provides **three case studies** that analyse recent notable practices in the design, delivery or recognition of short learning courses and micro-credentials. The report looks at the following cases:

- Digital solutions to validate micro-credentials and provide an online visual representation for them, created by the 'edubadges' project. The project is led by the organisation SURF in the Netherlands.

[22] Alternative higher education refers to alternative pathways to an academic degree, be they via alternative forms of higher education institutions or alternative programmes leading to an academic degree, or recognition of prior learning or of acquired competences. The term also refers to alternative credentials such as micro-credentials, industry-recognised certificates, badges and licences as alternatives to academic degrees (Klemenčič, 2020).

- The inclusion of micro-credentials in the New Zealand qualifications framework.
- Micro-credentialling solutions implemented under the European Universities Initiative: the European Consortium of Innovative Universities (ECIU) and the Young Universities for the Future of Europe (YUFE).

The report is tailored to be relevant mainly in the European policy context and therefore focuses mainly on practices implemented in Europe. However, the authors have also looked at some of the leading practices implemented by higher education institutions, other education providers or public organisations in non-EU countries.

The report proceeds as follows:

- The remainder of this introductory section provides a short discussion about the different definitions of micro-credentials, the drivers for and key obstacles to the growing use of micro-credentials, and the EU policy context in relation to this topic. Only the key aspects of these topics are discussed in the introduction, in order to provide the reader with essential background information before delving deeper into these issues in subsequent sections.
- The second section describes the key principles of the analytical framework used to examine the findings of the literature review, presented in the subsequent chapters. Our analytical framework consists of three scenarios for the use of micro-credentials in higher education, and four distinct learning pathways in higher education.
- The third section looks at the key issues relating to the design of learning activities leading to micro-credentials, as well as the recognition of learning outcomes acquired through these learning activities.
- The fourth section discusses the impacts of micro-credentials on learners, namely through their positive effects on employability, lifelong learning, inclusiveness and flexibility.
- The fifth section provides three case studies of notable practices in the provision and recognition of micro-credentials.
- Lastly, the sixth section provides conclusions and recommendations stemming from our analysis.

The report also includes an annex that provides a list of notable practices related to the design, provision and recognition of micro-credentials.

1.2 Defining micro-credentials

Many different terms are used to describe what this report calls 'micro-credentials'. The main synonyms used in the literature are alternative credentials, digital badges, micro-certifications, web badges, open badges, mini degrees, and nano degrees, among many others. Research in the area of alternative credentials[23] usually covers two main aspects: learning activities that lead to a credential, and the credential itself. The term 'micro-credential' is often used to describe both aspects. For example, both a short learning course and a certification are called a micro-credential. This report distinguishes:

[23] A credential is a documented award issued by a responsible and authorised body that has determined that an individual has achieved specific learning outcomes relative to a given standard. Possessing a credential helps an individual to prove their skills, competencies and knowledge in a given field to employers, education institutions and the community.

- Learning activities, achievements and contributions (including short[24] learning courses) that may lead to micro-credentials.
- Micro-credentials as certifications, i.e. as documents that recognise the learning activities that take place during the course and the learning outcomes resulting from these learning activities. The focus on certifications as distinct from simply learning activities could be regarded as closer to the everyday understanding of the concept of 'credentials'.

Regardless of the various definitions of micro-credentials that can be found in the literature, Resei et al. (2019, p. 15) identify some **common characteristics** of currently available micro-credentials, accepted by the majority of researchers:

- Limited length of learning activities leading to a micro-credential**:** larger than a single course, but less than a full degree.
- Labour market relevance**:** the focus is on the delivery of specific knowledge, skills and competences that are useful in the labour market.
- Wider societal impact: the focus is on lifelong learning opportunities that are reasonably priced, short and convenient to access.

Otherwise, micro-credentials and the related learning activities **vary quite widely in terms of other characteristics** (Tako, Galan-Muros and Weko, 2020; Oliver, 2019):

- ***Delivery mode****: on-site / blended / online*
- ***Providers****: higher education institutions / businesses / other education providers*
- ***Credits****: credit-bearing / non-credit-bearing*
- ***Duration****: hours / months*
- ***Time period****: self-paced / defined time period / defined shorter periods with a specified workload to be accomplished in each period*
- ***Objective****: to recognise (signal) competences already acquired / to acquire new competences, skills or qualifications*
- ***Intended use****: continuing education / labour market (up-skilling, re-skilling)*
- ***Prerequisites to take the course****: yes / no*
- ***Assessment process****: attendance / assignments / examination*
- ***Integration and stackability****: standalone / integrated into a study programme / stackable into a larger credential*
- ***Certification****: paper / digital*

To summarise, the common characteristics of the majority of micro-credentials are that they are acquired after a relatively short period of learning, are expected to be relevant in the labour market, and may recognise the development of wider transversal skills. Despite these shared characteristics, micro-credentials differ widely in terms of their modes of delivery, content, providers, the possibility of receiving credits, time period for learning, objectives, usefulness, prerequisites, assessment, integration/stackability options and types of certificates received. In developing a European definition or approach, it may be

[24] Here, by the word 'short' we only want to emphasise that these learning activities are shorter in duration than would be required for a full degree.

helpful, in particular, to distinguish between micro-credentials that are credit-bearing and non-credit bearing, as well as between stackable and non-stackable. Credit-bearing micro-credentials can offer easier recognition, comparability and the possibility of stackability, because they are expected to mirror the level of complexity and autonomy required in a typical unit of a formal qualification.

1.3 Drivers for the use of micro-credentials in higher education

The growing popularity of micro-credentials is an outcome of competing societal and economic forces and macro-level trends, which reflect changing perspectives in what individuals, employers and governments expect from higher education. Importantly, the growth of the global micro-credentials movement is part of a wider unbundling movement that is having a gradually increasing impact on higher education (Ralston, 2020). This movement encompasses a number competing perspectives on how higher education should best respond to the emergence of the new digital society, in order to ensure a well-educated citizenry with 21st-century skills that can help to shape a prosperous future.

Set against this wider backdrop, perhaps the most significant macro-level trends are the **changing nature of the labour market** and growing uncertainty as to what the future of work will look like. An important and related driver is the impact that new digital technologies, including the growth of artificial intelligence (AI), will have on the nature of work. Alongside these powerful drivers is a greater recognition on the part of individuals that the skills they have acquired in formal education are not future-proof, leading them to look for ways to gain new skills – or perhaps even re-skill in order to change their field of work. Camilleri (2018b) highlights the fact that there are no more 'jobs for life', and employers demand flexibility and quick reactions to changing circumstances. Alternative higher education pathways, including micro-credentials, can help fill to the gap between the programmes provided by higher education institutions and the skills that employers seek (Diaz, Finkelstein and Manning, 2015; Hurst, 2015; Pickard, Shah and De Simone, 2018). A recent OECD report (Tako, Galan-Muros and Weko, 2020) underlined that most learners pursue alternative credentials for work-related purposes.

Another major driver for the growing use of micro-credentials is the increasing accessibility of top-level quality education, particularly as a result of the **advancement of digital education tools** (Ghasia, Machumu and DeSmert, 2019). Digital education tools offer new ways to deliver learning activities, and have the potential to meet the growing demand for higher education that responds to the needs of the new digital society. The advancement of digital tools, such as online proctoring, also enables online learning to be better verified, assessed and certified (Resei et al., 2019).

The growing accessibility and quality of alternative higher education has also had a relatively negative impact on the perceived value-for-money of traditional higher education (Camilleri, 2018b; Oliver, 2019). This situation results from the **increasing costs of traditional higher education**, in particular in private universities and in certain countries (e.g. the UK and the US), and the difficulties encountered by higher education institutions in teaching the skills necessary for the current labour market. As a result, **affordability** has become one of the drivers for the growing use of micro-credentials. In the US in particular, there is evidence that people are starting to question the benefits of paying for traditional qualifications that may not prepare them for the new digital society. In Europe, even though tuition fees vary significantly between countries, they are generally lower than in Australia or North America, especially in the case of public higher education institutions. The differences in tuition fees seen in some EU countries are based on a number of criteria (European Commission, EACEA, Eurydice, 2018), which in turn can have negative effects on specific groups of learners:

- Study field (e.g. Bulgaria, Hungary, Italy, Lithuania, Portugal and Spain).
- Language of study (e.g. Czech Republic, Estonia, Latvia and Slovakia).
- Whether the student is studying towards his or her first or second degree at a specific level (e.g. Croatia, the Netherlands and Slovenia).
- Merit or performance in secondary education (e.g. Hungary, Lithuania, Latvia and Romania).
- Insufficient ECTS credits or extended duration of studies (e.g. Croatia, Estonia, Italy, Lithuania, Latvia, Poland, Spain, Slovakia).

The digital technological revolution has contributed to the 'massification' of higher education (Matthews, Garratt and Macdonald, 2018): more learners with diverse backgrounds and expectations want to get involved in both formal and non-formal education, and digital tools allow still higher numbers of them to be accommodated. This also offers potential for the democratisation of knowledge, as information is now easily accessible to a more diverse population via the internet. Lastly, some leading **higher education institutions and other education providers see this as a branding and marketing opportunity**, which increases global competition in the provision of alternative education (Tako, Galan-Muros and Weko, 2020). More diverse education providers have also emerged, such as online learning platforms, NGOs, companies and training organisations.

In such a context, defined by growing opportunities to learn and the increasing accessibility of top-level knowledge of all kinds, **lifelong learning becomes more attractive**. One practical implication of this is that it is now easier for individuals to receive formal recognition of their prior learning and experience, including learning activities leading to a micro-credential. Individual learners are also inspired and motivated by the possibility of learning things that are not directly relevant for their career, but in which they have a personal interest.

The COVID-19 pandemic has encouraged education providers to adjust their learning environments to provide flexible ways of learning for all, as well as continuous learning opportunities. Teaching and learning have increasingly shifted online. This has resulted in a huge increase in course enrolments on MOOC platforms. For example, the top three MOOC providers (Coursera, edX and FutureLearn) registered as many new users in April 2020 as they did during the whole of 2019 (Class Central, 2020). Coursera gained the largest number of new learners, enrolling 35 million between mid-March and end of July (Class Central, 2020).

Moreover, the current COVID-19 situation is changing the skills context across Europe. The COVID-19 lockdown measures introduced across the EU have had a substantial impact on the EU labour market, with many workers losing their jobs or being placed under short-term work schemes. Adults increasingly face the **need to upskill and reskill,** with more and more employees requiring immediately useful **'just-in-time' skills development**. Micro-credentials are particularly useful in such a situation as they allow for the personalised, quick and accessible development of skills. For instance, the pandemic has encouraged the growth of short courses at Australian universities and colleges, with 11 Australian universities introducing a total of 64 short online courses in areas aligned with the needs of industry (Times Higher Education, 2020). In Europe, the Coimbra Group of universities and the German Rectors' Conference (HRK) have issued collective outlooks in which they express support for more flexible and modular programmes, as well as recognition by means of micro-credentials, in the light of the current crisis (Coimbra Group, 2020; HRK, 2020).

1.4 Key barriers to the use of micro-credentials

Despite the emerging consensus that micro-credentials are beneficial – whether as standalone certifications, to complement or supplement degree programmes, for greater employability, or to improve the level of lifelong learning – challenges still exist in scaling up their use, signalling their benefits, and in building trust in micro-credentials among some stakeholders (Oliver, 2019).

Learners are yet to adopt micro-credentials on a wide scale, which might signal that they are still unsure about the benefits they offer (e.g. the extent to which micro-credentials are recognised by employers). OECD data on engagement with non-formal education from the PIAAC Survey of Adult Skills (2019) show that a **relatively low number of adults decide to get involved in additional learning activities.** Learning in adulthood is most often undertaken by those who have already completed higher education. Among 25-65 year olds, adults with higher education are 31 percentage points more likely to participate in non-formal education and training than those without higher education (67% vs 36%) (OECD, 2019).

Employers are still unsure what micro-credentials are and which ones to trust, given the wide variations in their characteristics. As mentioned earlier, these characteristics include delivery modes, content, providers, the possibility of receiving credits, the time period for learning, objectives, usefulness, prerequisites, assessment and validation process[25], integration/stackability options and type of certificates received. **Digital solutions such as transcripts, blockchain, learner verification and potential skills matching in recruitment are promising, but still nascent.**

Higher education institutions face several challenges in relation to the uptake of micro-credentials, namely the **recognition of micro-credentials within existing curricula**, **quality assurance constraints**, **lack of funding support** and a **lack of adequately trained teaching staff** (Shapiro, 2020). The lack of a common understanding of micro-credentials inhibits quality assurance processes and standards, while the short length of the courses that lead to micro-credentials discourages some institutions from allocating time and human resources to the development of such courses.

The main obstacles to the wider use of micro-credentials at system level identified by Shapiro (2020) include the **complexity of micro-credentials offerings**, **lack of digital solutions for assessment, validation, recognition and storage of micro-credentials** and **resistance from some stakeholders**.

To sum up, **none of the barriers mentioned above is insurmountable.** They can all be overcome, if European educators and policy makers adopt a **coherent and consistent approach** to micro-credentials. Providers of higher education need to establish internal procedures for designing, delivering, accrediting and validating the micro-credentials that they offer. These processes must be transparent and well developed to ensure that the micro-credentials they offer are useful to learners and recognised by other institutions and employers. For example, the European Consortium of Innovative Universities (ECIU) is piloting ways of unbundling and redesigning traditional study programmes. It recently announced the launch of micro-modules in Master's degree programmes, starting in the 2020 autumn semester (ECIU, 2020). ECIU provides two types of modules. The first type engages learners in challenges ranging from regional to international societal issues, and requires collaboration with other learners, researchers, industry leaders and people

[25] Practices and arrangements for assessing and validating learning outcomes; namely knowledge, skills and competences acquired through formal, non-formal and informal learning.

working in the community to overcome the critical societal issues. The second type is more theoretical in nature, and enables learners to learn more about these regional and international societal issues. Students from the ECIU member universities will be able to study in international groups for open and flexible education (fully online) or face to face through student exchange visits to the selected country. First, ECIU will concentrate on Master's-level micro-modules. To enrol on these, learners need at least 90 ECTS, or to have completed a Bachelor's degree.

1.5 EU policy context

To launch a common vision for the 'Transformation Agenda for higher education', EU policy makers need to reach a consensus on the role of higher education in the context of the aforementioned societal and economic drivers, and to ensure that learners are placed in the driving seat when it comes to planning their educational journey. Flexibility and inclusion are the main words mentioned by experts and stakeholders when asked about how higher education will develop in the next decade. To respond to the changing nature of the world of work, it is likely that an increasing number of graduates and workers will need to update their skills through some form of educational process. **Higher education institutions must therefore become better at offering opportunities for continuous learning**, in particular short learning courses that can be bundled into degrees, bundled for the purpose of pursuing further degrees, or recognised in another way, for example via micro-credentials.

Such a change requires work from national policy makers at system level, as well as work at the EU level to realise its potential and benefits – for example, by creating an approach towards these qualifications (linked to the current three Bologna cycles, the European Qualification Framework and the Standards and Guidelines for Quality Assurance in the European Higher Education Area [ESG]) and agreeing on requirements to ensure the quality, levelling and recognition of micro-credentials. In order to broaden the offer for lifelong and continuous learning to a diverse group of learners, supporting the goals of the European Education Area, micro-credentials should facilitate recognition of the learning outcomes of flexible courses and modules in higher education that anyone can follow on-site or online, to upskill or re-skill.

On 30 September 2020, the European Commission presented its vision for the creation of the European Education Area by 2025 and announced concrete measure to achieve it. The Commission proposes to consolidate ongoing efforts, and to further develop the European Education Area along six dimensions to bring about a significant shift in equity, outcomes and the resilience of education and training in Europe. A European approach to micro-credentials is integral to achieving the second of these dimensions, which relates to inclusion and gender equality.

> *"The Commission will work towards the development of a European Approach to micro-credentials, to help widen learning opportunities and strengthen the role of higher education and vocational education and training institutions in lifelong learning by providing more flexible and modular learning opportunities… The need for more flexible and inclusive learning paths has increased as the student population is becoming more diverse and the learning (European Commission, 2020)."*

The EU and national policy makers, as well as stakeholders, understand that **digital solutions can help immensely** in progressing towards the objectives of making higher education more flexible, inclusive and thus conducive to lifelong learning; a higher education that ensures every individual is able to upskill or re-skill as they see fit. The European Commission and other key stakeholders have therefore focused substantially on establishing a high-quality approach at European level that coordinates the provision of digital solutions for higher education. In 2016, the Commission's communication on modernising education stated:

> *"Digital transformation is changing the job market and requiring new skill sets. Digital technologies will also offer new ways of learning provided that there is adequate access to these technologies. To reap the benefits of these trends, education and training systems need to respond better to these changing realities (European Commission, 2016)."*

Through the adoption of the European Skills Agenda for Sustainable Competitiveness, Social Fairness and Resilience, the Commission is placing skills at the heart of the EU policy agenda, steering investment in people and their skills in order to promote sustainable growth and recovery after the coronavirus pandemic. The Skills Agenda contains 12 initiatives, one of which is devoted to developing a European approach to micro-credentials.

> *"The Commission will develop, together with all relevant stakeholders, European standards which address minimum requirements for quality and transparency; explore the inclusion of micro-credentials in qualifications frameworks, in dialogue with national qualification authorities; make it easier for individuals to store and showcase to employers acquired micro credentials through Europass and its Digital Credentials (European Commission, 2020)."*

The Commission's Digital Education Action Plan (2020) continues to emphasise the necessity of promoting inclusive and accessible digital education in Europe. The Action Plan has two strategic priorities:

1. Fostering the development of a high-performance digital education ecosystem. This requires infrastructure, connectivity and digital equipment; effective digital capacity planning and development; teachers as well as education and training staff who are digitally competent and confident; and high-quality learning content, as well as user-friendly tools and secure platforms that respect privacy and ethical standards.
2. Enhancing digital skills and competences for digital transformation, which requires basic digital skills and competences from an early age, as well as developing advanced digital skills. This will produce more digital specialists and ensure gender equality in digital studies and careers.

In 2018, the ministers of the European Higher Education Area (EHEA) met in Paris to determine a new focus on the possibilities of digitalisation (Paris Communiqué, 2018):

> *"Digitalisation plays a role in all areas of society and we recognise its potential to transform how higher education is delivered and how people learn at different stages of their lives. We call on our higher education institutions to prepare their students and support their teachers to act creatively in a digitalised environment. We will enable our education systems to make better use of digital and blended education, with appropriate quality assurance, in order to enhance lifelong and flexible learning, foster digital skills and competences, improve data analysis, educational research and foresight, and remove regulatory obstacles to the provision of open and digital education. We call on the BFUG to take the issue of digitalisation forward in the next working period."*

The communiqué of the Rome Ministerial Conference (Rome Communiqué, 2020) emphasises support for the use of digital technologies and the development of digital skills in higher education:

> *"We commit to supporting our higher education institutions in using digital technologies for learning, teaching and assessment, as well as for academic communication and research, and to investing in the development of digital skills and competences for all."*

Another key issue discussed at EU and national policy levels in the context of micro-credentials is how to organise quality assurance for the short learning courses that lead to micro-credentials, and how to add micro-credentials to the existing qualification frameworks, both at EHEA and national levels. Key stakeholders in higher education have begun working on these issues with the help of targeted, EU-funded projects and within the framework of the Bologna Process.

The MICROBOL (Micro-credentials linked to the Bologna key commitments) project, coordinated by the Ministry of Education and Training of Belgium/Flemish Community, with partners from Finland, Italy, the European University Association and the European Association for Quality Assurance in Higher Education, will work with EHEA governments and stakeholders to explore, within the Bologna Process, whether and how the existing Bologna tools can be used and/or need to be adapted to be fit for micro-credentials.

In addition, the Bologna Follow-Up Group (2020) indicates that three working groups tasked with looking at micro-credentials from the perspective of key commitments within the Bologna Process: Quality Assurance, Recognition, Qualification Frameworks and ECTS. The groups and will explore the feasibility of updating the relevant tools.

The European Commission is also working to **support the uptake and use of micro-credentials**. It is providing financial support for designing, providing and assessing the use of micro-credentials through its Erasmus+ programme.

Moreover, the recently launched European University Initiative presents two challenges to standard credentialling procedures: (1) that a student should be able to curate their own course of study out of modules offered by the member institution in an alliance; (2) almost all alliances want to further open up to the community around them, which means that they need a way to formally recognise what new learners have achieved (e.g. ECTS or other format). Solving these challenges appears to necessitate the use of some form of micro-credentials.

2. Analytical framework: how should we think about the role of micro-credentials in higher education?

To answer the question of how the European Commission could address the issue with a potential policy initiative on micro-credentials – and, indeed, if it should at all – **we first need to conceptualise the possible roles and purposes of micro-credentials in higher education**. This section therefore begins by presenting three scenarios for the use of micro-credentials: (1) their use only within the education system; (2) use in the education system and in the labour market; (3) their use in all possible social systems.

The importance of these different scenarios varies depending on how higher education is organised and which of the drivers mentioned earlier are regarded as most important to respond to by governments and policy makers. For this reason, we discuss four different potential learning pathways for a learner in higher education.

This analytical exercise will make the possible use-cases for micro-credentials clearer, and will facilitate discussion on the types of frameworks, criteria and standards necessary to harness the potential of micro-credentials, in order to make higher education:

- more responsive to the demands of the labour market;
- more inclusive for different types of learners;
- more able to support lifelong learning;
- more affordable.

2.1 Three scenarios for the use of micro-credentials in higher education

In an exploratory study on the acceptance and uses of open badges – one type of micro-credential – in Germany, the authors Buchem, Orr and Brunn (2019, p. 36) presented three possible future scenarios for their use. These scenarios are distinguished by the question of where the recognition for a micro-credential is determined: within one social system (e.g. within the educational system); across two social systems (e.g. education and the labour market); and in multiple systems with a high level of permeability, thus facilitating truly recognised lifelong learning. As implied by the names – minimum, medium and maximum – the authors expect that the first scenario is easier to achieve than the third.

Scenario 1: Recognition within one social system

Scenario 1 refers to a possible scenario with the **smallest scope**. It requires a minimum range of elements in the areas of (1) **infrastructure**; (2) **framework conditions**; and (3) **stakeholders**, which are necessary for the use of micro-credentials in a higher education system. This scenario is aimed at learners who want to document and map their skills and competences within the higher education system using micro-credentials. **The infrastructure** required for Scenario 1 is a platform that allows the exhibition and management of micro-credentials. The main requirements for such a platform include access and administration options for learners to their micro-credentials, options for exporting and importing micro-credentials between student management systems at

different universities, as well as hosting them in a university-independent service. **The conditions** required for Scenario 1 must ensure the recognition and use of micro-credentials from other higher education institutions as well as the recognition of services and competences certified using micro-credentials. **The stakeholders** that must be involved in the implementation of Scenario 1 are policy makers from the higher education system at national and European levels, higher education institutions and providers of learning management systems, and providers of credential hosting services.

Recognition among higher education institutions throughout Europe has been a clear line of action for the Bologna Process. In principle, the ECTS makes this easy to implement. Higher education tends to be organised in similar ways throughout Europe, i.e. by academic semester, and all higher education institutions are subject to external quality assurance procedures. This means that any ECTS credit given to a learner has been issued according to common (or similar) values, using similar procedures and documents that are principally similar in content. The main user-case for recognition here is for Erasmus+ students, who attend courses in other European higher education institutions during their studies and afterwards request that their 'home' university recognises the ECTS credits they have gained. Broadly speaking, this is an example that can also be applied to the mutual recognition of micro-credentials that are subject to quality assurance and are awarded ECTS credits.

A more complex case is that of the **recognition of prior learning**, i.e. where a learner has acquired knowledge and skills prior to enrolling at their present higher education institution. Through the recognition of prior learning, learners hope to gain alternative access routes into higher education – if, for instance, they have not attained the standard entrance examination. They may also wish to have learning acquired elsewhere recognised as part of their new course of study – leading, for instance, to a shorter overall period of study. The issue for the receiving higher education institution is how to assess the appropriateness of prior learning in terms of its level, content and quality in relation to the new course of study at their institution. This is often decided on a case-by-case basis, and with respect to certain types of learning. These include qualifications delivered by recognised educational providers (both completed and unfinished); professional development and employment-based awards; and prior experiential learning (e.g. knowledge and skills gained through employment or voluntary work). Recognising prior learning on a case-by-case basis has implications for the workload of teachers and staff at higher education institutions, and involves practices that are not yet standardised. As a result, the recognition of prior learning in some European countries is moving somewhat slowly, and validation procedures are neither mainstreamed nor encouraged. The European Commission supports Member States in their uptake of the validation of prior learning. The 2012 Council Recommendation on validation encourages Member States to put in place national arrangements for validation. Cedefop cooperates with the European Commission in developing European guidelines on validation and in collecting information on validation practices through the European inventory on validation of non-formal and informal learning.

Scenario 1 has the advantage of being relatively easy and quick to implement and may help universities to be more responsive to the emergence of new skills or knowledge domains (e.g. AI, FinTech, etc). On the other hand, Scenario 1 may not deliver work-ready graduates with the types of skills and knowledge required by employers, due to a gap between theory and practice.

Scenario 2: Recognition across two social systems

Scenario 2 refers to a possible scenario of **medium scope** and comprising a medium range of elements in the areas of (1) **infrastructure**, (2) **framework conditions** and (3) **stakeholders** necessary for the use and scaling of micro-credentials across two different systems, i.e. higher education and the labour market. Scenario 2 is an extension of Scenario 1, in which the use of micro-credentials in one system is already assumed. **The infrastructure** required for Scenario 2 is an interface between higher education and the labour market such as the European Skills/Competences Occupations and Qualifications Classification (ESCO) and Europass. The recognition of ESCO and Europass can thus contribute positively to the uptake and implementation of Scenario 2. In order to enable the use of micro-credentials at the interface between higher education and the world of work in a European context, employers must recognise these European instruments. **The stakeholders** that must be involved in the implementation of Scenario 2 are policy makers from the higher education and labour market systems at national and European levels, higher education institutions, ESCO and Europass managers, and providers of credential hosting services.

It is vital that the **labour market is able to recognise what the leaner in higher education has achieved** and to relate this to the needs of a relevant organisation or industry. The usual problem encountered here is that each of these two systems has a different way of describing achievements. In the past, higher education has documented the achievement of an aggregate level of skills and knowledge, which is then certified with a certificate of graduation from a Bachelor's or Master's programme. Criticism from employers concerning a lack of detailed information has led to the introduction of the Diploma Supplement, which describes the content of the study programme. This is widely used within the European Higher Education Area.

Micro-credentials can also be used to provide detailed information describing the skills and knowledge acquired by a learner. As mentioned above, for micro-credentials to be understood and recognised by both educational providers and by the labour market, they need to be formulated in a common language. This requires **closer contact between employers, higher education institutions and other micro-credential providers**, and the **use of common standards**. The idea behind ESCO and the development of the renewed Europass is to formulate a common language between education and the labour market, which will also accommodate micro-credentials. Europass is the European tool for lifelong learning and career management. It offers a digital infrastructure that can be used when issuing micro-credentials. The Europass Platform, launched in July 2020, also uses ESCO terminology in the background to suggest learning opportunities that suit the skills and skill aspirations of individuals (if users have indicated that they would like to receive such suggestions).

Scenario 2 has the potential to mitigate some of the challenges that Europe is facing in the context of skills (e.g. skills mismatch, skills gap) and to render people's skill profiles more visible. The possible challenge to implementing Scenario 2 could be in arriving at common standards and descriptions of achievements. However, this risk could be mitigated by ensuring that micro-credentials are well described and quality-assured.

Scenario 3: Recognition across all social systems

This third scenario is a more efficient version of what can be achieved by Scenario 2. Here, however, recognition via a common language and criteria should become so effective that permeability is achieved. Scenario 3 has the **largest scope** and comprises the maximum range of elements in the areas of (1) **infrastructure**, (2) **framework conditions** and (3) **stakeholders**. These are necessary for micro-credentials to be used across all systems,

e.g. in schools, university, work, further education and informal self-education. **The infrastructure** required for Scenario 3 needs to be further developed and should build upon existing instruments such as ESCO. In this scenario, digital certificates might replace traditional CVs and become part of an individual's digital portfolio or digital identity. **The conditions** required for Scenario 3 must enable the cross-system use of micro-credentials for lifelong learning in the European context, by developing methods and tools for recording, processing and recognising skills and competencies acquired through education and employment, as well as informal and non-formal activities (e.g. volunteering). **The stakeholders** that must be involved in the implementation of Scenario 3 are policy makers from the fields of schools and higher education, work, further education/adult education, vocational education and training at national and European level, as well as education institutions, ESCO managers and providers of learning management systems, and providers of credential hosting services.

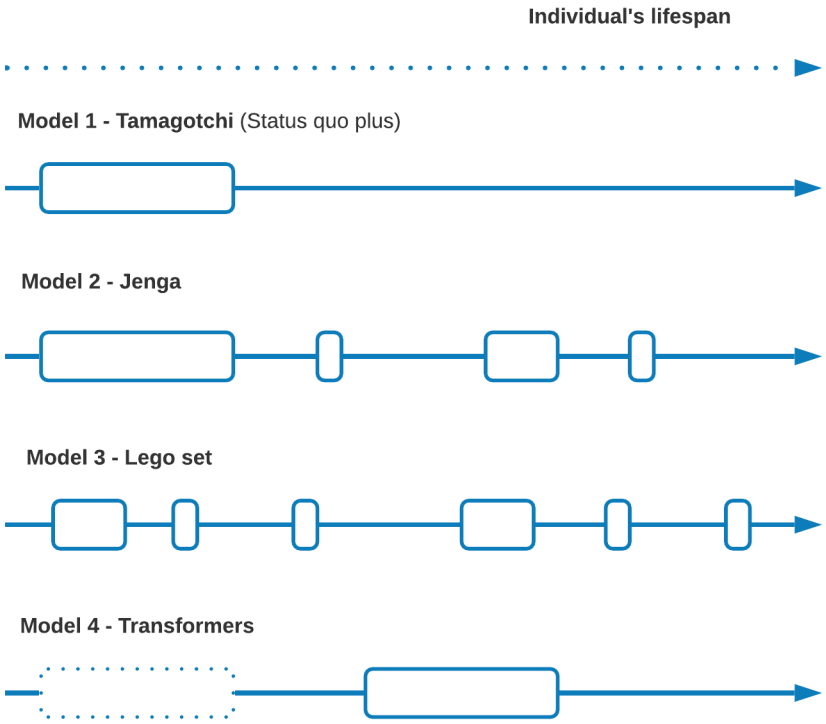
Scenario 3 will allow learners to follow more flexible pathways by **moving between labour market activities, family and civic duties, and learning acquired via different providers**. This scenario places high demands upon the ecosystem created around micro-credentials, as it can only really work with a low level of friction in recognition and communication between each of the social systems. Indeed, it is unlikely that this scenario can be achieved solely through a combination of standards and technical matching, together with AI-powered solutions. Recognition is also a social process, and is highly dependent on the existence of trust-giving systems. It would require the kind of change in the culture of recognition of skills and competencies that is encapsulated by the term 'open recognition' – i.e. the recognition of all learning outcomes and achievements throughout life and in all fields.

Scenario 3 is the scenario best positioned to advance the development of lifelong learning, but it has a disadvantage of being the hardest to implement across all systems within a timeframe that can respond to current needs.

2.2 Four learning pathways in higher education

The relative likelihood of the scenarios described above depends on the ways in which higher education is organised, as well as the ways in which it is currently provided and how it will be provided in the future. Two major European studies focusing on this topic were released within the past year (Ehlers, 2020; Orr et al., 2020). The study from Ehlers focuses on skills requirements for the future and their impact on the way in which higher education is likely to be organised, leading to four future scenarios based on different profiles for higher education provision. The study from Orr et al. (2020) covers the same topics and reaches similar conclusions, but takes a different approach to exploring the future landscape of higher education. This landscape is determined by the learning pathway of the learner throughout their life. In this, Orr et al. refer to the concepts of both the 100-year lifespan and the 60-year curriculum (a term coined by Gary Matkin). These terms highlight the fact that higher education institutions are encouraged to think beyond degree-based programming and to consider how value can be provided to learners across their entire lifetime. These changes are necessary, because people's work and personal lives are no longer linear, but complex, multi-stage and non-linear. Higher education institutions need to serve learners over the course of their lifetime to ensure employability in light of the changing nature of work, as well as the need for personal development. This has direct ramifications for the question of recognition and the role micro-credentials can play in each of these models. The four resulting models are presented in Figure 7 below and explained further in the text.

Figure 7. Four learning pathway models for higher education



Model 1: Tamagotchi

In the first model, the learner has typically finished secondary schooling and progresses on to higher education. They enrol in one institution and study relatively intensively for a period of three to five years, leading to the completion of the higher education programme in which they enrolled. Most learning following this first block is informal and non-formal, and is not directly linked to the first study programme.

This model follows the traditional concept of higher education, which assumes that the knowledge and skills learnt in higher education give the learner a competency profile that is future-proof, and which will allow them to adapt flexibly to future demands.

Model 2: Jenga

In the second model, the learner has typically finished secondary schooling and progresses on to higher education. They study relatively intensively for a period of three years or less at a single higher education institution. The focus is on helping them to acquire foundational knowledge and skills. Throughout their lives, these learners will 'top up' this knowledge via short programmes (studied either online or on-campus), possibly leading to micro-credentials. Together, these activities make up a complete programme of study that balances foundational and transversal knowledge and skills with upskilling and sideways-skilling, as necessary for the individual's current occupation. Formal recognition of the first

learning block is certain. Recognition of the other learning units depends on the way in which recognition is organised within the higher education landscape.

Model 3: Lego set

In the third model, the learner is highly self-motivated and self-reliant and wishes to piece together their own full study programme, taking advantage of offerings available and earning credentials from various education providers (online and on-campus). The chain of learning units completed by the learner describes their own personal study programme. Recognition of the learning units depends on the way in which recognition is organised within the higher education landscape. The learner might also choose to earn additional credentials in order to change careers or upskill in his/her existing career path.

Model 4: Transformer

Lastly, in the fourth model, there is a long break between the learner's period at school and in initial training (which may have included higher education) and a new learning period. They are returning to higher education either to gain new foundational knowledge and skills, or to improve the level of their formal education. This may be motivated by the need to change careers or upskill in their career path. They study relatively intensively for a period of three to five years, and then complete their higher education programme with the expectation of returning to or re-entering the labour market. This type of higher education provision satisfies the demand from individual learners for the chance to transform their knowledge and skills profile, in order to upskill significantly, to change their career pathway, or to re-enter the labour market. It could also be driven by the demands of an employer requesting that an employee adjusts their knowledge and competency profile. In this case, it makes sense to recognise some of the learner's previous learning and competencies in the design of their learning programme.

2.3 Conclusions relating to the analytical framework

A European approach to micro-credentials, if developed, would need to explicitly acknowledge which drivers are the most important and what related outcomes are expected in order to decide which of the scenarios for the use of micro-credentials it wants to enable, and which learning pathways to support. **Based on the three possible scenarios,** policy makers will need to agree whether to govern the use of micro-credentials only within the system of education, in both education and the labour market, or in all social systems (enabling true lifelong learning). **Based on the four possible learning pathways**, policy makers will need to decide whether to support the use of micro-credentials for formal, informal and/or non-formal learning after a person finishes traditional higher education (model 1); to formally finish traditional higher education or upgrade the skills and competences received by taking courses that provide recognised micro-credentials (model 2); to enable fully stackable higher education experiences in which a list of recognised micro-credentials leads to a full degree (model 3); or to formally recognise prior learning (model 4). The analytical framework presented in this chapter also enables policy makers to arrive at additional, more creative solutions. Whichever decision policy makers reach, there will be different implications for the design and recognition of micro-credentials.

3. Designing short learning courses and recognising micro-credentials

This section discusses the **'technical' and pedagogical aspect of micro-credentials**, i.e. those issues relating to the design and delivery of learning activities that lead to micro-credentials and to ways of validating and recognising what has been learned. The first sub-

section below discusses the development and provision of learning activities leading to micro-credentials. The second sub-section analyses the digital solutions available to facilitate the provision of learning activities and to digitally recognise and store the resulting credentials/learning outcomes. The third sub-section reviews the existing approaches to conducting quality assurance on courses leading to micro-credentials. The fourth and final sub-section section looks at how the potential of micro-credentials can be fully realised through their alignment with qualification frameworks and other standardisation and classification systems.

Each sub-section looks in particular at the potential obstacles and challenges that stakeholders may face in each of these areas when facilitating the uptake of micro-credentials. Each of the topics addressed by the sub-sections could also possibly fall under the European approach to micro-credentials; therefore, wherever relevant, our discussion aims to suggest how each of these aspects could be considered when developing a European approach to micro-credentials.

3.1 Design and delivery of courses leading to micro-credentials

Key findings

- Digital learning is gaining momentum and most of the currently available courses that lead to micro-credentials are offered online and based on MOOCs. Micro-credentials can also be gained via offline learning, especially via a blended approach.
- Courses leading to micro-credentials vary in terms of their design and delivery (e.g. variations in their length and level of workload, difficulty and work effort, the quality of the descriptions of their learning outcomes, assessment practices).
- Micro-credentials must include a concise summary of critical information (e.g. title, learning outcomes, description of content, type of assessment, quality assurance) to ensure that information about micro-credentials is transparent and informative, and that learners and employers are well informed about exactly what micro-credentials communicate about their holders.

Table 4 provides an overview of the numbers of individual courses, micro-credentials and online degrees[26] provided by the top MOOC providers[27] at the end of 2019. The uptake of these courses suggests that Model 2 (Jenga) is already an active pathway for many learners. The table also shows the number of learners using each platform. Class Central reported that over 2,500 individual courses, 170 micro-credentials and 11 online degree courses were launched in 2019 alone. **The online learning sector is clearly accelerating.**

[26] A large number of currently existing micro-credentials are MOOC-based.
[27] MOOCs were developed as a learning instrument that provides certificates to learners. MOOCs have adapted to offering new types of alternative credentials, such as micro-credentials, but can also lead to traditional degrees.

Table 4. Top MOOC providers in terms of users and offerings

MOOC provider	Learners	Courses	Micro-credentials	Degrees
Coursera	45 million	3,800	420	16
edX	24 million	2,640	292	10
Udacity	11.5 million	200	40	1
FutureLearn	10 million	880	49	23
Swayam	10 million	1,000	0	0

Source: Class Central, 2020.

According to Class Central, the total number of MOOC-based micro-credentials rose to 800 in 2019. In 2019, more than 170 new micro-credentials of 10 different types were launched, compared with 120 in 2018. Class Central also provides data on this increase, broken down by type and provider of micro-credentials. This information is provided in the table below.

Table 5. Number of micro-credentials by type and provider

Type	Provider	Year 2018	Year 2019
Specialisations	Coursera	310	400
Professional Certificate	Coursera	0	13
MasterTrack	Coursera	3	6
Professional Certificate	edX	89	123
MicroMasters	edX	51	56
XSeries	edX	29	40
Professional Education	edX	62	73
Nanodegrees	Udacity	35	40
Programmes	FutureLearn	23	32
Academic Certificates	FutureLearn	14	17
Programmes	Kadenze	19	20

Source: Class Central, 2020.

An extensive study of current courses leading to micro-credentials awarded by MOOC platforms (Pickard, 2018) shows **major variations between micro-credential courses**. Pickard (2018) indicated that "this variability and the lack of standardisation poses a problem for both learners and employers, as it makes it difficult to compare various micro-credentials. While all employers understand that a Master's degree signifies a higher level of preparation than a Bachelor's degree, it is impossible to say whether a Udacity Nanodegree prepares a person better than (or equally as) an edX Professional Certificate or a Coursera Specialization."

The main courses leading to micro-credentials include (Resei et al., 2019):

- Variability in length and workload.
- Role of courses leading to micro-credentials: either standalone or part of a degree.
- Difficulty and work effort.
- Quality of descriptions of the learning outcomes (often missing or insufficient).

- Assessment practices.

Courses leading to micro-credentials can be delivered both digitally and non-digitally. While **most of those currently on offer are online and based on MOOCs** (given that MOOC platforms have actively promoted the use of micro-credentials), micro-credential courses can also be delivered on-site. The latter approach may be beneficial – or sometimes even unavoidable – for subjects that require physical space and activities (e.g. design thinking and prototyping). Resei et al. (2019) also highlight the potential for a blended approach, mixing online and on-site learning. For example, MOOCs can be used to provide a basic understanding of a topic, in order to prepare for face-to-face group work activity and the application of the prior learning. Conversely, the kick-off could be held face-to-face, providing a basic understanding and enabling participants to get to know each other and build trust at an early stage. After this, the group work activities and collaboration could continue online.

A number of studies (Lim et al., 2018; Malaysian Qualification Agency, 2019; Ehlers, 2018; Buckingham, 2014, Resei et al., 2019) have identified a list of principles that a high-quality course leading to micro-credentials should apply in order to ensure maximum value for all relevant stakeholders (learners, higher education institutions, employers, officials, and quality assurance bodies). First, micro-credentials should be **outcome-based,** and these outcomes (i.e. knowledge, skills, attitudes, or competences) should be articulated clearly and in a measurable manner. Second, micro-credentials need to be **personalised** as far as possible, meaning that learners can select units/courses/modules that cater to their needs and interests. The mode of delivery, the pace of learning and assessment methods should be personalised appropriately for optimal learning. Third, micro-credentials should be designed and delivered in response to the demands of learners or employers. In keeping with Scenario 2, **engagement with employers is crucial** to ensure value and relevance in the labour market. Fourth, micro-credentials should be **transparent and provide complete information** (e.g. the course objectives, outcomes, mode of delivery, notional hours of learning, assessment, credits, etc.) in a readable and easily accessible form. Fifth, micro-credentials should be **appropriately named** based on their purpose, delivery, content, assessment and scope. Lastly, at present the stackability of micro-credentials remains limited: most micro-credentials do not yet provide the ability to combine and stack them up to a full degree. In cases where this is possible, all micro-credentials concerned usually have to be awarded by the same higher education institution in which the learner is enrolled. Micro-credentials acquired at one institution are frequently not recognised by another. Allocation of credits, a stronger connection to the traditional higher education system and support for stackability across different platforms could potentially enable learners to mix and match micro-credentials from different institutions, adding up to a full degree. Interestingly, it could be argued that a system already exists that works for Scenario 1, in the case of postgraduate certificates, which are a widely recognised and stackable credential leading to a Master's, are considered to be micro-credentials. In the case of digital micro-credentials, these should be **based on technologies that are secure**, which authenticate the identity of a learner, and which protect a certification from misuse or alteration. They should also be **easy to share** on and via different platforms (e.g. social media, e-mail, blogs, etc.).

In short, in order to be better integrated into higher education systems, micro-credentials must be well designed and understandable by all interested parties. Oliver (2019) and Lim et al. (2018) suggest that **micro-credentials must include a concise summary of critical information**, indicating the certified learning and the conditions under which it was achieved. It is indeed most crucial that the information provided along with the micro-credential is transparent and understandable by employers, quality assurance agencies,

education providers, society at large, and every other imaginable stakeholder. The information that must be included in such a summary of critical information is:

- ***Title*** *of the micro-credential, which precisely signals the learning outcomes.*
- ***Provider*** *of the course.*
- ***Date*** *when the micro-credential was awarded.*
- ***Description*** *of the course content and its purpose.*
- ***Learning outcomes:*** *what the successful learner knows, understands and can do based on this assessed learning.*
- ***How learner has participated:*** *online, on-site or both online and on-site.*
- ***Credits****: number of credits provided, if credit-bearing.*
- ***Time period*** *when the learning took place.*
- ***Any prerequisites*** *that were required to begin the course.*
- ***Learning resources*** *relevant for the credential.*
- ***Type of assessment:*** *testing, application of a skill, portfolio, etc.*
- ***Supervision and identity verification:*** *unsupervised with no identity verification, supervised with no identity verification, supervised online or on-site with identity verification.*
- ***Quality assurance:*** *the body ensuring the quality of the course.*
- ***Outcome for a successful learner:*** *admission to a degree programme, credit towards a degree programme, certification or digital badge earned, number of credits.*
- ***Integration / stackability options****: standalone, independent course / integrated, stackable towards another credential.*

Such **information packs** ensure that learners and employers are well informed about exactly what micro-credentials communicate about their holders. This information can be included into the (digital) micro-credential itself. Ensuring that information about micro-credentials is transparent and informative will build trust among learners and employers and facilitate the uptake of micro-credentials.

3.2 Digital solutions that enable the use of micro-credentials in higher education

Key findings

- Prospective students are more supportive of digital learning than current students. This is partly driven by changing expectations among learners as to when and where they learn. The growing demand for digital learning has been particularly pronounced in light of the COVID-19 pandemic, with MOOC providers seeing an immense increase in course enrolments.
- Well-functioning digital credential systems require processes and procedures to be in place for developing, issuing, managing and storing digital credentials.
- Digital credentials provide significant capabilities for recognising and recording learning (e.g. they include consistent metadata, and are easy to share, display and distribute).
- Despite growing popularity and support for digital learning, there is still some mistrust of online education, particularly with respect to learner verification and authentication.

The digitalisation of higher education is a transformative process that substantially influences all activities of higher education institutions. It permeates all processes, places, formats and objectives for teaching, learning, researching and working in higher education (Rampelt et al., 2018). This digital transformation includes the development of new infrastructures and the increasing use of digital media and technologies for teaching and learning, research, support services, administration and communication, but also the need for learners and staff to develop new (digital) skills for their current and future workplaces (Rampelt, Orr and Knoth, 2019, p. 9).

Digital solutions are extremely important in the context of micro-credentials (perhaps even more than for other types of currently recognised credentials):

- To ensure the quality of digital or blended provision of short learning courses.
- To provide enhanced digital means to recognise the skills, competences and qualifications acquired during these courses.

The growth of online learning that leads to higher education credentials is driven by changing expectations among learners as to when and where they learn. Matthew, Garratt and Macdonald (2018) present quantitative variations between current and prospective students in relation to their expectations (see Table 6), which show that **prospective students are more favourable towards online learning** than current students, and that they anticipate that learning providers will rethink and diversify their course delivery practices.

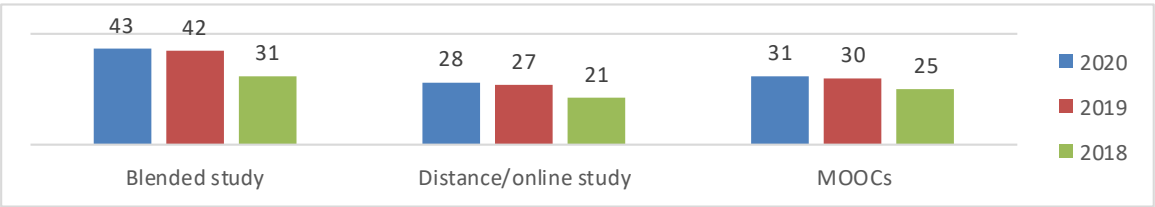
Table 6. Expectations of current and prospective students

Expectations	Current students	Prospective students
Prefer most of their degree to be delivered online	22%	42%
Availability of online study plays an important role in course selection	43%	58%
Believe that online learning is as effective as traditional learning	37%	49%

Source: Matthew, Garratt and Macdonald (2018).

The International Student Survey 2020 (QS, 2020) has also highlighted that **openness towards online learning options had been increasing over recent years,** and that the online market has matured (see Figure 8).

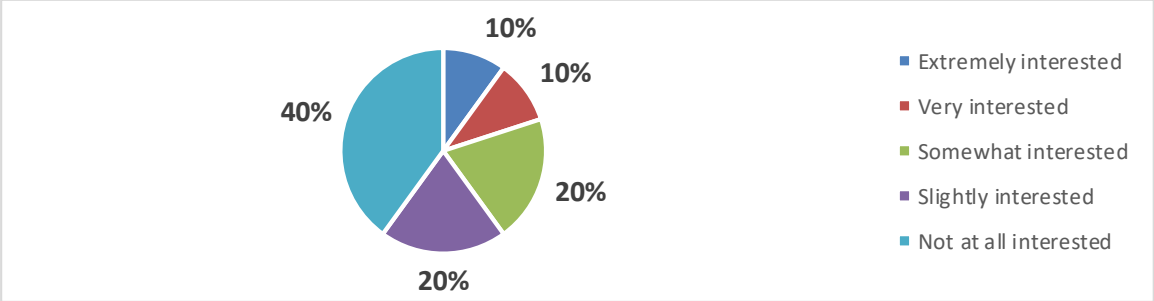
Figure 8. Percentage of students who are very interested or somewhat interested in various delivery options



Source: QS (2020).

The same survey also found that **the majority of prospective international students expressed some interest in studying their degree online in light of COVID-19** (see Figure 9).

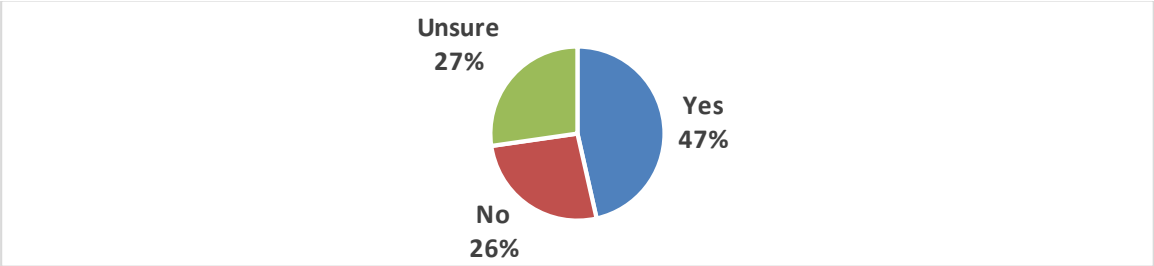
Figure 9. Interest of prospective international students in studying their degree online due to COVID-19



Source: QS (2020).

Moreover, a large portion of prospective international students would be interested in starting their studies online if it meant that they could begin their studies in the upcoming academic year (QS, 2020) (see Figure 10). This share is likely to have increased during the Covid-19 pandemic.

Figure 10. Percentage of prospective international students who would be interested in starting their course online if it meant they could begin studying in the upcoming academic year



Source: QS (2020).

However, while a significant proportion were interested in (or at least unsure about) whether they would like to start their degree online, the majority (77%) of prospective international students said that they would expect a discount in such an event. Many **students argue that the value of the on-campus experience is crucial to the higher education offering** and **should be considered when determining tuition fees** (QS, 2020).

According to Diaz, Finkelstein and Manning (2015), **the digital nature of some micro-credentials provides significant affordances, and can offer greater ongoing value** than more traditional formats for recognising or recording learning (e.g. a degree, an academic course-level transcript, a paper-based certificate of completion), because digital badges:

- include a consistent set of metadata or information about criteria or assessment that led to the outcomes represented (e.g. skills, competences);
- incorporate authentic evidence of the learning outcome being certified (especially if linked to or integrated with an e-portfolio system, which over time shows critical reflection on a learning trajectory);
- can be shared and displayed across different platforms in both human and machine-readable formats;

- can be distributed in a simple and consistent format that can lead to relationship building, marketing or networking (particularly in relation to career opportunities);
- are searchable and discoverable in various settings.

The demand for online learning has grown in the light of COVID-19 and large-scale lockdowns around the world. At the end of March 2020, the world's largest MOOC provider, Coursera, announced that it would be making some courses completely free for anyone, so that people everywhere could continue learning. Even though many courses on Coursera were already available for free without a certificate, the newly announced selection of courses also included those that offer certificates. This offer was only valid until the end of July 2020. Once a learner checks out, they have 180 days to earn a certificate. Coursera's courses come from both well-known universities (e.g. John Hopkins University, the University of Pennsylvania, Imperial College London and the California Institute of Technology) and companies (e.g. Google and Amazon).

The ongoing situation has also driven other MOOC providers to launch similar initiatives (Class Central, 2020):

- Udacity offers one-month free nanodegrees in artificial intelligence, programming and autonomous systems, which usually cost $400 per month each, to European and Northern American learners.
- FutureLearn offers free certificate courses from institutions such as King's College London, the University of Edinburgh and some Australian universities. In the light of the pandemic, the Australian Trade and Investment Commission (Austrade) has partnered with social learning platform FutureLearn.com to provide free online courses and help students stay ahead of the learning curve. This partnership allows access to free online courses from leading Australian educational institutions to everyone while international travel is restricted.
- Datacamp offers one week's free access to its full platform, which includes over 300 certificate courses.
- Udemy offers more than 650 free online courses in tech, leadership and language.
- edX made much of its course catalogue and certificate programmes available for free to its partners.

According to Class Central (2020), **MOOC providers have seen an immense increase in course enrolments** when compared with the same period last year. Coursera, for example, has seen over 10 million course enrolments since it partnered with higher education institutions, enabling them to offer free access to Coursera's course catalogue (Boorstin, 2020). The number of sessions on MOOC platforms also increased in March 2020 when compared to February 2020 (see Table 7).

Table 7. Sessions (in millions) on the most popular MOOC platforms

MOOC provider	Sessions (in millions)[28]
Coursera	45 (up by 67%)
edX	19.2 (up by 52%)
FutureLearn	6.15 (up by 116%)

Source: Class Central, 2020.

[28] Number of sessions in March and percent change from February.

For a digital credential system to work, **a process needs to be in place for developing, issuing, managing and storing digital credentials** (Finkelstein, Knight, Manning, 2013). First, it is important to decide who (e.g. an individual teacher or specific department) is responsible for the development and design of the course that leads to the digital credential. Second, technological tools and infrastructure must be developed for the use of institutions, teachers and learners. Third, it is important to determine who has the authority to issue a digital credential. Lastly, managing digital credentials entails storing them in some type of digital repository, allows recipients to control who is able to see their digital credentials, and which credentials they wish to display to specific users.

The International Council for Open and Distance Education (ICDE, 2019) highlights that **in order to successfully implement a digital credential system, providers need to make governance decisions, choose iconography, determine metadata configurations and decide on a specific implementation pathway (i.e. select a platform)**. As a first step, institutions must establish internal governance of the credentialling system. This will determine which entities administer the issuing of credentials, provide guidance on the issuing of credentials, and which entities oversee the quality of credentials. This is crucial to ensuring the reputation of the institution and the quality of the credentials offered. The main principles guiding the development of iconography include the readability of a credential (e.g. icons are not laden with distracting, unnecessary and uninterpretable design features); the clear indication of the competences and skills achieved (e.g. icons do not contain abstract symbols that require further interpretation); an indication of the issuing institution (e.g. the name of the institution rather than its logo). ICDE also emphasises that meeting these simple criteria may not be an easy task, given the technical parameters imposed and the uncertainty of future directions for the use of digital credentials. However, setting a clear design framework early on could help to avoid further confusion. One of the most important aspects of a digital credential system to implement successfully is the ability to provide information about the skills and competences it represents (in line with the summary of critical information discussed in the previous sub-section).

Another early and important implementation decision is the **choice of a digital credential platform**. Previously, the natural choice was for the institution to create a software variant of its own existing transcript system that would handle digital credentials. However, today's technical requirements and the complexity of such systems (including their continuous updating and maintenance) make in-house software development too complex, and thus less attractive (ICDE, 2019). Many institutions can benefit instead from selecting a third-party vendor that can offer high-quality services and continuously introduce novelties and improvements into its platform (see Box 7). Some important aspects to be considered include interoperability, integration, longevity and data migration. Alternatively, higher education institutions can create networks and collaborate in creating a shared platform. For an example of such platform, see Box 8.

Box 7. Digitary CORE platform

Digitary is a leading online platform for certifying, sharing and verifying credentials. It was launched in Ireland in 2005 and is currently used by many respected higher education providers in 135 countries to eliminate credential fraud, improve service levels and increase efficiencies. It is a learner-centric platform that enables learners to access their verified achievements 24/7 and to share them with others securely, quickly and easily. Digitary enables the instant verification of records with full learner consent, maintaining regulatory compliance and eliminating the hassle of manual verification.

Digitary Certified Online Record Exchange (CORE) is a secure cloud platform that helps learners around the world access and share their digitally signed academic documents online with

employers, education providers, governments and other third parties. The following are some benefits of Digitary CORE:

- Education providers can reduce credential fraud through the use of secure digital technologies.
- Education providers can reduce costs and streamline processes by enabling self-service for learners and employers.
- Learners can access their digitally certified academic records online.
- Learners can securely share their records with third parties, quickly and easily.
- Employers and others can quickly and easily verify learners' academic records.

In 2007, the Irish Institutes of Technology (IoTs) chose Digitary's Classic platform to implement its digital European Diploma Supplement (EDS) across all 14 IoTs. In 2016, Digitary was again chosen to implement a cloud-based digital credentialling system, this time using Digitary's CORE platform, which extends to a wide variety of documents including transcripts, EDS and grade mailers.

In 2020, Digitary and Dublin City University (DCU) announced a strategic partnership to launch a new micro-credentialling initiative to recognise the learning of students. As part of this partnership, DCU will issue badges using Digitary's Badges Platform. An important feature of the announcement is that many of DCU's new micro-credentials can be stacked together, to realise greater and more focused learning within a particular competence or skill area. Learners will now have a single digital wallet that will contain all official certificates, documents and badges earned throughout their DCU learning journey. In addition, learners will be able to share these credentials easily with third parties such as employers, helping them to meet their employment goals.

Box 8. The Digital Credentials Initiative

The Digital Credentials Initiative started in April 2019 with the mission "to create a trusted, distributed, and shared infrastructure that will become the standard for issuing, storing, displaying, and verifying academic credentials, digitally".

It is coordinated by MIT (USA) and involves Delft University of Technology (Netherlands), the Hasso Plattner Institute at the University of Potsdam (Germany) as well as the Technical University of Munich (Germany) from Europe. Other partners include Tecnológico de Monterrey (Mexico), Harvard University Division of Continuing Education (USA), University of California, Berkeley (USA), University of California, Irvine (USA), and the University of Toronto (Canada).

The initiative aims to create a central platform for storing students' achievement records that will continue even after a student has graduated, and which is based on the latest advances in public key infrastructures, public ledgers and blockchains.

The background document on the Europass Digital Credentials Framework indicates that the "technical approach to be designed for the common framework of digitally signed credentials should allow for identifying, issuing, storing, sharing and verifying digitally signed credentials in a cross-border context". The Commission is currently working on the Europass Digital Credentials Infrastructure (see Box 9) – a technical infrastructure that organisations can use to issue digital credentials across the EU. However, it is important that higher education institutions should have student management systems that allow their credential platforms to integrate with the Europass system. This could pose a potential problem for institutions that use outside vendors, as it may require investments from the vendors to upgrade their systems. The Commission is exploring a set of components and services (building blocks) to facilitate the integration of digital credentials into existing institutional infrastructures.

Box 9. Europass Digital Credential Infrastructure

The Europass Digital Credential Infrastructure (EDCI) 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. The use of the Europass Digital Credential Infrastructure will provide learners, employers, education and training providers and other authorised bodies with a simple and trustworthy way of verifying the validity and authenticity of digital credentials.

The European Commission will provide organisations with detailed documentation, services code samples and open-source code, as well as the following resources:

- A developer portal that provides a detailed data model, business guidelines, standards and application programming interface (API) documentation.
- A Github allowing users to re-use (contribute to) code for issuing, storing, sharing and verifying digital credentials.
- A help desk to assist with queries on development.

The Commission will further provide APIs that will allow the sharing of information between student data or human resources management systems, and the EDCI infrastructure. This will allow any developer to build an EDCI-compliant credential issuer.

Europass Digital Credentials are legally equivalent to paper-based certificates across the European Union, and all components of the infrastructure are open and free. Neither credential issuers nor credential holders will have to pay for any of the services, or to use the cloud-based services (EC-hosted) of Europass.

A suite of free software, tools and services is offered to help individuals or organisations to:

- issue and create credentials and send them to their owners;
- store credentials securely in a single online and offline wallet;
- verify and check if credentials are authentic, valid and issued by an accredited organisation;
- share the information in the credential with any other person or organisation.

Europass Digital Credential Infrastructure is currently being piloted by 18 Member States. Successful implementation of Europass digitally signed credentials could bring multiple benefits:

- Improved portability of qualifications and skills between countries.
- Reduced administrative burden for citizens, learning providers and businesses.
- Reduced credential fraud.
- Empowering citizens to own and control their own credentials.
- Contributing to the digitisation of government processes.

The use of blockchain technology is another example of an emerging technology in this context of certification, increasingly used by several MOOC platforms (see Box 10) to increase trust and ensure the validity of certifications. According to Camilleri (2018a), blockchain is "ideal as a new infrastructure to secure, share, and verify learning achievements. In the case of certifications, a blockchain can keep a list of issuers and receivers of each certificate, together with the document signature (hash) in a public database (the blockchain) which is identically stored on thousands of computers around the world". The use of blockchain solutions can be applicable to Scenarios 1 and 2, while also showing potential for application in Scenario 3. The main advantages (Camilleri, 2018a, p.9) of digital certificates stored on a blockchain, compared with other digital certificates are:

- They cannot be forged – it is possible to verify with certainty that the certificate was originally issued by and received by the same persons indicated in the certificate.
- Verification of the certificate can be performed by anyone who has access to the blockchain, using easily available open-source software – there is no need for any intermediary parties.
- Because no intermediary parties are required to validate the certificate, the certificate can still be validated even if the organisation that issued it no longer exists or no longer has access to the issued record.
- The record of issued and received certificates on a blockchain can only be destroyed if every copy on every computer in the world that hosts the software is destroyed.
- The hash is merely a way of creating a 'link' to the original document, which is held by the user. This means that the above mechanism allows the signature of a document to be published without needing to publish the document itself, thus preserving the privacy of the documents.

Box 10. A global decentralised blockchain-based platform – EduCTX

The EduCTX Platform is based on a globally distributed peer-to-peer (P2P) network. It processes, manages and monitors ECTX tokens and transactions, which represent trusted and transparent evidence of individuals' acquired skills and knowledge in the form of digital micro-credentials. Like the European Credit Transfer and Accumulation System (ECTS), ECTX tokens represent the credits acquired by an individual in the form of digital micro certificates for completed learning units (courses, diplomas, certificates, etc.). Each individual has their own EduCTX address, at which they collect tokens assigned to them by an institution in return for completed learning units. All EduCTX users have access to a decentralised web application that provides an overview of tokens the user has received.

All EduCTX stakeholders (institutions) also have their own unique address and the ability to use the platform's decentralised application to manage (transfer) tokens in a simple and secure way. Once a learning unit has been completed, the institution transfers the appropriate number of tokens to the address of the individual's wallet. The EduCTX blockchain network stores data on the sender (an institution with an official name and address) and an anonymous individual receiver (a public, but anonymous address). Due to the dynamic nature of the certificates, the transaction structure has been extended to include an external link, which stores more detailed information about the learning unit and/or certificate. Each institution has the option of adding certificate information, while at the same time assuming responsibility for maintaining and enabling access to this information on its servers. In this way, the ecosystem remains a platform for the secure, trusted and efficient distribution of digital micro-certificates, while ensuring objectivity in a distributed system that comprises different organisations, each with their own requirements and specifications for particular learning units.

An individual can demonstrate the skills and knowledge they have acquired in the form of digital micro credentials using an anonymous address and private key associated with this address, without administrative or language barriers. In addition, the platform prevents an individual from transferring the ECTX tokens they have acquired to other addresses. This can only be done by authorised institutions and organisations that have the right to award tokens. To demonstrate the skills they have acquired, an individual can use their private key, which corresponds to their public address where their assigned ECTX tokens are stored. Since an individual user's private key is known only to them, they alone are able to prove the ownership of a specific public address. In this way, an individual can provide their public EduCTX address to a potential employer in order to verify their knowledge and skills. The employer can then easily obtain additional information relating to this address (such as the ECTX tokens acquired). To verify that the individual matches the address, they must sign their message with their personal private key. If this matches, the

employer can be sure that the ECTX tokens at a given anonymous address belong to the person concerned.

The verification process itself will be semi-automated via user-friendly web interfaces. The first prototype of the EduCTX platform was implemented using the ARK blockchain platform. A newer prototype is based on the Ethereum blockchain platform, and uses smart contracts.

Even though the digitalisation of higher education contributes to the use of micro-credentials, **some mistrust still exists over certification**, particularly in the areas of learner verification or authentication and the prevention of cheating (Resei et al., 2019). These risks are still perceived as being easier to avoid offline, despite recent technological developments like online proctoring (Ramplet, Orr and Knoth, 2019). There is still some bias towards campus-based education as the Gold Standard of learning. However, campus-based and online qualification are increasingly issued and verified via the same systems and platforms. Verified credentials are at the core of a higher education institution's reputation, and most institutions carefully maintain a secure record of the individuals to whom they have awarded credentials.

3.3 Quality assurance of micro-credentials

Key findings

- The role of quality assurance is of great importance when it comes to the establishment and recognition of new education formats. However, quality assurance procedures are (in some cases) not yet adapted to facilitating and monitoring micro-credentials.
- The standards and key elements that exist for formal recognition and quality assurance in higher education can and should also be applicable to micro-credentials. It is important to ensure that the quality of courses leading to micro-credentials is assured in accordance with the ESG.

One of the main successes of the Bologna Process is the establishment of quality assurance as a key element of higher education. There is a consensus that quality assurance is necessary to ensure accountability and support enhancement. Quality assurance gives confidence to learners and other users of the credential, such as employers and universities, that courses or modules adhere to state-of-the-art principles with regard to their development, design, delivery, assessment, overall management and enhancement. The current approach to quality assurance best serves Scenario 1 and Scenario 2, while being very challenging to achieve in the context of implementing Scenario 3.

Ideally, quality assurance of recognition procedures in the provision higher education should be carried out both internally and externally, to ensure that internal quality assurance is in line with European standards (Nuffic, 2019). However, in some cases **quality assurance procedures and regulatory frameworks have not yet been adapted to facilitate and monitor the digital provision of emerging courses that lead to micro-credentials**. Quality assurance is still largely programme-based, although this is moving towards a more institution-centred model. In the case of programme-based external quality assurance, it is necessary to **extend national quality assurance processes and regulations to micro-credentials**. In the case of Scenario 1, quality assurance agencies can verify these when reviewing micro-credentials. This is the option that is most in line with current quality assurance processes, and can be built on existing practices. In the case of institution-centred external quality assurance, micro-credentials (like all other programmes and courses) are subject to internal quality assurance, and it is the responsibility of individual higher education institutions to adapt their internal process and regulations accordingly. **Institution-based external quality assurance allows**

institutions greater freedom to introduce and regulate micro-credentials on their own behalf (especially given that micro-credentials are still uncommon in most national contexts across the EU Member States).

The role of quality assurance is of great importance when it comes to the establishment and recognition of new education formats, particularly in the context of online education. Resei et al. (2019, p. 17) argue that increased standardisation, awareness and familiarity will help users (including learners, employers and human resources departments) to establish trust and recognise the value of micro-credentials in demonstrating the competences of new employees and improving the performance of the existing workforce.

The reputation of the higher education institution is important. Higher education institutions usually have their own quality assurance procedures and guidelines which they follow in creating new content and credentials. In the area of higher education, quality is additionally secured by legal accreditation bodies. These enable universities to take parts of their accredited study programmes and offer them as micro-credentials. However, MOOCs and other forms of learning often fall outside the scope of existing internal and external quality assurance in higher education, making it difficult to establish the quality of e-learning (Nuffic, 2019, p. 8). In some cases, this is a result of legal restrictions, particularly in the case of quality assurance that takes place at the level of study programmes rather than the institutional level, and when an online course is offered as standalone learning unit. To ensure better quality e-learning, it is important to:

- **Make the quality assurance of credit-bearing and stackable courses a part of internal quality assurance procedures at higher education institutions.**
- **Ensure that national quality assurance agencies include credit-bearing and stackable courses in their external review procedures for higher education institutions** (Nuffic, 2019).

To provide an alternative to existing quality assurance measures, the European Association for Distance Teaching Universities (EADTU) launched the OpenupEd quality label in 2014 (see Box 11). However, as of May 2019, only a handful of higher education institutions have adopted this label due to its limited international status. Another label, Quality Matters (see Box 12), is currently the most widely used and recognised label internationally for the design and delivery of online and blended modules and programmes. This label concentrates mainly on the quality processes adopted by higher education institutions, but is not recognised by quality assurance agencies. Quality Matters nevertheless gives learners some confidence that higher education institutions have quality assurance processes in place.

Box 11. The OpenupEd quality label

OpenupEd has developed quality standards based on a completely new understanding of quality in a digital world, which focuses on the aspect of openness. OpenupEd aims to be a distinctive quality brand that embraces a wide diversity of (institutional) approaches to open education via the use of MOOCs. Consequently, OpenupEd partners agreed to develop a quality label for MOOCs, tailored to both e-learning and open education. This label was published in January 2014.

The institutional benchmarking associated with this label is primarily intended to be applied as an improvement tool, enabling an institution's performance to be compared against current best practices, leading where necessary to measures to raise the quality of the institution's MOOCs and their operation. The process is designed to complement an institution's course approval process, as well as the ongoing evaluation and monitoring of courses in presentation.

Box 12. The Quality Matters label

Quality Matters is a US-based and US-oriented non-profit organisation working on quality assurance in online and innovative digital teaching and learning environments. Its main goal is to promote and improve the quality of online education and student learning nationally and internationally through:

- The development of current, research-supported, and practice-based quality standards and appropriate evaluation tools and procedures.
- Recognition of expertise in the quality assurance and evaluation of online education.
- Fostering a culture of continuous improvement by integrating standards and processes into organisational plans, to improve the quality of online education.
- Providing professional development in the use of rubrics, tools and practices to improve the quality of online education.
- Peer review and certification of quality in online education.

Quality Matters provides services based on the quality assurance goals of institutions in the areas of:

- Improving course design (episodic or custom application of criteria).
- Creating professional development opportunities.
- Demonstrating quality assurance processes.
- Continuously improving quality assurance processes (going beyond quality thresholds).
- Benchmarking (comparing and connecting across institutions).
- Driving institutional change (sustaining high quality).

Quality Matters has created various rubrics and standards. The General Standards and Specific Review Standards in each rubric are intended to guide higher education institutions through the development, evaluation and improvement of their online and blended courses. Achieving a level of 85% or above in relation to these quality expectations is key to certifying the quality of a course.

The Higher Ed Course Design Rubric is a set of eight General Standards (e.g. learning objectives, assessment and measurement, learning activities, accessibility and usability) and 42 Specific Review Standards used to evaluate the design of online and blended courses. The rubric includes a scoring system that is used by the review team to determine whether a course meets the standards. Essential Standards (3-point Specific Review Standards) must be met during the review, and an overall score of 85% of the maximum possible points is required for a course to attain QM certification.

Camilleri and Rampelt (2018) indicate that while degrees from accredited higher education institutions rarely raise concerns in terms of recognition and portability, the quality of new forms of credentials is more questionable due to the lack of commonly agreed standards, technologies and comprehensive criteria applied to their assessment. Offering an option to recognise credits, or providing them directly with the micro-credential, can also signal a level of rigour and quality and increase the credibility of credit-bearing micro-credentials.

When considering Scenario 1 and Scenario 2, **the standards and key elements that exist for formal recognition and quality assurance in higher education can and should also be applicable to all new forms of learning, certification and credentialisation** (Resei et al., 2019; Camilleri and Rampelt, 2018; Rampelt, Orr and Knoth, 2019). If Scenario 3 is preferred, this would have considerable implications for quality assurance agencies because Scenario 3 allows learners to follow flexible pathways and move between labour market activities, family and civic duties and learning acquired

at different providers. This would require the kind of change in the culture of recognition of skills and competencies that is encapsulated by the term 'open recognition', i.e. the recognition of all learning outcomes and achievements throughout life and in all fields.

Learning outcomes must be included as one of the main elements of any quality assurance system. Learning outcomes facilitate the transparency, comparability and stackability of micro-credentials. In addition to clearly defined learning outcomes, a credential also needs to provide transparent information on the quality of the programme or the learning opportunity that leads to the credential, the level of learning (ideally with reference to a qualifications framework), and the workload required to gain the credential. These learning outcomes should also be backed up by a robust assessment mechanism, described in the credential, which should also verify the identity of the learner and the issuing organisation. Trust in the credential can also be supported by the reputation of the issuing organisation, and the system used to issue the credential. An organisation's reputation alone does not necessarily guarantee the quality of its micro-credentials, however. Micro-credentials issued by reputable and trusted organisations must also adhere to the main principles of quality assurance.

According to Rampelt, Orr and Knoth (2019), "on the one hand, new forms of learning provision are to be welcomed as they enable more flexible and more personal learning support. However, on the other hand, there are concerns about degree mills (i.e. providers with low quality learning, provision and assessment) and fraud (i.e. the verification that a person completed a course or programme, when they had not)". For this reason, **existing criteria and measures for quality assurance must be supplemented accordingly** to take appropriate account of digitalisation in teaching and learning, and to ensure security and transparency for all learner groups.

The need to strengthen the ESG against fraud was considered in the Peer Learning Activity on academic integrity of the European Commission's Education and Training 2020 Working Group on Higher Education. The participants agreed that academic integrity is essential for trust in quality of higher education. The group presented and discussed national and institutional strategies, tools and policies for solving the digital challenges relating to the academic integrity. These include holistic and preventive approaches across all levels of education and research; elaborating national frameworks for guidance, monitoring and reporting on academic integrity; intensifying the focus of quality assurance on academic integrity; increasing communication and training on academic integrity for teaching and non-teaching staff in higher education; as well as collecting comparable information on the approaches to integrity taken by the Member States, via the Eurydice network (Ministry of Science and Education of the Republic of Croatia, 2020).

Quality assurance procedures should cover digital learning in two environments: 1) where it is offered within a higher education institution's own course programme (e.g. also as blended learning); and 2) where it is used by learners to supplement their own learning pathways. Both cases require a more student-centred approach to quality assurance (Rampelt, Orr and Knoth, 2019). Institutions must ensure that their courses are designed and delivered in such a way that students are encouraged to take an active role in creating the learning process, and that the assessment of students reflects this approach. The Irish quality assurance agency QQI has already published guidelines for blended learning that address the specific responsibilities of providers with regard to the quality assurance of blended learning programmes and related services. It is crucial that the quality assurance of online learning activities is extended to cover the virtual learning environment, the pedagogical quality of online provision and the availability of online student support, which are often criticised as lacking in online learning. To sum up, all courses leading to micro-credentials must be subject to a standardised and accepted quality assurance process.

3.4 Recognition of micro-credentials

Key findings

- The recognition of micro-credentials for the purpose of further studies and employment presents challenges (e.g. a lack of common understanding, and diverse recognition practices), particularly in relation to informal and non-formal learning.
- Micro-credentials obtained from accredited higher education institutions through quality-assured short learning courses present fewer challenges to being recognised, both for further learning and for employability.

In general, the standards and key elements that exist for formal recognition in higher education can and should also be applicable to all new forms of learning, certification and credentialisation (Resei et al., 2019; Camilleri and Rampelt, 2018; Rampelt, Orr and Knoth, 2019). However, MicroHE (2019) found that the recognition of micro-credentials, both for purposes of further studies (academic recognition) and for employment, presents some challenges. These include:

- Recognition practices vary between institutions and countries.
- No common understanding exists as to what micro-credentials are.
- Learners often do not actively attempt to have micro-credentials recognised.
- Recognition is fairly sporadic and considered on a case-by-case basis.
- Recognition of informal and non-formal learning[29] is a complex process and therefore less scalable.

MicroHE (2019) conducted an interview programme for its analysis, which showed that only a very **small number of the students had any experience with micro-credentials**, an even smaller number had tried to have them recognised by their higher education institutions – and none had succeeded in their attempt. The primary reason for this was the rigid requirements (both actual and perceived) for recognition. Even though this lack of recognition to some extent limits the uptake of micro-credentials among some learner groups, learners still appreciate access to micro-credentials for their advancement in the workplace or the development of personal interests.

Micro-credentials can be used to recognise important non-formal and informal learning activities that currently do not enjoy a high status within formal learning activities leading to recognised credentials. While there is potential for non-formal and informal experiences to gain greater recognition in formal qualifications, the development of this category of non-credit bearing micro-credentials is one means of raising the value of this type of learning, alongside formal qualifications. Despite this, it is known that not all higher education institutions are moving in this direction. One of the main reasons for this is that recognition of informal and non-formal learning is a complex and lengthy process (MicroHE, 2019). Having said that, some countries have advanced their practices for the recognition and validation of learning acquired through prior study or experience. The relevance of the recognition of prior learning stems from the need to **reduce the cost**

[29] At the policy level, this is referred to as 'validation of non-formal and informal learning'. A 2012 Council Recommendation called for Member States to establish arrangements for the validation of non-formal and informal learning that enables individuals to (1) have knowledge, skills and competences that have been acquired through non-formal and informal learning validated; and (2) obtain a full qualification, or, where applicable, part of a qualification, on the basis of validated non-formal and informal learning experiences. The Recommendation gives explicit importance to periods of mobility as experiences for non-formally and informally acquired learning.

of educating and reskilling the working adult population (Oliver, 2019). While there is still no single international model for the recognition of prior learning, most countries and universities do so on the basis of the **identification of learning outcomes** and on a **case-by-case basis**. Higher education institutions in the United Kingdom, for example, recognise and validate certain types of learning on a case-by-case basis. These types of learning are usually:

- Qualifications delivered by recognised educational providers (both completed and unfinished).
- Professional development and employment-based awards.
- Prior experiential learning (e.g. knowledge and skills gained through employment or voluntary work).

The Swedish government has also prepared a National Validation Strategy, which aims to guarantee that significantly more individuals have their prior learning validated. Validation of prior learning should be available across the country, at all levels of the educational system and for a broader range of qualifications in working life. The strategy emphasises that such validation, as a pathway to a qualification, should have the same high level of legitimacy as formal education and training (Oliver, 2019). It is also crucial that the **labour market can recognise what the learner has achieved** and relate this to the needs of the organisation or company. As illustrated in Scenario 2, a typical problem for higher education and the labour market systems has been that each uses a different way to describe achievements.

The Diploma Supplement has been developed to describe the content and some of the main features of a study programme. When it comes to the recognition of micro-credentials by employers, the awareness about the value of this new type of credential is fairly low (Oliver, 2019). The recognition of micro-credentials is more common within companies and industries that have more experience of them (e.g. through employees who have acquired micro-credentials; companies that provide professional development using micro-credentials; organisations whose human resources personnel are familiar with micro-credentials). Legal professionals in Ireland are an example of a case in which the yearly renewal of registration requires a number of continuous professional development hours. The Law Society of Ireland, which is the educational, representative and regulatory body for the solicitors' profession in Ireland, embarked on a micro-credentialling initiative for its programme design. The proliferation of micro-credentials also challenges their recognition.

In addition to these other obstacles, the wide variety of micro-credentials available creates confusion, and employers often require assistance in understanding, judging and comparing the plethora of micro-credentials presented to them by potential employees (Oliver, 2019).

The recognition of micro-credentials obtained from accredited higher education institutions through quality assured and credit-bearing short learning courses presents fewer challenges to recognition. This is because credits enhance the comprehension of the learning outcomes, workload and assessment of such programmes. In addition, the role of the platform used to deliver the course should not be underestimated, as these often possess their own quality assurance processes and reputations (e.g. FutureLearn). The reason for this is that such micro-credentials are issued according to similar values, using similar procedures and documenting information that describes the skills and knowledge acquired by learners. Quality assured and credit-bearing micro-credentials signal transparency and trustworthiness to other higher education institutions, employers and learners.

3.5 Realising the potential of micro-credentials through alignment with qualification frameworks and other standardisation and classification systems

Key findings

- Micro-credentials can be both credit-bearing and non-credit bearing, which provides learners with the flexibility to choose learning pathways according to their preferences and situation. This distinction should be at the core of any definition that may be adopted.
- Credit-bearing micro-credentials are expected to mirror the level of complexity and autonomy required in a typical unit of a formal qualification, if integrated into higher education frameworks or other qualification systems.
- Micro-credentials that are offered by higher education institutions and are credit-bearing often still fall outside of the scope of standardised frameworks.

Micro-credentials can be both:

- **Credit-bearing,** when they earn admission to, or credits towards, formal qualifications.
- **Non-credit bearing,** when they do not earn admission to, or credits towards, a formal qualification.

This section returns to the question of definitions first raised at the beginning of this report. Two common approaches are used to deploy micro-credentials in education: (1) complementing existing credentialling systems, which involves adding skills-based modules that require learners to put in some optional efforts in order to earn non-credit-bearing micro-credentials; and (2) the total integration of credit-bearing micro-credentials as part of formal credentials that learners have to earn on top of traditional credentials (Abramovich, 2016; Gibson et al., 2015).

Resei et al. (2019) explain that both directions should ideally be enabled by the micro-credential creator or issuing institution. This gives learners the flexibility to choose according to their preferences and situation. If they have the possibility of turning their achieved micro-credentials into something bigger, learners may also be motivated to pursue a full degree at a later date. Preferably, the relevant micro-credential should also work in a standalone format and as an important employment-focused learning experience, that demonstrates competency and skill in a specific topic or discipline. Newly created credit-bearing micro-credentials are increasingly being embedded within degree programmes, serving as an entry point for a full degree without the learner having to make the full commitment upfront. For example, MOOC platforms are constantly innovating and experimenting in their search for a sustainable business model and in response to trends and learner feedback.

For a more detailed comparison of credit-bearing and non-credit bearing micro-credentials, please see Table 8.

Table 8. Comparison of credit-bearing and non-credit-bearing micro-credentials

Credit-bearing micro-credentials	Non-credit-bearing micro-credentials
▪ Credit-bearing micro-credentials include assessment aligned to a formal qualification level. ▪ Achievement of the learning outcomes leads to an offer of admission to, or credits towards, at	▪ Non-credit-bearing micro-credentials include assessment that may or may not be aligned with a formal qualification level.

least one formal qualification, regardless of whether the offer is taken up by the learner. ▪ Credit-bearing micro-credentials mirror and contribute to the academic standards required in the target qualification(s). ▪ The duration and effort required by the learner are in keeping with amount of credit earned in the target qualification(s). ▪ Credit-bearing micro-credentials are, by their nature, likely to be more strongly linked to an individual's employability.	▪ Achievement of the learning outcomes does not lead to an offer of admission or credit towards a formal qualification. ▪ Non-credit-bearing micro-credentials may or may not conform to the academic standards, including duration and effort, required for a formal qualification. ▪ Non-credit-bearing micro-credentials often reflect a wider societal or labour market focus on the development of important skills and knowledge for lifelong learning, as well as for the labour market. However, in some cases, a micro-credential geared towards a personal interest (e.g. in family, genealogy). might have little or no relevance to employability.

Source: Oliver, 2019, p. 20.

In order to integrate micro-credentials into the higher education framework in line with Scenario 1, credit-bearing micro-credentials must be aligned to qualification frameworks. Such alignment is highly desirable if credit-bearing micro-credentials are to gain a wider status among employers and students. **Micro-credentials are expected to mirror the level of complexity and autonomy required in a typical unit of a formal qualification** (Oliver, 2019).

The Bologna Process and the introduction of the three-cycle system in the EHEA led to agreement on the common standards for the level, learning outcomes and workload of study programmes within formal higher education. The European Qualifications Framework has established eight European **reference levels** expressing proficiency. At national level, most European countries have established National Qualification Frameworks (NQFs) reflecting these levels. The European Credit Transfer and Accumulation System (ECTS) helps to determine **workload**. Diploma Supplements (DS) are widely used to describe **learning outcomes** (Nuffic, 2019, p. 6). This standardisation **supports the recognition of prior learning and that of foreign qualifications**. However, even when they are offered by higher education institutions, **micro-credentials often fall outside of the scope of standardised frameworks**. Because of this, the uptake of credit-bearing micro-credentials across European higher education institutions is still relatively low.

Tako, Galan-Muros and Weko (2020, p. 34) summarised alternative credential criteria and quality standards within different qualification frameworks and classification systems, which are presented in Table 9. This table could provide inspiration to European policy makers and experts in deciding how micro-credentials could be integrated into national qualifications frameworks that are referenced to the European Qualifications Framework.

Table 9. Alternative credential criteria and quality standards

	Formal action	**Formal and informal recommendations**			
	New Zealand Qualifications Authority	**European MOOC Consortium**	**German Forum for Higher Education in the Digital Age**	**Expert Panel for the Review of the Australian Qualifications Framework**	**US Council for Higher Education Accreditation**
Intended learning outcomes	X	X	X	X	X
Qualifications	X	X	X	X	X

Verification/assessment	X	X	X	X	X
Workload	X (up to 40 credits)	X (100-150 hours)	X (100-150 hours/3-5 ECTS)	X	X
Verification of learner identity		X	X	X	X
Accreditation and recognition		X	X		X
Listens to employers' demand	X		X		X
Level		X (EQF level 6-7)	X (EQF level 6-7)		X
Providers' capability	X				X
External and internal review	X		X	X	
Listens to learners' demand	X		X		X
Mission/purpose	X			X	X
Absence of significant weaknesses	X				
Accessibility and affordability					
Labour market outcomes					
Non-duplication	X				
Orientation					X
Stackability					
Transparency					

The European MOOC Consortium's recent initiative to develop a Common Micro-credentials Framework (CMF) is an important step (see Box 13). The CMF is an agreement among Europe's biggest e-learning providers as to the specifications to which a micro-credential should adhere (Nuffic, 2019).

Box 13. The Common Micro-credential Framework (CMF)

European MOOC platforms have launched a micro-credential framework that fits into the European Qualification Framework for Lifelong Learning, which encompasses learning outcomes in both higher education and professional training. The Common Micro-Credential Framework (CMF) indicates the scale of a MOOC programme in terms of workload (the standard equates to 4-6 ECTS credits / 100 to 150 hours of study time) and level (levels 6 and 7 in the EFQ, i.e. Bachelor's and Master's levels).

Based on discussions during the Bologna Digital workshops and existing approaches to quality, Rampelt, Orr and Knoth (2019, p. 34) proposed a European framework for micro-credentials, which would establish a cycle complementary to the existing short cycle, Bachelor's, Master's and doctorate cycles. According to the authors (Rampelt, Orr and Knoth, 2019), the development of an additional cycle could help to widen learning on an unprecedented scale and serve both social and economic innovation. The authors propose to base the framework on the following seven elements, which align most closely with Scenarios 1 and 2:

1. Average duration of 3-5 ECTS credits (equivalent to a workload of about 100-150 hours for the learner).
2. Well-defined learning outcomes at Bachelor's or Master's level (first or second cycle of the Qualification Framework for the EHEA – Level 6 or 7 of the EQF).
3. Reliable assessment of learning outcomes.
4. Accreditation by EQAR-registered agencies as part of their regular review of higher education institutions' wider offerings and internal QA (an extension of the existing review system).
5. Accreditation is also possible in separate series for other providers (e.g. labour agencies, in-company training, training by professional associations, private higher education institutions, NGOs).
6. Quality assurance processes are complemented by trusted crowd assessment, e.g. by other institutions that allow credit recognition, positive feedback on courses from learners, employers or professional associations.
7. It has been developed from the outset as part of the concept of 'digitally signed credentials', which that means that it can be uploaded to the New Europass 'wallet', in line with General Data Protection Regulation (GDPR) and the principles of the Groningen Declaration Network.

4. Possible impacts of the growing use of micro-credentials

This section reviews the literature on the possible and emerging impacts of the growing use of micro-credentials. The section comprises three dedicated sub-sections. The first of these discusses the impact of micro-credentials on employability. The second discusses the ways in which micro-credentials contribute to lifelong learning[30]. The third and final sub-section reviews the literature on the ways in which micro-credentials can contribute to inclusiveness, flexibility and widening learning opportunities in higher education.

To summarise, our literature review shows that the **main impacts on learners** relating to the increasing use of micro-credentials are in the areas of **upskilling, reskilling** and employability; **student-centred learning** (flexible curriculum and flexible learning pathways); **inclusiveness** in higher education; and **lifelong learning** opportunities.

Our review of the literature (Tako, Galan-Muros and Weko, 2020; Lim et al., 2018; Shields and Chugh, 2016; Gibson et al., 2015; Flintoff, Grant and Knight, 2013) reveals various **benefits** and motivations for learners to increasingly seek out alternative learning opportunities such as micro-credentials, as opposed to traditional higher education courses:

- Acquisition and verification of skills and/or knowledge.
- Different types of outcome (extrinsic, intrinsic, practical).
- Lower participation cost, shorter duration of learning, and greater flexibility.
- Ability to differentiate the different skill sets earned by students from their peers within the same degree programme.

[30] Lifelong learning encompasses all learning activities undertaken throughout life with the aim of improving knowledge, skills and competences within personal, civic, social or employment-related perspectives.

- Continuous engagement with learning (including online materials and activities).

The PIAAC Survey of Adult Skills (2019) uncovered an additional set of reasons for leaners participating in non-formal education and training in OECD countries. From the most popular to least popular, these are:

- To do their job better and/or improve career prospects.
- To increase their knowledge or skills on a subject of interest.
- To follow an obligation to attend a learning course.
- To increase their opportunities for getting a job, or changing their job or profession.
- To obtain a certificate.
- To start a business.
- To be less likely to lose their job.

These changing learner needs play an important role in the growth of new learning formats such as micro-credentials, which provide learners with lifelong learning opportunities. This is particularly important in the light of fast-changing technological developments and changing job roles and requirements, which drive the need to upskill, reskill or gain new skills and knowledge in order to ensure better employment opportunities. Despite an increasing number of employers beginning to support additional learning on the part of their employees, including during working hours, many **learners prefer to learn at their own convenience** (self-driven learning, no time during the working week) (Resei et al., 2019). As a result, **learners who prefer to learn in their free time might favour shorter learning opportunities** to gain new, or build on existing, knowledge, skills and competences. According to Finkelstein, Knight and Manning (2013, p. 12), "breaking down lifelong personal and professional development into smaller, more discrete moments and milestones of observable achievement can provide victories early and often for busy adults who may engage in learning opportunities as time and resources permit. These learners might get discouraged or lose momentum when there is only a single defined end point way off on the horizon versus valuable milestones of recognition along the way".

Learners' needs are changing, and they **increasingly demand flexible and personalised education** via flexible curricula and learning pathways (Resei et al., 2019). Learners are also increasingly seeking **knowledge on demand**, which allows them to access knowledge, skills and competences when necessary (Resei et al., 2019).

4.1 Impact of micro-credentials on employability

Key findings

- Micro-credentials provide an opportunity to mitigate some of the challenges Europe faces in the context of skills (e.g. skills mismatch, skills gap) and make people's skills profiles more visible.
- Micro-credentials offer an opportunity for higher education providers to achieve better understanding and cooperation with employers (e.g. providing credits for work experience, cooperating on curricula, the verification and validation of credentials).
- Micro-credentials are equipped to respond to the changing needs of the labour market and learners. The use of micro-credentials provides a learning environment in which new skills and credentials can be acquired in a quick, convenient and affordable way.

Gaining the right skills helps individuals adjust to constant technological developments, as well as global and demographic changes, in order to ensure their own well-being. Policies and practices that support this will contribute significantly to better lives and economic growth. In the light of these constant developments and changes, people need to be equipped with basic digital, vocational, technical, entrepreneurial, transversal and foreign language skills.

The newly adopted European Skills Agenda for Sustainable Competitiveness, Social Fairness and Resilience states:

> *"Now, more than ever, the EU needs a paradigm-shift on skills. One that delivers a bold skills agenda for jobs to drive the twin transitions and ensure recovery from the socio-economic impact of the COVID-19 pandemic and in order to strengthen sustainable competitiveness, ensure social fairness and build on resilience" (European Commission, 2020).*

Europe faces several challenges in this area (European Commission, 2019) These include:

- 61 million Europeans struggle with reading, writing and digital skills.
- 40% of employers say they cannot find people with the right skills to fill their vacancies.

It is important to note that **under the current COVID-19 situation, the skills context in Europe is changing**. The COVID-19 lockdown measures introduced across the EU have triggered a sharp increase in the number of people claiming unemployment benefits. At the same time, a significant portion of those who registered with unemployment agencies were no longer actively looking for a job (e.g. because such employment is limited by the lockdown measures) or were no longer available for work (e.g. they had to take care of their children during the lockdown). The 'nowcasting' model[31] of the International Labour Organisation (ILO) shows that the COVID-19 crisis is causing an unprecedented reduction in economic activity and working time (see Table 10).

Table 10. Decline in working hours and employment (FTE)

	Decline in working hours (%)	Full-time equivalent[32] (40 hours, million)	Full-time equivalent[33] (48 hours, million)
Europe	7.8	15	12

Source: International Labour Organisation, 2020.

Data from Cedefop's European Skills and Jobs Survey (ESJS) show that **skills mismatch is a particularly pressing issue**. Some degree of skills mismatch in the labour market is

[31] The 'nowcasting' model is based on real-time economic and labour market data to predict the loss in working hours in the second quarter of 2020 on the basis of data available on 1 April.
[32] Shows the number of full-time jobs lost (in millions) if the full-time equivalent is based on a 40-hour working week.
[33] Shows the number of full-time jobs lost (in millions) if the full-time equivalent is based on a 48-hour working week.

usually expected. However, an excessive mismatch can lead to adverse economic and social consequences such as unemployment, recruitment difficulties, skills becoming outdated and people not using their full potential at work. There is **a high incidence of under-skilling** or **skills gaps at hiring**, which arises when employees' skills are lower than those required for the job at the time of recruitment. The ESJS reveals that one in five Europeans are under-skilled at the time of hiring (Cedefop, 2018).

However, the Cedefop analysis shows that over a third of workers in the EU find their skill level to be higher than that required by their job. The use of **micro-credentials would not only allow for the re-skilling and up-skilling of individuals, but could also provide better methods for making people's skills profiles more visible**, enabling both individuals and society to fully harness their skills and competences (Orr, 2018).

According to Fong, Janzow and Peck (2016, p. 7), "in today's highly competitive global market, both employers and potential employees are looking for any advantage they can find to give them an edge on their competition. As a result, micro-credentialing programmes have seen a dramatic increase in popularity over the last few years, a trend that is projected to continue".

Resei et al. (2019) also suggest that, if successful, micro-credentials can help education and training to align more closely with the requirements of the fast-changing labour market, as well as being personalised and tailored to the needs and interests of individuals and providing a new, valuable education and training format in the context of lifelong learning. **Micro-credentials can address, in particular, the increasing need for re-skilling** (to maintain one's level of employability or adapt to changing requirements, especially for people whose skills are no longer marketable) **and up-skilling** (to create or improve career opportunities by upgrading and extending one's skills).

Micro-credentials offer an opportunity for higher education providers to achieve better understanding and cooperation with the employers. Oliver (2019) presents the results from surveys carried out in Australia and the US, which report that both employees and employers value work-integrated learning and curricula. The survey involving US employers suggested that higher education providers should give greater consideration to the following priorities:

- Real-world projects and engagement with employers.
- Providing academic credits for experience and on-the-job learning.
- Increased validation of curricula by industry and employers.
- Better assistance in verifying and validating the authenticity of credentials.
- More rigorous forms of quality assurance and accreditation (Oliver, 2019).

The survey shows that **employers and employees expect higher education providers to be more responsive to the changing needs** of the labour market and job seekers, by creating a learning environment in which new skills and credentials can be acquired in a quick, convenient and affordable way (Lim et al., 2018; ICDE, 2019). Micro-credentials serve this purpose because they help to recognise the specific skills of learners. They provide learners with an opportunity to demonstrate their skills and knowledge, which is earned through assessment-based activities, and to align them according to the specific and timely needs of the labour market. The micro-credentials earned by learners can then help them to stand out in comparison with their peers (Lim et al., 2018).

As Raish and Rimland (2016) highlight, recent changes in the working environment emphasise the use of digital resources, the ability to create and share artefacts using digital

resources, and the expectation that employees can work collaboratively in teams. Moreover, the authors indicate that although students in higher education may possess these critical skills, competences, and literacies, there is a lack of transparency and proof in by which new graduates can demonstrate to employers that they possess them. One potential way to alleviate the issues associated with traditional forms of instruction, and the desire to certify the granular skills of graduates, is to use credit-bearing micro-credentials. Unlike current and traditional credentialling conventions, which are usually summarised by a certificate or transcript that does not provide explicit evidence of the learner's competences, micro-credentials are linked directly to digital artefacts that explain the nature and criteria of the credential, as well as evidence contributed by the learner (Ehlers, 2018).

The main factors constraining the uptake of credit-bearing micro-credentials that are in line with Scenario 1 and Scenario 2 are that:

- Various stakeholders are still unfamiliar with these new credentials.
- Many micro-credentials still lack standardised validation procedures.
- The quality of these credentials, and trust in them, are not always guaranteed.

4.2 Impact of micro-credentials on lifelong learning

Key findings

- Micro-credentials enable learners to build or validate their professional skills and pursue lifelong learning opportunities by providing them with short, easy to access and reasonably priced learning options.

Continuous learning is vital as people change their careers more often during a **longer working life** in the context of an **ever-changing labour market** that is impacted by **increasing automation and digitalisation** (Matthews et al., 2018). The McKinsey Global Institute (2017) found that that around 60% of all occupations contain at least 30% of activities that are technically capable of being automated, based on currently demonstrated technologies. This means that most occupations will change, and more people will have to work with technology. These findings are based on a study focusing on 46 countries, representing around 80% of the global workforce and examining more than 2,000 work activities. Until recently, people acquired a vocational or higher education degree that would lead them into careers that lasted a lifetime. This was largely a result of the slower development of information. Nowadays, knowledge is growing exponentially, and in many fields the lifespan of knowledge can be measured in months or years (Siemens, 2005). The **half-life of knowledge** – that is, the time taken for half of the knowledge in a particular area to become obsolete – **is shrinking** (Johnson and Kaslow, 2014). To deal with the shrinking half-life of knowledge, education providers are required to adopt new methods of instruction. To summarise, there are several significant trends in learning (Siemens, 2005; Flintoff, Grant and Knight, 2013; Matthews et al., 2018; McKinsey Global Institute, 2017):

- Many learners are moving into a variety of different and sometimes unrelated fields over the course of their lifetime.
- Informal learning is an important part of an individual's learning experience, and formal learning comprises only a fraction of people's learning experience. Learning now occurs in a variety of ways through communities of practice, personal networks, experiences, the completion of work-related tasks and various short courses (online and on-site).

- Learning is a continuous process that lasts for a lifetime. This means that learning and work-related activities are no longer separate, and are often the same.
- Know-*how* and know-*what* are being supplemented with know-*where*, which means that individuals need to understand where to find the knowledge they need.

The PIAAC Survey of Adult Skills shows that in 2016, **44.4% of people in the EU aged 25 to 64 took part in education and training** during the 12 months preceding their interview. The majority of respondents participated in non-formal education and training (Eurostat, 2020). Across the EU as a whole, participation rates in education and training during the 12 months preceding the interview were almost the same among men and women. In 2016, in Cyprus, Czechia, Hungary and Italy, men were considerably more likely than women to have participated in education and training, whereas the reverse was true in Estonia, Finland, Latvia, Sweden and Lithuania. The data also show that the participation of younger persons (aged 25–34) in the EU was more than 20 percentage points higher than that of older persons (aged 55–64) in 2016 (Eurostat, 2020). Moreover, the level of an individual's previous educational achievement influenced participation rates. Adults with tertiary-level education reported the highest participation rates (65.4%), while those who had completed lower secondary education were least likely to have participated (23.6%).

Evidence from the PIAAC Survey shows that, on average, **voluntary engagement with non-formal education is fairly low in selected OECD countries** (mostly from 2012)[34]. Participation rates from the survey are summarised below:

- Less than 5% participated in formal education only.
- Around 42% participated in non-formal education only.
- 9% participated in both formal and non-formal education.
- 45% participated in neither (9% wanted to participate, but had not).
- Of those who did participate: around 21% wanted to participate more, and 34% had not wanted to participate (Oliver, 2019, p. 2).

The most common reasons for not participating in non-formal learning are:

- Lack of free time.
- Work responsibilities.
- Family and childcare responsibilities.
- Financial reasons (courses are too expensive)
- Inconvenient time and/or place of courses.

These data show that **potential learners are looking for additional learning opportunities that are reasonably priced, short and convenient to access**. According to Oliver (2019, p. 2) if such micro-credentials are aligned with formal qualification levels and robustly assessed, they could represent a mechanism by which working learners can continue to build or validate their professional skills, as well as encouraging all learners to pursue lifelong learning opportunities.

[34] Data are drawn from the Survey of Adult Skills, a product of the OECD Programme for the International Assessment of Adult Competencies (PIAAC) available at https://stats.oecd.org/index.aspx?queryid=79308

Resei et al. (2019) indicate that **different learner groups for micro-credentials are emerging**. These are traditional learners (e.g. students) or the so-called "lifelong learners"[35]. In the context of lifelong learning, learner needs are changing, and some learner groups (e.g. adult learners) increasingly demand personalised, flexible and on-demand learning possibilities.

Higher education providers have a role to play in providing **flexible ways of learning** and **continuous learning opportunities through the provision of more short-term courses** and ensuring the easier recognition and certification of this new and expanded type of learning. The use of micro-credentials by higher education providers has the potential to foster continuous learning, fill the knowledge and skills gap, increase the efficiency of the higher education system, encourage innovation of provision, and reach a diverse group of learners (BFUG, 2020).

Higher education institutions have a key role to play in providing these new and flexible ways of learning and lifelong learning opportunities – for example, through more short-term courses, delivered digitally and/or on site. They can also help to ensure the easier recognition and certification of this newly expanded type of learning. These new types of learning are not meant to replace full degrees, but to complement them with new shorter formats that are better adapted to the needs of people in the labour market (BFUG meeting, 2020). Even though various stakeholders have addressed the enhancement of lifelong learning, the aspects of the quality and recognition of micro-credentials remain largely vague, despite their possible impacts on lifelong learning opportunities.

4.3 Impact of micro-credentials on inclusiveness, flexibility and widening learning opportunities in higher education

Key findings

- Micro-credentials have the potential to provide access to education to a greater diversity of learners. The main aspects of micro-credentials that contribute to inclusiveness are:
  a) Flexible design and delivery of courses leading to micro-credentials.
  b) Flexible delivery mode of courses leading to micro-credentials (e.g. online, face-to-face, or blended).
  c) Length of courses leading to micro-credentials (shorter than a traditional degree).
  d) Affordability (less expensive than a traditional degree).
- Micro-credentials need to be verified and recognised to ensure the availability of quality education to learner groups that cannot enrol in traditional degrees.
- Regardless of the potential that micro-credentials offer for greater inclusiveness in higher education, they do not yet serve as an alternative educational opportunity for underrepresented groups.

Ensuring that higher education is open to all is a key goal of the 'social dimension agenda' within the Bologna Process. In a 21st-century society, the ability to access and succeed in higher education is central to social mobility and economic sustainability in European countries (Rampelt, Orr and Knoth, 2019). Currently, the admissions processes of higher education institutions largely concentrate on those who have the potential to succeed in

[35] A lifelong learner is a person who keeps acquiring new skills and capabilities well after their formal education years. Personal development continues alongside professional development, and the lifelong learner looks for opportunities to expand their knowledge and understanding (Keating, 2020).

higher education, which can limit access to higher education among certain social groups (e.g. adult learners, learners with lower achievements). In order to increase accessibility for such groups, there is a need for **well-guided and well-designed transition programmes**. These can also take the form of programmes that lead to micro-credentials. Rampelt, Orr and Knoth (2019) explain that transition programmes can begin and end before enrolment in a programme of study (as access or bridging courses), or continue alongside the main study programme during a student's first year of studies (as introductory and supporting programmes). Access and bridging courses can have an impact on inclusiveness in higher education by:

- Sparking interest in learning opportunities.
- Equalising starting levels and taking into account prior learning and experiences.
- Providing support for underrepresented and vulnerable groups.

According to Rampelt, Orr and Knoth (2019), learners from underrepresented groups are often insecure about their study decisions; thus, digitally based bridging and support programmes, which do not require physical presence for access, can help to alleviate worries or present opportunities for study orientation. They can also be used to smooth out the transition process on admission to higher education by recognising credits gained in the short online courses.

Micro-credentials can provide **access to education to a greater diversity of learners**, including those with fewer opportunities (e.g. people with lower socio-economic backgrounds, refugees), those from different age categories (e.g. reskilling, adult learning), and those already in employment. The main ways in which micro-credentials can contribute to inclusiveness are:

- **Flexible** design and delivery of courses leading to micro-credentials.
- **Online and digital** delivery of courses leading to micro-credentials.
- **Length** of courses leading to micro-credentials (shorter than a traditional degree).
- **Affordability**.

According to Resei et al. (2019, p. 20), micro-credentials provide the following benefits:

a) In some cases, they are less expensive and thus more affordable for certain learners, particularly in countries with high tuition fees (e.g. the USA).

b) Micro-credentials permit flexibility, because they allow learners to choose when, where and what specific content to learn, and to advance at their own rhythm. They can also help to achieve a better work-life-balance, as they can be gained without having to leave a job (for full time employed learners, those with family commitments and others).

c) They provide access to global content from top universities and global companies that would otherwise often be impossible to study at. In addition, they cover topics not offered, or insufficiently covered, by traditional university offers.

d) Micro-credentials offer personalised, customised and modularised learning, because they enable learners to combine different micro-credentials according to their personal interests and needs, as well as supporting different learning paths, creating dynamic and diverse profiles, and offering the ability 'unbundle and rebundle' education programmes.

e) They provide new ways and possibilities for learning by making use of new digital technology for teaching and learning (such as gamification elements).

There is an **increasing need for affordable credentials** that can be earned much more quicky than a formal higher education qualification, to allow more people to access higher education (Lim et al., 2018). This is a particularly important consideration with regard to mature learners who work full-time and may have a family or other responsibilities, and are therefore not able or willing to return to higher education for a traditional long degree programme. Even though an increasing number of employers support additional learning, employees often prefer to study during their free time (e.g. for their personal learning needs and aspirations, or due to a lack of time during the work week). The shorter duration of micro-credentials provides a clear and achievable goal that increases their motivation to finish and eventually go on to something bigger (Resei et al., 2019).

The current price of formal and non-formal learning is too high for many learners who already have financial commitments, including a debt from a first degree or mortgage (Oliver, 2019). The cost of micro-credentials can be an important determining factor for a learner. However, it is still **crucial that such credentials are verified and recognised by well-established higher education institutions to ensure the availability of quality education to those groups that cannot enrol themselves in traditional degrees**.

Online courses that lead to micro-credentials are also the preferred study model for non-traditional learners (e.g. mature learners). These learners usually work, have children, maintain a relationship and/or are over the age of 24 (Bautista-Godínez et al., 2018). Even though many such learners would like to have a face-to-face experience on campus, online learning often provides greater flexibility. To ensure the usefulness of online courses leading to micro-credentials, providers need to ensure as much flexibility as possible in their provision. For example, higher education institutions can provide the ability to start a course at a time that suits the learner, engage with them online when needed, and conduct assessment when learners are ready (within a time range) (Oliver, 2019).

Despite their potential for promoting inclusiveness in higher education, micro-credentials do not yet serve as an alternative for individuals who are underrepresented in traditional higher education. The PIAAC data show[36] that organised learning in adulthood is most often undertaken by those who hold a higher education degree and possess higher levels of literacy skills. Among 25-65 year olds, adults with higher education degree are 31 percentage points more likely to participate in non-formal education and training than those who do not hold a higher education degree (67% versus 36%) (Tako, Galan-Muros and Weko, 2020). Another survey of 262 individuals who completed two types of MOOC-based micro-credentials (MicroMasters [edX] and Specialisation [Coursera]) reported that 85% of those who completed the courses held an undergraduate or graduate degree; the average age of the respondents was 36 (Tako, Galan-Muros and Weko, 2020). However, positive examples of credentials that have succeeded in attracting non-traditional learners do exist outside of higher education. For example, over half of all learners pursuing a Google IT Support Professional Certificate do not have a Bachelor's degree. The Google IT Support Professional Certificate is a certificate programme that takes approximately eight to 12 months to complete, and costs $49 per

[36] The data refer to OECD countries and economies that participated in PIAAC, namely Australia, Austria, Belgium (Flanders), Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Israel, Italy, Japan, Korea, Lithuania, Mexico, the Netherlands, New Zealand, Norway, Poland, the Slovak Republic, Slovenia, Spain, Sweden, Turkey, the United Kingdom (England and Northern Ireland) and the United States. Each country or economy participated in one (or two) of the three rounds of PIAAC in 2012, 2015 or 2018.

month. Google also funds 10,000 scholarships through non-profit organisations that serve veterans, refugees and students from low-income backgrounds. Google IT Professional Certificate holders are allowed to share information about their credential with a consortium of over 20 employers, including Google and Walmart (Tako, Galan-Muros, Weko, 2020).

5. Case studies on notable practices relating to micro-credentials

This section presents three case studies that provide an in-depth analysis of recent practices with regard to micro-credentials. The report also maps other current practices related to micro-credentials, which are presented as a catalogue of best practices, in the Annex.

5.1 Case study 1: Edubadges project

SURF is a Dutch collaborative organisation for ICT in education and research. More than 100 education and research institutions in the Netherlands work together in the SURF cooperative. SURF is a driver of technological innovation in close cooperation with higher education institutions.

One of the ways in which this collaboration takes place in practice is through the **edubadges project**. Through this project, SURF has been working on a **national infrastructure that enables all Dutch higher education institutions to issue open badges to their students**. The badges are visual, digital certificates that serve as proof of certain skills or knowledge that a student has mastered. Each edubadge states its own value, which is what the holder had to do (the criteria) in order to earn it. To request an edubadge, learners must first create an eduID.

The main advantage of edubadges is that they allow learners to boost their profile in relation to potential employers, or as part of the admission procedure for a new educational institution. As a digital certificate, an edubadge is also always available. The learner's eduID provides a single means of identification via which learners can collect edubadges from different institutions.

Participants in the pilot project have gained experience of issuing badges, while SURF has further developed the infrastructure. The pilot project covered a broad range of use cases in various fields and with various target groups. Because Dutch higher education is developing towards a more modular, flexible system, edubadges could become an important instrument in making this flexible system a new reality.

16 institutions took part in the pilot phase, using the experimental edubadges infrastructure developed by SURF. Participation in the pilot was reserved for institutions that are affiliated with SURF. The participating institutions were Rotterdam University of Applied Sciences, Hanze University of Applied Sciences, the University of Twente, Vrije Universiteit Amsterdam, Tilburg University, Maastricht University, Deltion College, Amsterdam University of Applied Sciences, Windesheim University of Applied Sciences, Utrecht University, NHL Stenden University of Applied Sciences, Avans University of Applied Sciences, Wageningen University and Research, Erasmus University Rotterdam/Rotterdam School of Management, Eindhoven University of Technology, and Albeda.

The main premise for the pilot is to provide institutions with an infrastructure to issue digital certificates and to help institutions to become familiar with using this infrastructure in their educational context, either to facilitate micro-credentialling in a formal context or

to issue certificates for extra-curricular activities or non-formal learning. Some of the topics with which SURF dealt include: GDPR solutions, storage, badges, learning management systems, and theming possibilities.

The pilot was conducted in two main phases in 2017-2018 and 2018-2020, with different tasks in each phase. The main developments during the period 2017-2018 include:

- Open Badge Infrastructure, based on Open Source Badgr[37].
- Collaboration with Concentric Sky on joint development.
- Development of Badgr on Github (https:///github.com/edubadges):
  - SSO SURFconext – openID Connect.
  - LTI integration component.
  - Roles and permissions model.
  - Fronted theming options.
- Experiment to research the use of blockchain technology for endorsements.
- Code audit.

The main actions for the period of 2018-2020 were:

- Fresh install of the edubadges infrastructure.
- GDPR-compliant setup.
- Increasing policy support for enabling micro-credentialing within Dutch higher education.
- Alignment with European exchange and description frameworks.
- Preparing a business model for service delivery by SURF to Dutch higher education.
- Investigating interest and possibilities for a pan-European badge infrastructure.

SURF made the edubadges pilot infrastructure available to participating institutions to enable them to issue badges. All institutions were also obliged to provide sufficient resources for the development of their edubadge systems. SURF provides support where it serves the generic purposes of the pilot and the shared infrastructure. Each participating institution is exploring edubadges from its own specific use case (see Box 14), and issues badges within one or more badge classes.

Box 14. Edubadges at Vrije Universiteit Amsterdam

The University Library offers workshops such as 'The Smart way to find literature' and 'EndNote'. Recently, edubadges were introduced as a reward for completing these workshops. This digital certificate enables learners to demonstrate their knowledge and skills to educational institutions as well as potential employers. They can share their edubadges on websites and social media platforms such as LinkedIn.

Learners earn edubadges when:

- They participate actively in the exercises and discussions during the 'EndNote' workshop.

[37] Badgr is open-source software based on open standards, which continues the foundational work carried out by Mozilla on Open Badges. In late 2018, Mozilla announced that it would retire the Mozilla Backpack and migrate all users to the free and open Badgr platform, which is run by Concentric Sky. Badgr allows users to issue and manage a standardised type of digital badges called Open Badges.

- 'The Smart way to find literature' workshop concludes with a digital test. Learners who successfully pass the test earn an edubadge.

Most participating institutions sought to experiment with rewarding participants for informal and non-formal education. However, several of the participating institutions viewed the pilot as **a prelude to issuing badges for units of accredited education (i.e. micro-credentials) in the longer term** (SURF, 2018).

SURF also organised a half-day meeting roughly every three months, at which knowledge and experiences were shared among the participants. At the same time, SURF collected the experiences of institutions participating in the pilot, formulated lessons learned, kept track of the list of desired functionalities, and improved the infrastructure as far as possible. Participants provided input for the lessons learned document and tracked progress using the project wiki.

In its recent publication (2020) based on the practical experiences gained during the pilot project, SURF describes **lessons learned in seven thematic areas.** These are presented below.

1. **Badge strategy**

   The decision to issue badges is closely linked to the primary processes involved in providing education; namely, teaching activities and the provision of exams. It is therefore essential to develop in advance a coherent strategy for the use of badges in education. An institution experimenting with badges for the first time often chooses a limited, well-defined context. However, it is also important to think about the direction in which the institution's ultimate goal in issuing badges may lie. The main aspects to be considered are:

   - **Clear added value in the eyes of the target group**. The main finding is that badges issued in non-formal contexts are often perceived as meaningful, as they are usually awarded for activities for which previously no certificates were issued.
   - **Clear information**. The target group needs to understand clearly what a badge is, what its benefits are, what they can do with it, and how they can apply to receive the badge.
   - **Good visibility of badges**. The target group appreciates a badge that can be openly displayed (e.g. on LinkedIn).
   - **Exploring multiple contexts**. It is easier to determine and adopt a badge strategy after it is piloted with different target groups and in different contexts.
   - **Choosing a student-centred or teacher-centred application process**. It is crucial to decide whether a learner applies for a badge on his/her own initiative, or if a teacher awards a badge unsolicited. Different strategies can be used to fit different contexts.
   - **Granularity of the badge**. Institutions have to decide on how 'big' or 'small' a badge is in terms of study time or the amount of learning it represents.

   Some examples of the strategies of participating institutions are provided in the table below.

Table 11. Examples of badge strategies

Using badges for a specific target group e.g. incoming Erasmus students	**NHL Stenden University of Applied Sciences** awarded edubadges to international Erasmus students. In this way, the students could present an informative certificate at home that explains what they achieved during their time in the Netherlands. The foreign students really appreciated this.
Using badges for a 'plus-programme' e.g. excellence programmes in education	**Hanze University of Applied Sciences** is considering the use of digital badges for various levels of Honours programmes from the Hanze Honours College. **NHL Stenden University of Applied Sciences** is issuing excellence badges to students on teacher training programmes who have received an 'excellent' grade in the assessment for the ICT & Didactics component.
Using badges to indicate a learning pathway within a regular programme e.g. by defining basic and advanced badges that follow each other sequentially	**NHL Stenden University of Applied Sciences** has set up a badge strategy in which the badges correspond to phases within a minor programme in order to display their logical sequence.
Using badges within a specific subject area e.g. the subject area of information literacy skills	**Wageningen University & Research** and the **Vrije Universiteit** have developed edubadges for the subject area of information literacy skills. They have defined levels of learning based on international standards such as SCONUL and the ACRL Framework. Badges are linked to these different levels of information literacy skills.
Using badges for a specific extracurricular activity e.g. membership of the student council	At the **University of Twente**, the Student Union (an umbrella student body of 130 affiliated student organisations) issues badges in recognition of a full-time committee year (so-called 'activism recognition'). Students feel that the badge is a good addition to the existing paper certificate, which is signed by the *rector magnificus* and the Student Union. Both the badge and the paper certificate underline the learning experience and the commitment of the student. At pathways.tue.nl, **Eindhoven University of Technology** has created an overview of extracurricular learning paths that students can follow. Students can use these pathways to gain additional skills that will help them to function well in employment. Examples include presentation skills, negotiation skills and creativity. **Utrecht University** issues edubadges to students who participate in an educational innovation think tank. The badges recognise their contribution of ideas to the field of educational innovation within Utrecht University. Students indicate that this motivates them to participate in the think tank.
Using badges to achieve a certain entry level	The City Lab of **Rotterdam University of Applied Sciences** has issued various badges to students that demonstrate the holder's skills in operating certain equipment. Examples include: City lab / 3D printing basic, City lab / Laser cutting basic, City lab / 3D modelling basic. **Wageningen University & Research** has experimented with awarding edubadges for the safety instructions that students and staff must understand before they are allowed to carry out lab work or field practice. Following the instruction modules is mandatory, but does not earn the learner credit points.
Using badges in a cross-institutional framework e.g. 21st Century Skills	If badges are based on a joint framework, it becomes possible to stack and combine badges across institutions. In this respect, it is essential to have a national taxonomy of the subject area. **Albeda** has set up badge classes for the 10 '21st-century skills' for which a joint framework has been agreed (KOMPAS21, developed by students, education and business). The 12 institutions that have committed to this framework can all use the badge classes that Albeda has created. This makes mutual comparison possible.

Using badges for staff members e.g. in professional development	**Deltion College** has used badges to indicate which components of a 'Learning with ICT' professional development programme the participating teachers have already successfully completed. Deltion created a landing page for participants (here: teachers) at which badge recipients can find out information about the badge. Within the pilot, **Utrecht University** issued edubadges for training and workshops within the Educate-it programme. This is a UU-wide programme supporting lecturers in strengthening and innovating their education through blended learning. After the pilot phase, UU would also like to issue edubadges within other teacher professional development programmes at the university.

Source: SURF, 2020.

2. Visuals and graphic design

One feature of badges – in contrast with other types of digital certificates – is that the badge has the appearance of an image, but includes underlying metadata. The following aspects should be considered:

- **Badge design.** Institutions need to decide what images best align with their strategy and corporate identity.
- **Practical requirements for the visual.** There are a number of practical design requirements within the edubadges environment (e.g. issued in .png file, larger than 90 by 90 pixels). Institutions also need to decide what they want to display in the visual (e.g. name of the issuer, title of the badge).
- **Recognisable visual link between badges.** If badges are to be used in different contexts, it is beneficial to issue different types of badges that share a coordinated look.
- **Minimising changes.** Once the visual is developed and used, it will be difficult to change it.
- **Cooperation with the communication department.** Badges might need to comply with corporate identity requirements (e.g. colour scheme, symbols).

3. Badge contents

Clear and consistent information is necessary about the competences, skills and experience gained to ensure trust in and relevance of the badges. The following aspects must be considered:

- **Formulating guidelines for badge-awarding criteria**. Institutions need to consider whether they are going to formulate criteria in terms of learning outcomes, or also in terms of efforts invested (such as attendance or submission of a piece of work). The guidelines can also describe how the criteria should be formulated (e.g. Dublin descriptors, or a Tuning method for describing learning outcomes).
- **Linking to frameworks**. Institutions should consider whether there are general frameworks with which their badges can be linked (e.g. the European Qualifications Framework, Europass, the ESCO or other frameworks).
- **Distinction between formal and non-formal badges**. Institutions can issue badges in both formal (credit-bearing) and non-formal education (non-credit-bearing). The content and metadata will differ according to the

context. In a formal (credit-bearing) context, more information is required (e.g. better alignment to qualifications frameworks).

- **Changes vs. persistence**. Badges usually last a lifetime, with some exceptions in which an expiration date may apply (e.g. a first aid certificate). It is difficult to include URLs within a badge as there are no persistent URLs in use by education institutions (information is constantly changed and updated). For this reason, all necessary information must be included in the metadata fields of the badge itself.

4. Governance (roles and privileges)

The process of issuing badges from an education institution involves various people with different tasks and privileges. SURF's edubadges infrastructure assumes the availability of a single administrator at institutional level, who can then assign privileges to colleagues within their own organisation. The following aspects must be considered:

- **Structure of roles and privileges**. In theory, it is possible to build in a profound tree structure of roles and privileges from an institutional account. Based on the experiences gained during the proof-of-concept phase, SURF has added an extra layer – 'faculty (issuer group)' – to the roles and privileges structure, at the request of the participating institutions. This extra (non-mandatory) layer allows institutions to group issuers by faculty, study programme or another organisational unit, and to manage roles and privileges at that level too. The pilot institutions expressed the need to see their organisational reality mirrored in the roles and privileges structure.
- **Designating responsibility**. Institutions need to decide who is assigned responsibility for issuing badges (e.g. lecturers, dedicated administrative staff, the examination board).
- **Maintaining an overview**. During a pilot phase, only a relatively small number of badges might be issued. Eventually, institutions are likely to want to issue larger numbers of badges. It then becomes important to ensure that things remain manageable.
- **Linking to a student information system or learning management system**. Good integration with the learning environment will allow the institution to issue larger numbers of badges while reducing the burden involved in issuing badges on personnel.

5. Implementation and upscaling

Going from the initial pilot stage to a broad scaling up within an institution can be challenging. Institutions that participated in the pilot identified **two different strategies**: one **fast,** and one **thorough**:

- **The 'just get started' strategy**. Several institutions decided to quickly start experimenting in a limited context with a small group of stakeholders, and to see where it took them. They did not seek broad support within the organisation at first, but began to do so in the second phase, based on successful pilots.
- **The 'patience pays off' strategy.** Other institutions in the pilot decided to set out a widely supported strategy before issuing badges. Many different areas of expertise can potentially be involved: legal advisers, examination

boards, quality assurance, educational advisers, ICT, functional administrators, and the administrative layer. The advantage of broad internal acceptance is that it allows an institution to position the agenda within the institution, right from the outset.

6. Feedback from students

As part of the pilot, SURF met with the student organisations ISO and LSVb and hosted a special student feedback session. Some points raised during these discussions were:

- **Fear of stress.** Dutch students said that they were afraid that earning badges as an extra would be added to the long list of tasks that they already feel they have to deliver, which would cause added stress. Particularly when it comes to profiling for the labour market, students are afraid that "this will be another thing to do, because if my neighbour has done the same, and we're both going to apply for the same job, I can't afford to be left behind". Incidentally, this argument appears to be a specifically Dutch phenomenon: it was not reported in any case by SURF research partner Rick West from Brigham Young University, who interviewed groups of students in the United States and Slovenia.
- **Extracurricular badges are of particular interest.** A signal that seems to contradict the previous point is that students indicated that they find extracurricular badges particularly interesting. These badges recognise achievements for which there was previously no recognition or certification.
- **User-friendliness is essential.** Teachers want to be able to issue badges easily, and students need to be able to claim them easily. Students think that they should be able to obtain a badge at the push of a button. The process of issuing and claiming edubadges must avoid complex systems.
- **Guidance is required. Badges in higher education are a relatively new concept.** Students who received a badge for the first time during the pilot sometimes wondered about the use of these badges. It may be useful to set up a landing page on an institution's website explaining what badges are, and how students may be able to use them.
- **Different target groups, different experiences.** A regular Dutch Bachelor's or Master's student views badges differently from an international student or professional who receives a badge as part of a lifelong learning programme. Institutions need to be responsive to these differences.

7. Position of employers

SURF found that students say badges are particularly interesting if they have a value in the labour market. At the same time, employers say that badges are interesting if they are widely used within the education system and if their value can be quickly and clearly understood by the labour market. The main ways to get employers involved in working with badges are:

- **Approaching badges by subject or competences/skills area**. Badges can be constructed in accordance with an existing common framework in order to be recognisable within a particular field. Badges could potentially be linked to the credit system used by some professions for professional development or permanent education.

- **Matching skills with employers in the region**. Employers could be given an active voice in the competences that are embedded in badges.

The technological capabilities and infrastructure developed under this project are intertwined with strategic national questions. The move towards a national modular education system, in which micro-credentials are transferrable between institutions, will require specific metadata (e.g. ECTS credits) to be collected and displayed in the badge. It may also be desirable to include a certain design element to distinguish micro-credentials that are derived from accredited educational paths, from badges that certify extra-curricular activities and therefore do not fall under the regular national quality assurance scheme.

Following the successful pilot phase, SURF is developing edubadges into a fully-fledged service, which is expected to be launched at the end of 2020. Educational institutions throughout the Netherlands will then be able to issue digital certificates to their students, using the edubadges infrastructure provided by SURF.

There are several arguments for a national approach to open badges in higher education, which also serve to explain why SURF is running the edubadges project:

1. **Making knowledge and skills transparent.** Edubadges are a useful tool to make visible and portable the competences, knowledge and skills gathered at different institutions. It is important to ensure that learners can share information about their achievements without having to worry about their privacy or the sustained availability of the information.
2. **Flexible transfer to different educational institutions.** Learners are increasingly obtaining education from different higher education institutions. Using edubadges, they can prove what knowledge and skills they have gained and where. Because the infrastructure will become available to all higher education institutions in the Netherlands, comparability of badges between institutions is assured. This could help to simplify admissions procedures for students who transfer. Edubadges can also help in the transition from education to the labour market. For employers, badges make it easier to select candidates for their specific knowledge or skills.
3. **Less work, some freedom of choice for the educational institution.** Badges can be used for various purposes in higher education, and institutions are free to choose the purpose for which they want to issue edubadges – whether as part of formal education, or in a different context. SURF's infrastructure supports both purposes. The educational context in which a badge was issued is visible in the metadata of the badge.
4. **Preventing proliferation and ensuring badges are meaningful.** The security and reliability of badges is paramount. Therefore, SURF chooses to offer an infrastructure that provides storage and management for badges. This allows institutions to issue badges effectively and efficiently, while helping to prevent their proliferation. SURF coordinates the identification of educational institutions' requirements for edubadges and organises the provision of an appropriate technological infrastructure. This infrastructure will offer educational institutions the freedom to make their own choices within a standardised system of badges.
5. **Authentication, verification and privacy.** To make edubadges a success, authentication and verification need to be properly regulated. The authentication and verification of badges determine whether or not they add value for institutions and employers. Badge owners and users want to be sure that badges are genuine, and they need to be able to verify the issuing party. This requires coordination

between all educational institutions – something that SURF ensures through its infrastructure; every badge issued can be verified for authenticity with a single mouse-click. In order to last a lifetime, badges should ideally be linked to an authentication system that remains available after graduation. To ensure this, SURF is experimenting with linking edubadges to a new 'identity' that transcends institutions – eduID. Privacy is also important: badges must be GDPR compliant, and the owner should always be in control of their data. The system requires the owner to grant permission to use their personal data in order to issue a badge.

6. **Alignment to international standards.** SURF will provide the edubadges infrastructure to Dutch educational institutions. However, it goes without saying that students and institutions are active in an international educational context. It is therefore important that Dutch edubadges are compatible with badges issued elsewhere. Thanks to the use of the Open Badges standard, students will be able to collect multiple badges and display them in a presentation environment. In terms of content, SURF ensures that edubadges contain the key information that has been agreed on in the European Bachelor's-Master's system. This includes the number of ECTS credits, and a description of the learning outcomes achieved. SURF is also in close contact with the European Commission's Europass project, with which it is piloting interoperability with the Europass Digital Credentials Infrastructure.
7. **Easier collaboration through open source.** SURF always strives to apply open-source technology and to promote its use to make cooperation easier and to avoid supplier dependency. For edubadges, SURF has opted for the technology of Badgr – the only technology partner working on open source when the edubadges project started. The advantage of this is that the development work carried out by SURF also becomes available to others, and vice versa.

5.2 Case study 2: Micro-credential system as part of New Zealand's regulated education and training system

The New Zealand Qualifications Authority (NZQA) has introduced a micro-credential system into New Zealand Qualifications Framework (NZQF), as part of New Zealand's regulated education and training system. The New Zealand Qualifications Framework (NZQF), established in July 2010, replaced both the National Qualifications Framework (established in 1992) and the New Zealand Register of Quality Assured Qualifications (established in 2001). The NZQF is a single, unified framework for all of New Zealand's quality-assured qualifications, from senior secondary school to doctoral degrees. New Zealand universities sit outside this framework.

A key function of the NZQA is to establish overarching statutory rules for the quality assurance of qualifications and the tertiary education organisations that provide them. Tertiary education in New Zealand covers vocational education and training, as well as higher education. To implement quality assurance rules, New Zealand has two quality assurance agencies with responsibilities for separate parts of the tertiary education sector:

- The NZQA maintains and quality-assures New Zealand's qualifications system for the non-university tertiary education sector.
- Universities New Zealand fulfils this function for the university sector. Universities New Zealand has delegated authority to approve university programmes, provide accreditation, list university qualifications in the NZQF, approve training schemes, as well as ancillary powers.

According to the NZQA, a micro-credential certifies the achievement of a coherent set of skills and knowledge; and is specified by a statement of purpose, learning outcomes, and **strong evidence of need by industry, employers, iwi[38] and/or the community.** They are smaller than a qualification, and focus on skills development opportunities that are not currently catered for within the regulated tertiary education system. Micro-credentials usually have a very practical focus and largely concern the vocational education and training sector.

At a minimum, micro-credentials will be subject to the same requirements as training schemes or assessment standards. In addition, they must:

- be 5–40 credits in size (equal to between 2.5 and 20 ECTS credits[39]).
- show strong evidence of need from employers, the industry and/or the community.
- not duplicate other current quality-assured learning approved by the NZQA.
- be reviewed annually to confirm that they continue to meet their intended purpose.

Micro-credentials can be provided by tertiary education organisations (TEOs), universities, employers and professional bodies, either directly or in partnership with tertiary education providers. TEOs include qualification developers, transitional industry training organisations (transitional ITOs), and providers (the New Zealand Institute of Skills and Technology [NZIST] and NZIST subsidiaries, wānanga[40], private training establishments and government training establishments) with accreditation to deliver a programme that leads to a New Zealand qualification.

TEOs must apply to the NZQA for the approval of micro-credentials through the Training Scheme Rules for Consent to Assess Rules. The Training Scheme Rules are intended to approve micro-credentials delivered mainly through blended, online, and classroom-based settings, while the Consent to Assess Rules are intended to approve micro-credentials delivered mainly via industry and workplace-based settings.

Once the NZQA has approved a micro-credential, it is published on a micro-credential register (see Table 12 for an example of how this looks in practice). The register is searchable by keyword, or by developer name or education organisation number. The information available in the register includes:

- Title
- Level in the qualification's framework
- Number of credits
- Institution/developer
- Approval date
- Review date

[38] Māori society.

[39] New Zealand credits were equated to ECTS on the basis of information provided in 'Description of the New Zealand Tertiary Education System 2015'. Available at: https://www.nzqa.govt.nz/assets/About-us/Our-role/TEQS-2015.pdf

[40] Wānanga are recognised as tertiary institutions under section 162 of the Education Act 1989. As such, wānanga are regarded as the peers of universities, polytechnics, and colleges of education. Under the Act: A wānanga is characterised by teaching and research that maintains, advances and disseminates knowledge and develops intellectual independence, and assists the application of knowledge regarding ahuatanga Maori (Maori tradition) according to tikanga Māori (Māori custom).

- Aim
- Outcome

Table 12. An example of how micro-credentials are published in the register

Title	Level	Credits	Institution/Developer		
Introduction to Inshore Commercial Fishing	2	40	Primary Industry Training Organisation	08/2019	30/08/2020
Aim To provide the commercial fishing industry with entry-level personnel who have the knowledge and skills needed to work on an inshore commercial fishing vessel. **Outcome** At the end of this learning package, learners will be able to: ▪ Describe the characteristics of contaminated seafood product and use hygienic practices when working with seafood to avoid contamination on an inshore commercial fishing vessel. ▪ Describe and apply safe work practices and participate as a crew member on an inshore commercial fishing vessel. ▪ Describe the responsibilities of a seafood industry worker on an inshore commercial fishing vessel, under the Fisheries Act 1996. ▪ Identify and describe the key principles of the New Zealand Quota Management System. ▪ Explain commercial catch handling procedures and catch chilling and storage techniques used on an inshore commercial fishing vessel.					

Source: New Zealand Qualification Authority. Available at: https://www.nzqa.govt.nz/nzqf/search/microcredentials.do

When a learner gains a micro-credential, TEOs can report that achievement to the NZQA so that it is displayed on their New Zealand Record of Achievement (NZRoA). There is no legal requirement for TEOs to report a learner's achievement of a micro-credential to the NZQA. However, the NZQA recommends that TEOs report the completion of micro-credentials so that learners benefit from having their achievement appear promptly on their NZRoA. To report an achievement, TEOs need:

- The learner's NSN (National Student Number)
- The date of the achievement
- The name of the micro-credential or qualification achieved

A charge of $5.10 is made for reporting the achievement of a micro-credential. This charge supports the administration of the system.

Micro-credentials offered by universities must be approved by the university's academic board, and must meet the requirements of the Committee on University Academic Programmes (CUAP). The CUAP Handbook, which sets out the approval and accreditation procedures for the quality assurance of academic programmes in New Zealand's eight universities, states that micro-credentials should:

- reflect the commitments and objectives set out by the university in its strategic plan, with respect to community access to education and the provision of professional development
- satisfy the university's quality assurance requirements

- reflect the standing of the university as a provider of advanced learning and its priorities for adult and community education and the provision of professional development.

The offering of a micro-credential is approved for a period of two years, after which re-approval is required. An evaluation plan must also be in place to ensure that a micro-credential undergoes an evaluation that uses student feedback at least annually. However, the uptake of micro-credentials in New Zealand's universities is fairly low as they are regarded as inferior to traditional qualifications.

5.3 Case study 3: Micro-credentialling solutions implemented under the European Universities Initiative: the European Consortium of Innovative Universities (ECIU) and the Young Universities for the Future of Europe (YUFE).

European Universities, the European Consortium of Innovative Universities (ECIU) and the Young Universities for the Future of Europe (YUFE) aim to develop micro-credentials on a larger scale in order to offer increased innovation in higher education, flexible learning pathways and technology enhanced learning, as well as more inclusive curricula and pedagogies. These alliances can act as test beds, paving the way for other higher education institutions to follow. They are currently undergoing a consultation process among member institutions to develop common approaches to micro-credentials and micro-learning experiences.

European Consortium of Innovative Universities (ECIU)

The ECIU consists of 12 universities and one associate partner from Mexico. The ECIU's goal is to enable universities, learners, researchers, enterprises, local bodies and citizens to co-create original educational pathways and relevant innovative solutions for challenges to the advancement of society. Building on the longstanding experiences of its partner universities, ECIU aims to act as a role model for mainstreaming open, innovative and flexible learning as well as ensuring its recognition. The ECIU will allow students to work in interdisciplinary teams and to have the possibility of personalising curricula to their own needs by selecting different micro-credentials depending on their specific interests and societal challenges.

The ECIU acknowledges a growing demand among learners and employers for smaller, 'just in time' and 'just enough', stackable units of learning. It seeks to fill this gap by offering a wide range of micro-learning opportunities. ECIU micro-credential courses will include online courses, study packages, summer schools and courses from industry.

The ECIU is currently working to identify units across all its member institutions that already make use of challenge-based learning. These units will then be provided to students either through standalone micro-modules, recognised micro-credentials, or as a part of their study progression.

The ECIU strongly supports the movement supporting micro-credentials, as well as **efforts to define and align them with existing national and European qualification frameworks**. It is currently developing an internal approach to micro-credentials and micro-learning. The ECIU also recently released a statement of guiding principles to better define and develop a common European terminology for micro-credentials. The **key principles** proposed are:

1. "Micro-credentials require a **common definition** supporting both credit and non-credit recognition pathways. The ECIU University uses the term micro-credential to

refers to "certification of learning that can accumulate into a larger credential or degree, be part of a portfolio that demonstrates individuals' proof of learning or have a value in itself."

2. "European **quality assurance** guidelines for micro-credentials are needed to define standards and support institutional best practices. Micro-credentials need to adhere to an agreed ECTS credit value when intended to be credit-bearing. They should be aligned with, and fully embedded within, the European Qualification Framework. Authentication and recognition challenges need to be addressed."
3. "**Society engagement** is needed to identify, understand and help shape perceptions of the value, credibility, recognition and currency of micro-credentials. Developing micro-credentials is an open process where universities and society work together. Questions regarding ownership and financing need to be addressed. Universities are academically independent and in control of the quality assurance."
4. "Suitable open **technical platforms and systems** are needed for sustainability and to help manage new credit and recognition models. Micro-credentials need to be brought together in a Learner's Wallet (as developed by the ECIU University)."
5. "**Commitment** from policy makers, institutions and initiative leaders are needed to support major system-level educational innovations."

Micro-credentials at Dublin City University

One of the ECIU's member institutions, Dublin City University (DCU), has already launched its first stackable and credit-bearing micro-credential, and others are being developed. Before it launched this micro-credential, DCU had to introduce the concept of micro-credentials into its academic regulations and quality assurance processes. Irish universities undergo external institutional quality assurance, which means they are responsible for the quality assurance of their own programmes and services.

DCU Business School introduced a short online course called the FinTech – Financial Innovation Micro-credential. It is a 12-week online programme worth 5 ECTS credits at postgraduate level from Dublin City University. The course explores the interaction between finance and technology and its impact on the financial services industry.

To qualify for direct entry into this course, learners need to fulfil one or more of the following criteria:

- Have several years of experience in financial services or a related sector.
- Have completed relevant, accredited Continuing Professional Development learning.
- Hold a Level 8 (undergraduate) Honours Degree (2:1) or higher in business, finance, or a related discipline under the Irish national framework.

DCU made a strategic move to begin with (and potentially concentrate on) micro-credentials at postgraduate level. Postgraduate-level courses leading to micro-credentials have the potential to reach learners who are unable to study full-time in class due to personal reasons (e.g. career or family).

After the launch of the Common Micro-credential Framework (CMF), Dublin City University entered into a global strategic partnership with FutureLearn to provide its first micro-credential. FutureLearn is a digital education platform founded in December 2012 and jointly owned by The Open University and SEEK Ltd. It is a massive open online course (MOOC) learning platform. All of its online micro-credentials are designed to upskill learners for work in rapidly growing industries, without the time and cost commitment of

a full degree. Each micro-credential includes a formal online assessment and meets the standards set by the CMF. By using FutureLearn, higher education institutions gain greater flexibility, because courses can start at any point in time and can attract a global student body.

In 2018, DCU started using Digitary, a leading platform for certifying, sharing and verifying academic credentials. The university uses an online document sharing service called Digitary Core, through which students and alumni can access their Diploma Supplement and share academic records with employers and other education providers. Digitary Core guarantees security and is password-protected. The Digitary platform also serves as a useful tool for certifying and issuing micro-credentials, replacing paper documents with digitally signed electronic documents and replacing manual processes with automated ones. The platform enables records to be verified instantly with full learner consent, thus maintaining regulatory compliance and eliminating the hassle of manual verification, and making certificates both secure and less costly.

In 2020, the Irish Universities Association (IUA), of which DCU is a member, was awarded a national grant of EUR 12.3 million from Pillar 3 of the Human Capital Initiative (HCI), to establish a Multi-Campus Micro-Credentials (MC2) system across the seven universities over the next five years. Through the MC2 project, the IUA universities intend to establish a coherent national framework for ECTS-bearing micro-credentials, a system of certified qualifications in short courses delivered in flexible formats. This first-of-its-kind project was designed to increase the capacity of Irish universities to extract and adapt high-demand modules from existing programmes, and to develop tailored courses that suit the needs of enterprise and learners (Irish Universities Association, 2020).

Young Universities for the Future of Europe (YUFE)

YUFE consists of eight young universities and six associate partners from higher education, as well as the non-governmental and private sectors. It aims to bring about radical change by becoming the leading model of a young, student-centred, non-elitist, open and inclusive European university based on cooperation between higher education institutions, the public and private sectors, and citizens. YUFE seeks to provide personalised academic curricula that will form the backbone of an equitable, diverse and effective education system that recognises and optimally fosters individual talents. In this context, YUFE will provide students with unique opportunities to be trained in an inclusive research- and work-based learning ecosystem, leading to interdisciplinary and intersectoral knowledge and skills.

In line with its goals, **YUFE aims to develop an approach to micro-credentials**. The main objective of introducing micro-credentials is to promote inclusiveness and expand the benefits of higher education beyond the 'usual suspects'. YUFE is currently **carrying out a consultation process** among its member organisations. The main goal of this is to gather data on institutional practices and national contexts. This data gathering is crucial to better understanding the different processes and practices of usage and recognition of micro-credentials across organisations and countries.

After the consultation process is complete, YUFE will build **a catalogue detailing what member organisations are already doing**. This catalogue will help to gain a sense of the various contexts, to gather good practices, and to understand the existing frameworks. This knowledge will allow YUFE to consider these existing frameworks for its own practice.

Preliminary feedback from YUFE member organisations shows that there is no common understanding of what micro-credentials are, what actions should be taken to fully integrate them into the educational processes of institutions, and to ensure the compatibility of micro-credentials across the alliance.

YUFE has not yet developed a definition for micro-credentials, but considers the following to be key elements that are crucial in developing it:

- Content
- Learning outcomes
- ECTS
- Standalone and stackable
- Flexible mode of delivery

Some potential challenges to the provision of micro-credentials by YUFE members include combining existing practices and frameworks, and guaranteeing the same quality standards. YUFE has established a Quality Task Force to mitigate these risks and develop a common approach.

6. Conclusions and policy considerations. What role could policy at European level play in facilitating the use of micro-credentials?

What does success look like?

To ensure that the European approach to micro-credentials is beneficial and creates European added value, we suggest asking the following question now: how will we know if the European approach to micro-credentials has succeeded? If we can imagine what the key success factors will look like, it will be easier to assess whether or not we have achieved them.

Our analysis has been primarily guided by the following question: would European higher education institutions and individuals benefit from an EU-level approach to micro-credentials? Furthermore, we asked: if EU policy makers decided to create a European approach to govern and harmonise the use of micro-credentials, what aspects should fall under this approach and why?

To ensure genuine European added value, the European approach needs to be achieved through collaboration and discussion among stakeholders in the field of higher education. Actions by the European Commission should work in synergy with national policies and the work done by higher education institutions.

A European approach to micro-credentials will be applied in the context of fundamental and fast changes in education and the labour market. Flexibility and inclusion are the main words mentioned by experts and stakeholders when they are asked about how higher education will develop over the next decade. More and more, graduates and workers will need to update their skills to meet the changing nature of work. Higher education institutions need to become better prepared to offer continuous learning possibilities, and especially short learning courses.

The success of a European approach to micro-credentials will largely mean the following key changes:

- **Increased trust** in micro-credentials across all social systems: education and training, the labour market, and society.
- **Enhanced transparency** of learning outcomes achieved as a result of short learning courses.
- **Strengthened educational innovation** as a result of a common approach.
- **Enhanced flexibility** for all learners in choosing the most suitable learning pathways.

Increased trust in alternative credentials would mean more job adverts from employers that emphasise skills and competencies that can be evidenced and documented using micro-credentials, as well as more adults engaging in lifelong learning.

Our report has revealed that there is still lack of trust in micro-credentials. Some employers are unsure about what micro-credentials are, and which ones to trust. Micro-credentials vary in terms of characteristics such as their delivery modes, content, providers, the possibility of receiving credits, the period of study, objectives, usefulness, prerequisites, validation process, integration/stackability options and types of certificates received. Some learners are also unsure of the benefits offered by micro-credentials. The Adult Education Survey (AES) from 2016 shows that a substantial number of adults, 44.4% of people in the EU aged 25 to 64, participate in education and training. Some of this comes in the form

of non-formal learning in the workplace, such as annual health and safety lessons or internal training, which are often challenging to gain recognition for outside the workplace.

Enhanced transparency would mean that all micro-credentials in Europe should present certain key information about the learning process and the learning outcomes achieved as a result of short learning activities.

The gap in trust in relation to micro-credentials stems largely from insufficient transparency about the learning outcomes achieved as a result of short learning courses. It also stems from the way in which the learning is provided, and how its outcomes are assessed. This lack of transparency is one of the main barriers to the seamless external quality assurance and recognition of micro-credentials. It is difficult for quality assurance agencies to do their work if the existing micro-credentials all provide very different information about the learning process, and for many it is not even possible to find the information that is usually assessed as part of quality assurance procedures. Here, a European approach to micro-credentials could play a crucial role in harmonising the information presented in micro-credentials. Then, quality assurance agencies, higher education institutions, employers and learners would know exactly what they should see when looking at *any* micro-credential.

This report emphasises the challenges to current education provision and the demands from the labour market for new forms of learning. A European approach could **foster educational innovation,** not least by enhancing trust in alternative credentials and the transparency of information provided therein.

Among the key risks associated with creating any new policy framework is that of unintentionally limiting certain activities that fall outside the scope of the framework. Therefore, in developing a European framework, we suggest asking cautiously if the framework will be a barrier or inhibitor to educational innovations which might otherwise exist in its absence. For example, not setting a fixed level of volume for learning that leads to micro-credentials (e.g. in terms of ECTS points) would allow innovation and experimentation involving micro-credentials of different sizes that meet various institutional and national needs. Reinforcing trust and transparency is likely to encourage higher education institutions to offer more micro-credentials, as demand from employers and use by learners will grow. In the context of a European approach, it is also likely that the European Commission will be able to provide further funding for innovative solutions relating to micro-credentials.

Ultimately, with increased trust, transparency and a framework that supports educational innovations, a new ecosystem will emerge that fosters **increased flexibility** for all learners in choosing learning pathways that are in line with their goals and needs in the labour market and society. Enabling flexible learning pathways will contribute to the achievement of EU policy objectives to ensure that higher education is of high quality, inclusive and lifelong for all. In doing so, it will also contribute significantly to achieving SDG goal 4.3, namely: "by 2030, ensure equal access for all women and men to affordable quality technical, vocational and tertiary education, including university".

Policy considerations

Below, we suggest a list of policy considerations that will help the European Commission to design an approach to micro-credentials that will **create substantial European added value**. In line with the findings of the study, each text segment explains what problems are being tackled, and suggests ways forward.

1. ***A European approach to micro-credentials should define critical information items that any micro-credential must provide.***

As previously discussed, trust in, and transparency of, micro-credentials are hindered by the fact that different micro-credentials currently provide very different information about their learning outcomes, learning processes and assessment. This creates a problem for quality assurance agencies, employers, higher education institutions and, most importantly, learners, in understanding the value offered by these learning courses and in comparing them with other similar courses. We therefore suggest that a European approach to micro-credentials could formulate a list of critical information items that providers of micro-credentials must summarise in order to comply with the European approach. It is still a matter of discussion how direct such a recommendation should be. It could range from an invitation for action in the Commission's Communication, to being included in the Bologna ministerial communiqué, to the European Commission mainstreaming such a request through Erasmus+ actions and attaching funding decisions to it. Such a recommendation should be made with the goal in mind of supporting, and not to limiting, educational innovations.

Based on our study, we suggest considering the following list of critical information items to be provided by all micro-credentials operating within the framework of a European approach:

- ***Title*** *of the micro-credential, which precisely signals the learning outcomes.*
- ***Provider*** *of the course.*
- ***Date*** *when the micro-credential was issued.*
- ***Description*** *of the course content and its purpose.*
- ***Learning outcomes****: what the successful learner knows, understands and can do based on this assessed learning.*
- ***How learner participates:*** *online, on-site or both online and on-site.*
- ***Credits****: number of credits provided, if credit-bearing.*
- ***Time period*** *when the learning took place.*
- ***Any prerequisites*** *that were required to begin the course.*
- ***Learning resources*** *relevant for the credential.*
- ***Type of assessment:*** *testing, application of a skill, portfolio, etc.*
- ***Supervision and identity verification:*** *unsupervised with no identity verification, supervised with no identity verification, supervised online or on-site with identity verification.*
- ***Quality assurance:*** *the body ensuring the quality of the course.*
- ***Outcome for a successful learner:*** *admission to a degree programme, credit towards a degree programme, certification or digital badge earned, number of credits.*
- ***Integration / stackability options****: standalone, independent course / integrated, stackable towards another credential.*

It is not necessary that this list of critical items should be provided in a micro-credential (i.e. the certification) itself. A European approach should simply ask that these items of critical information must be described in an easily accessible and intuitive place, so that employers, quality assurance agencies, higher education institutions, learners and other interested stakeholders can access them in the simplest possible way (e.g. by using a QR code on the certificate itself).

2. In order to allow educational innovation and flexibility, a European approach should not prescribe/standardise the critical information items too narrowly.

It may be tempting to define the terms of the critical information items in such a way that only certain types of micro-credentials will be considered in line with the European approach. At first glance, it might seem reasonable to say that the learning activities leading to micro-credentials should, for example, encompass no fewer than three and no more than 10 ECTS credits, and that they must be quality assured. However, our report reveals that any such limits may hinder educational innovation and flexibility, and that it is difficult to find grounds for establishing such specific requirements. We therefore suggest establishing a list of critical items, without specifying the particular values of these items. This more liberal approach would ensure trust and transparency with regard to micro-credentials, without hindering educational innovation and flexibility. Such an approach would also enable Member States to develop their own local approaches within this broad umbrella, which align with its definitions and terminology.

3. Work towards a European digital solution to store micro-credentials.

The lack of digital solutions for the validation, recognition and storage of micro-credentials remains one of the obstacles to their wider uptake. While digital solutions to providing online learning have already gained momentum and reliable ways exist for organising its provision, digital solutions for storing micro-credentials (such as transcripts, blockchain, learner verification and potential skills matching in recruitment) are promising, but still nascent.

Creating a European digital solution for storing micro-credentials would be a strong step towards the practical implementation of a European approach to micro-credentials. A secure and flexible European digital solution for storing micro-credentials would contribute strongly to their transparency and increase trust. Current EU initiatives such as the European Student Card Initiative[41], Europass[42] and ESCO classification[43] could be brought together to build such a digital solution, which could become a standard across Europe. It is also important to ensure that European digital solutions for storing micro-credentials are:

- based on technologies that are secure, which authenticate the identity of a learner, and protect the certification from misuse or alterations.
- easy to share via different platforms (e.g. social media, e-mail, blogs, etc.).
- developed in such a way that European higher education institutions can easily integrate them into their own institutional infrastructures.

4. Existing criteria and measures for quality assurance must be renewed and supplemented to be fit for micro-credentials.

One of the main successes of the Bologna Process is the establishment of quality assurance as a key element of higher education. There is a consensus that quality assurance is

[41] The European Student Card Initiative will develop an online one-stop shop through the Erasmus+ Mobile App for students to manage all administrative steps relating to their mobility period - before, during and after their stay. For more information, please see: https://ec.europa.eu/education/education-in-the-eu/european-student-card-initiative_en

[42] Europass provides a set of online tools and information to manage learning and career. For more information, please see: https://europa.eu/europass/en

[43] The ESCO classification identifies and categorises skills, competences, qualifications and occupations relevant for the EU labour market and education and training. For more information, please see: https://ec.europa.eu/esco/portal/home

necessary to ensure accountability and support enhancement. In general, the standards and key elements that exist for formal recognition and quality assurance in higher education can and should be applicable to any new forms of learning, certification and credentialisation.

Ideally, quality assurance in the provision of higher education should be carried both internally and externally, to ensure that internal quality assurance is in line with European standards (Nuffic, 2019). However, in some cases quality assurance procedures and regulatory frameworks have not yet been adapted to facilitate and monitor courses leading to micro-credentials, particularly the digital provision of emerging micro-credentials. The existing criteria and measures for quality assurance must accordingly be renewed and supplemented, to take appropriate account of digitalisation in teaching and learning and to ensure security and transparency for all learner groups. To sum up, all credit-bearing and stackable micro-credentials must be subject to a standardised and accepted quality assurance process.

Quality assurance procedures in some countries must be expanded to cover digital learning in two environments: 1) in case where it is offered within a higher education institution's own course programme (e.g. also as blended learning); and 2) in cases where it is used by learners to supplement their own learning pathway, and is credit-bearing. Both cases require a more student-centred approach to quality assurance.

In other countries, quality assurance procedures already cover digital learning. For example, the Irish quality assurance agency QQI has published guidelines for blended learning and standard quality assurance processes to fully recognise both online and blended delivery of education. It is crucial that quality assurance of online learning activities that are credit-bearing is extended to cover the virtual learning environment, the pedagogical quality of online provision, and the availability of online student support, which are often criticised as lacking in relation to online learning. In summary: all credit-bearing and stackable micro-credentials must be aligned with standards and accepted quality assurance processes.

It would be helpful if these quality assurance procedures would also recognise non-credit bearing micro-credentials, i.e. those mainly gained to prove that certain skills and competences have been achieved. In this case, quality assurance measures should ensure that the certificate lists the critical information from the framework and perhaps even enables the educational provider to be recognised for issuing such certificates. This expanded approach would be a step towards achieving Scenario 3, 'Recognition across all social systems' (see above) for the implementation of micro-credentials.

5. Seek opportunities to bring higher education institutions together with employers in order to find the best ways to design and deliver micro-credentials.

We found that there are more characteristics in which currently provided micro-credentials differ, than in which they are similar. The two main characteristics that almost all micro-credentials have in common are that they are used for fairly short courses of learning, and that they are relevant to the labour market. The latter characteristic indicates that engagement between higher education institutions and employers is crucial to ensuring that micro-credentials are valuable in the labour market.

Currently, employers seem to be somewhat left out of discussions relating to the design of a European approach to micro-credentials. The European Commission, national governments and other key stakeholders should look for ways to bring in employers' perspectives – for instance, by organising discussions with the key employers' associations

such as EUROCHAMBRES, SMEunited and Business Europe, asking the opinion of the European Economic and Social Committee, and potentially supporting Erasmus+ projects that bringing together higher education institutions and employers.

Annex: List of notable practices relating to micro-credentials

Title	Short description
Micro-credentials at IBM	IBM offers a range of open badges to the public (and a few restricted to employees only) in knowledge, skill and proficiency, and promotes its programme as a way for professionals to display and share their accomplishments. IBM has a partnership with Northeastern University whereby certain IBM badges can contribute towards professional Master's degree programmes. In addition, IBM relies on 'new collar' skills development at community colleges, boot camps, apprenticeships and other internal training programs for about 15 per cent of its 'new hires'.
Micro-credentials at Google	Google provides an online certificate in IT support jobs intended for jobseekers at entry-level and middle-skill jobs, available through Coursera. It can be completed in eight months, but students can move at their own speed. As of June 2018, 40,000 learners had enrolled and 1,200 had completed. Traditional providers such as Duke University are preparing to offer credit for the course. Google has brought together a consortium of more than 20 employers (including Bank of America, Walmart, Sprint, GE Digital and PNC Bank) who are interested in hiring those who have completed its certificate.
Micro-credentials at Ernst & Young	EY has an in-house training program designed to provide on-demand education at a lower cost. The EY Badge system enables staff to earn badges in areas such as data visualisation, design thinking and cyber security.
A global decentralised blockchain-based platform – EduCTX	The EduCTX platform is based on a globally distributed P2P network. It processes, manages and monitors ECTX tokens and transactions representing trusted and transparent evidence of individuals' acquired skills and knowledge in the form of digital micro-credentials. Like the European Credit Transfer and Accumulation System (ECTS), ECTX tokens represent the credits acquired by the individual in the form of digital micro certificates for completed learning units (courses, diplomas, certificates, etc.). Each individual has their own EduCTX address, at which they collect tokens assigned to them by an institution in return for completed learning units. All EduCTX users have access to a decentralised web application that provides an overview of tokens the user has received. All EduCTX stakeholders (institutions) also have their own unique address and the ability to use the platform's decentralised application to manage (transfer) tokens in a simple and secure way. Once a learning unit has been completed, the institution transfers an appropriate number of tokens to the address of the individual's wallet. The data is stored on the EduCTX blockchain network and includes data about a known sender (an institution with an official name and address) and an anonymous individual receiver (a public, but anonymous address). Due to the dynamic nature of the certificates, the transaction structure has been extended to enable an external link to be included, which stores more detailed information about the learning unit and/or certificate. Each institution has the option of adding certificate information, while at the same time it assumes responsibility for maintaining and enabling access to this information on its servers. In this way, the ecosystem remains a platform for the secure, trusted and efficient distribution of digital micro certificates, while ensuring objectivity in a distributed system comprising different organisations, each with their own requirements and specifications for particular

	learning units. An individual can demonstrate skills and knowledge they have acquired in the form of digital micro-credentials using their anonymous address and the private key associated with this address, without administrative or language barriers. In addition, the platform prevents an individual from transferring the ECTX tokens they have acquired to other addresses. This can only be done by authorised institutions and organisations that have the right to award tokens. To demonstrate their acquired skills, an individual can use their private key, which corresponds to the public address at which the assigned ECTX tokens are stored. Since an individual user's private key is known only to them, they alone can prove ownership of a specific public address. In this way, an individual can provide their public EduCTX address to a potential employer in order to verify their knowledge and skills. The employer can easily obtain additional information relating to this address (the ECTX tokens acquired). To verify that the individual matches the address, they must sign their message using their personal private key. If it matches, the employer can be sure that the ECTX tokens at a given anonymous address belong to the person concerned. The verification process itself will be semiautomated via user-friendly web interfaces. The first prototype of the EduCTX platform was implemented using the ARK blockchain platform. A newer prototype is based on the Ethereum blockchain platform, and uses smart contracts
The Digital Credentials Initiative	The Digital Credentials Initiative started in April 2019 with a mission to create a trusted, distributed and shared infrastructure that would become the standard for issuing, storing, displaying, and verifying academic credentials, digitally. It is coordinated by MIT (USA) and involves Delft University of Technology (Netherlands), Hasso Plattner Institute at the University of Potsdam (Germany) as well as the Technical University of Munich (Germany) from Europe. Other partners indude Tecnológico de Monterrey (Mexico), Harvard University Division of Continuing Education (USA), University of California, Berkeley (USA), University of California, Irvine (USA), Tecnológico de Monterrey in Mexico, and the University of Toronto (Canada). The initiative aims to create a central platform for the storage of students' achievement records, which will continue even after a student has graduated, based on the latest advances in public key infrastructures, public ledgers and blockchains. For learners, the technology will allow them to: ▪ Maintain a compelling and verifiable record of their lifelong learning achievements to share with employers. ▪ Receive their credentials digitally and safely. ▪ Own all of their credentials forever, without having to ask/pay their institution for a transcript ever again. ▪ Compile and curate the credentials they receive from multiple institutions. For institutions, digital verifiable credentials enable them to: ▪ Keep and distribute learner records in a way that is easy, safe and inexpensive. ▪ Remove the risk of identity fraud.

	▪ Issue multiple credentials to a single learner easily, using the same streamlined process.
Application of DigComp at Anglia Ruskin University	Anglia Ruskin University (UK) has applied the EU's DigComp framework to its staff development and to embed digital literacies within the curriculum. Its Digital Literacy Barometer includes competency statements about a spectrum of digital capabilities aligned to DigComp. Using a quiz format, individuals receive a score for their overall self-reported competency, as well as for each of the five literacies within the framework. Staff are able to use the results to identify their existing strengths and areas for further development. The university also provides a range of staff development activities aligned with the framework, including bite-sized training, following completion of which participants receive digital badges. The embedding of digital competencies into the curriculum was also piloted in one faculty. Digital badges were developed for each digital literacy domain and proficiency level. As part of a review process, course curricula were examined and subsequently mapped to identify opportunities to deliver the elements of the ARU digital literacy framework. A variety of stakeholders representing academics, professional services and students were engaged in the development of the framework (Rampelt, Orr and Knoth, 2019).
Awarding badges at Texas Wesleyan University	Texas Wesleyan University's Center for Excellence in Teaching and Learning awards badges for participation in faculty development programmes to recognise soft and technical skill development. A system of badges was developed to better acknowledge, challenge and reward faculty and staff who engage in professional development activities. Most of these badges have three distinct levels, and progression from one level to another is an example of a participant's learning path. Level 1 is earned by attending any professional development activities. These activities can be CETL workshops, individual consultations with CETL staff, or even opportunities from other sources such as a professional conference or webinar. Progression to Level 2 is achieved by completing a challenge. Participants choose the challenge they wish to complete (e.g. using personalised learning, learner-centred teaching, competency-based education strategies) at their own pace. The completion of the self-assigned challenges become evidence of the participant's learning. Level 3 is earned by sharing the knowledge the learner has gained with the professional community. Participants wishing to achieve this level (thereby becoming "trailblazer" for the topic) are encouraged to share their experiences of learning about a topic (or tool) and the results of applying that knowledge in their professional lives/teaching via the CETL blog, a workshop, or any other formal/informal research and publication avenues.
Common Micro-credential Framework (CMF)	European MOOC platforms launched a micro-credential framework that fits into the European Qualification Framework for Lifelong Learning, and which combines learning outcomes in higher education and in professional training. The Common Micro-credential Framework indicates the scale of a MOOC programme in terms of workload (the Standard entails 4-6 ECTS credits / 100-150 hours of study time) and level (Levels 6 and 7 in the EFQ represent Bachelor's and Master's levels).
New Zealand Qualification Framework	The New Zealand Qualifications Authority has introduced a micro-credential system as part of New Zealand's regulated education and training system. The service, provided by the New Zealand Qualifications Authority, allows for short courses to receive between five and 40 credit points on the country's qualifications framework, as it looks to prepare education and training for the future of work. As part of the platform, a service will be available to those outside the education space to have their skills and training programmes receive equivalence statements. This will enable both in-house professional development

	at large corporations and MOOCs to carry NZQA recognition. NZQA will issue equivalence statements showing credit value and will set up a service to evaluate micro-credentials from international and non-tertiary New Zealand institutions.
Micro-credentials at Deakin University	Deakin University offers Professional Practice Credentials as a standalone credentials that are aligned with the Australian Qualifications Framework (AQF) and professional or industry accreditation frameworks, and thus warrant the achievement of key employability outcomes. To attain these credentials, experienced professionals can bypass taught courses in areas in which they already have expertise, and present concise qualitative evidence – including video testimony – for personalised assessment via Deakin University's digital platform. These credentials have proven attractive to companies looking for bespoke assessment and recognition of critical workplace capabilities, and many of these credentials are awarded on a standalone basis to warrant workplace outcomes. All of the Professional Practice Credentials bear the insignia of the Deakin University, are assessed by academic and industry leaders, and must be based on evidence of achievement, rather than participation. The management of all Deakin Professional Practice Credentials is through the university's separate commercial entity, DeakinCo. While most of its credential candidates currently come from corporate cohorts, the university plans to increase engagement with individual candidates, particularly their own students. For example, the university envisages that some students may be interested in earning a standalone credential in, say, Innovation, Communication or Teamwork in addition to completing their traditional Bachelor's or Master's degree, as a way to differentiate themselves and stand out to employers.
EdX MicroMasters system developed for university partners	MicroMasters covering a wide range of topics such as supply chain management or artificial intelligence can either be taken on their own, or count towards a full Master's at universities such as MIT. A MicroMasters programme credential is a professional and academic credential for online learners based anywhere in the world. This credential is valuable in and of itself. In addition, credential-holders can then apply for an accelerated, on-campus Master's degree programme at MIT or other universities. All holders of MicroMasters programme credentials are also considered affiliates of the MIT Alumni Association. MicroMasters programme courses offer the same learning and challenge as MIT courses.
Open badges platform Bestr, operated by Cineca in Italy	Cineca is a non-profit consortium made up of 70 Italian universities, eight Italian research institutes and the Italian Ministry of Education. The project's managers collaborate with universities across Italy to develop badges as proof of competence for academic achievement. The universities use them to strengthen the commitment of their students, especially for those courses that are not compulsory, such as those on social and communication skills development and Sustainable Development Goals. Badges can now be stored on a blockchain.
The MicroHE project	The MicroHE project aims to provide the most comprehensive policy analysis yet conducted of the impact of modularisation, unbundling and micro-credentialling in European Higher Education. Micro HE project's activities are: ▪ Gathering the state of the art in micro-credentialling in European Higher Education today by organising the first European survey on micro-credentials in HE, surveying at least 70 institutions across the continent, with the aim of understanding the current level of provision, the types of micro-credentials offered, and future trends in provision of micro-credentials.

	▪ Forecasting the impacts on HE institutions of the continued modularisation of higher education by using forward-scanning techniques, specifically through the use of the DELPHI methodology. ▪ Examining the adequacy of European recognition instruments for micro-credentials, in particular ECTS, the Diploma Supplement and qualification frameworks. ▪ Proposing a 'credit supplement' to provide detailed information about micro-credentials in a way that is compatible with ECTS, the diploma supplement and qualifications frameworks. ▪ Proposing a meta-data standard and developing an online clearing house to facilitate the recognition, transfer and portability of micro-credentials in Europe. While maintaining the European tradition of high-quality education and high levels of student-protection, provided through systems of accreditation and quality assurance, the project aims to: ▪ Promote increased choice for students and lifelong learners by increasing the range of education opportunities offered to them. ▪ Equip universities to adequately adapt to the changes brought about by the modularisation of education. ▪ Improve the recognition and transfer of learning between different educational organisations as well as in the world of work, including transnationally.
The project DIGI-HE	The DIGI-HE project aims to create a self-reflection tool that will support European higher education institutions in developing and enhancing their strategic approaches to digitalisation. Such a tool exists already for schools (SELFIE), but not for higher education, at least not at European level. The project targets different types of institutions (universities and colleges) at different levels of maturity in their digital developments. DIGI-HE is led by EUA and a diverse consortium that consists of European higher education institutions and organisations actively involved in the development of digital learning across Europe. DIGI-HE's activities are: ▪ Gathering data on the strategic development of digitalisation in higher education institutions through a survey of higher education institutions. ▪ Developing a self-assessment tool and supporting institutions in the development of strategic approaches to digitalisation. ▪ Building a community of practice by fostering inter-institutional exchange of good practices.

Micro-credentialling programmes at Wayne State University	In 2014, Wayne State University (WSU) Graduate School undertook a project to understand the career pathways and trajectories of its 15-year doctoral alumni. The project involved approximately 3,000 alumni from about 75 programmes across all disciplines. From these data it learned that, mirroring national trends, WSU doctoral alumni were pursuing careers in academia as well as in for-profit organisations (such as in biotechnology), government, and not-for-profit organisations. From surveys and conversations with its alumni, their employers, and faculty, WSU understood the need to provide enhanced career development programming that would help its alumni succeed in their various careers. As a first step, WSU identified a set of five competencies that are essential for doctoral and postdoctoral training. These competencies are based on those defined by the National Postdoctoral Association (NPA) and the Council of Graduate Schools, and aligned with WSU's mission. These five competencies include Communication, Leadership and Professionalism, Teamwork and Collaboration, Research and Professional Ethics, and Career Development. With input from alumni, employers, faculty and current students, WSU created a series of interactive seminars to address each competency. A number of skillsets and learning outcomes were defined within each competency. Each interactive seminar is one to two hours in length and is led by faculty experts in the domain. In line with best assessment practices, each seminar includes three to five learning outcomes that students can expect to achieve by attending the seminar. Presenters are coached to provide opportunities for active learning during the seminar, including think-pair-share exercises, reflective writing, and other high-impact pedagogical practices. In addition, presenters are provided with guidelines for the assessment of the learning outcomes to ensure that evidence of skills mastery is adequately assessed. Upon completion of a seminar, students complete an exercise to demonstrate their mastery of the subject. The work is then evaluated by faculty or industry experts. Students who meet the learning objectives are awarded the micro-credential in that domain. This micro-credential can then be shared on social media platforms such as LinkedIn, or on personal or professional websites. Wayne State is the official issuer of the badge, which adds credibility and validity to the micro-credential. Since the badges are awarded for the fulfilment of specific learning objectives, employers can be confident in that student's mastery of that particular skillset. These credentials do not appear on official Wayne State transcripts. However, an authorised credentialling system licensed by Credly.com is in place to certify mastery of each skill that a student chooses to acquire. It also enables staff and faculty to track student participation by competency, to determine which skills are viewed as most important for students preparing to enter the workforce.
OpenupEd Quality Label	OpenupEd aims to be a distinctive quality brand embracing a wide diversity of (institutional) approaches to opening up education via the use of MOOCs. As a consequence, OpenupEd partners agreed to develop a quality label for MOOCs tailored to both e-learning and open education. This label was published in January 2014. The institutional benchmarking associated with the label is primarily intended to be applied as an improvement tool, enabling institutional performance to be compared against current best practice and leading where necessary to measures to raise the quality of the institution's MOOCs and their operation. The process is designed to complement an institution's course approval process, as well as the ongoing evaluation and monitoring of courses in presentation. The overall quality process for OpenupEd MOOCs is as follows: ▪ OpenupEd partners will be higher education institutions that meet national requirements for quality assurance and accreditation.

	▪ Higher education institutions should have an internal QA system in place to approve a MOOC. ▪ Higher education institutions obtain the OpenupEd MOOC label at entry through a self-assessment and review process that considers benchmarks both at institutional and course level (for two courses initially). ▪ Higher education institutions should endorse the OpenupEd eight features for MOOCs (below). All MOOCs must comply with the features 'openness to learners' and 'digital openness'. ▪ The OpenupEd MOOC label must be renewed periodically. Between institutional reviews, additional MOOCs will be reviewed at course level only. ▪ The institution evaluates and monitors its MOOCs in presentation. ▪ The overall quality process is intended to encourage the enhancement of quality through self-assessment and review. ▪ The OpenupEd MOOC benchmarks are themselves provisional and open to revision. To ensure that OpenupEd courses meet this mission, courses should show eight common features: ▪ Openness to learners (e.g. open entry, freedom to study at the time, place and pace of the learner's choice, flexible pathways, suitability for a wide variety of lifelong learners). ▪ Digital openness (courses should be available online for free, but should in addition apply open licensing so that material and data can be reused, remixed, reworked and redistributed). ▪ Learner-centred approach (courses should help students to construct their own learning). ▪ Independent learning (courses should provide high-quality materials to enable an independent learner to progress through self-study). ▪ Media-supported interaction (course materials should make the best use of online affordances to engage students with their learning). ▪ Recognition options (successful curse completion should be recognised as indicating worthwhile educational achievement). ▪ Quality focus (there should be consistent focus on quality in the production and presentation of courses). ▪ Spectrum of diversity (courses should be inclusive and accessible to a wide variety of citizens).

Credential Transparency Description Language (CTDL)	The Credential Transparency Description Language (CTDL) is a schema (a type of mini-language that people and systems can use to understand each other even if their data comes from different sources) that anyone can use to share information about credentialling data. It provides a common, unified, consistent and transparent vocabulary for describing credentials (including diplomas, badges, certificates, certifications, licences and degrees of all types and levels). The CTDL not only provides a common and unified way of describing information in the Credential Registry; it also is an open language that can be used on the web. This powerful feature makes it dramatically easier for students, businesses, researchers, and automated systems to discover, understand and compare information about credentials from a variety of sources. Like a dictionary, the CTDL consists of nouns (classes) and verbs (properties) that allows it to make simple statements, which, in aggregate, enable the rich description of credential-related resources including credentialling organisations and specific subclasses of credentials such as degrees, certificates, certifications and digital badges. Credentials are related (linked) to other entities in the credentialling ecosystem such as assessments, learning opportunities, requirements, costs and conceptual frameworks (e.g. competencies, classifications of occupations and instructional programs). It will also support labour market outcomes, education and career pathways, and employer preferences. The CTDL is managed by Credential Engine through policies to ensure its long-term persistence. It is expanded and maintained through the guidance and consensus of five voluntary advisory committees (Technical, Quality Assurance, Higher Education, Certification and Licensure, and Business), each consisting of experts and practitioners in their fields. The CTDL is openly available for anyone to use through a Creative Commons Attribution 4.0 International Licence. Credential Engine reflects the 2013 Open Data Policy to provide data in open, machine-readable formats.
OpenClassrooms	OpenClassrooms is an online platform offering top-quality education-to-employment programmes and career coaching services to students worldwide. Unlike other online learning platforms, OpenClassrooms Career Paths include weekly, one-on-one mentorship sessions with a dedicated professional in each field, supporting learners through their studies. The curriculum is specifically based around the competencies that learners need to thrive on the job. OpenClassrooms programmes are project-driven. There are no tests or studying for exams. Instead, experiential learning is used as the fastest way to become operational. All courses are self-paced to fit into learners' schedules.
Digital Promise	Digital Promise, also known as the National Center for Research in Advanced Information and Digital Technologies, is a non-profit organisation originated by the U.S. Congress as part of the 2008 re-authorisation of the Higher Education Opportunity Act. Its mission is to spur innovation in education to improve the opportunity to learn for all Americans. It offers micro-credentials of its own, but it also provides a platform for other entities to offer their own sets of micro-credentials. Over 35 other organisations offer micro-credentials through Digital Promise.

European Short Learning Programmes (E-SLP) project	E-SLP is an Erasmus+ project focusing on short learning programmes (SLPs) or short degree programmes for continuous professional development and lifelong learning at a European level. Its results should include reports on the status quo and positioning within the European higher education system, quality and recognition, guidelines, an online portal with SLP offerings, as well as policy recommendations. The consortium defined SLP according to the following characteristics: ▪ European Qualification Framework (EQF) Levels 4 to 8 (foundation to doctoral level). ▪ Study time between 5 to 60 ECTS. ▪ Relation to and recognition as part of formal degrees required (building blocks). ▪ Online and blended format. ▪ Target groups of non-traditional learners and adult learners (work and study). ▪ Society- and market-driven.
OpenCreds	OpenLearning has introduced OpenCreds, a lifelong learning framework designed to meet the needs of the Australian education sector, industry, and most importantly its lifelong learners. OpenCreds is an extension of OpenLearning, an Australian company and lifelong learning platform that exists to increase access to higher-quality education. In keeping with the agreed definitions from the Australian Qualifications Framework (AQF) Review, an OpenCred is a certification of assessed learning that is additional, alternative, complementary to or a component part of a formal qualification. Each OpenCred centres around: ▪ Hours of learning: a common measure used by education providers (and regulatory bodies) to establish the average amount of time required for a new learner with little or no experience to develop the required competency or expected learning outcomes. ▪ Evidence of learning: a consistent set of expectations to show that the learning produces the development of knowledge, skills and competency in a particular area. OpenCreds must include: ▪ Learning outcomes tailored to the target audience, hours of learning, and AQF level if they are designed to align with it or be credit-bearing. ▪ Produce at least one artefact of learning that is unique to the learner and which demonstrates the application of the skills and knowledge acquired during the learning. ▪ A summative assessment if the OpenCred is classified as credit-bearing.

	Depending on the course design process, it is acknowledged that the artefact of learning and summative assessment may be the same. OpenCreds may be standalone credentials or they may interact with a formal qualification. An OpenCred that interacts with a formal qualification may be: a) An AQF-aligned OpenCred: aligned to a formal qualification level to provide learners and employers with a clear understanding of their level of achievement. b) An admission OpenCred: successful completion leads to an offer of admission to a formal qualification. c) A credit-bearing OpenCred: successful completion earns a credit for learning which is a pathway into a qualification, or component part of the body of a course that leads to a qualification. d) An industry-recognised OpenCred: recognised by an industry association or accrediting body as meeting the needs of contributing to maintenance of continuing professional development requirements. OpenCreds have been developed with the awareness that while they sit outside the AQF, that it would do the learner and education providers themselves a disservice not to factor in levels, types, policies and regulatory frameworks. By taking this approach, OpenCreds empower accredited education providers with: ▪ Greater flexibility to meet learner/industry needs while still meeting their regulatory requirements. ▪ The ability to diversify their revenue streams and reach new markets. ▪ An assessable framework that produces verifiable evidence of learning. The OpenCreds framework was formulated to enable alignment with a range of education spheres: ▪ Vocational education and training. ▪ Higher education. ▪ Providers of continuing professional development. ▪ Professional learning providers. ▪ Industry.
Digitary CORE Platform	Digitary are experts in digital credentials, and a leading online platform for certifying, sharing and verifying credentials. The platform was launched in Ireland in 2005 and is currently used by many respected higher education providers in 135 countries to eliminate credential fraud, improve service levels and increase efficiencies. Digitary is a learner-centric platform that enables learners to access their verified achievements 24/7 and to share them with others securely, quickly and easily. Digitary enables

	the instant verification of records with full learner consent, maintaining regulatory compliance and eliminating the hassle of manual verification. In 2007, the Irish Institutes of Technology (IoTs) chose Digitary's Classic platform to implement their digital European Diploma Supplement (EDS) across all 14 IoTs. In 2016, Digitary was again chosen to implement a cloud-based digital credentialling system, this time using Digitary's CORE platform, which extends to a wide variety of documents including transcripts, EDS and grade mailers. Digitary Certified Online Record Exchange (CORE) is a secure cloud platform that helps learners around the world access and share their digitally signed academic documents online with employers, education providers, governments and other third parties. With Digitary CORE: ▪ Education providers can reduce credential fraud by using secure digital technologies. ▪ Education providers can reduce costs and streamline processes by enabling self-service for learners and employers. ▪ Learners can access their digitally certified academic records online. ▪ Learners can securely share their records with third parties, quickly and easily. ▪ Employers and others can quickly and easily verify learners' academic records.
Quality Matters Label	Quality Matters is a global non-profit organisation working on quality assurance in online and innovative digital teaching and learning environments. The main goal of Quality Matters is to promote and improve the quality of online education and student learning nationally and internationally, through: ▪ The development of current, research-supported and practice-based quality standards and appropriate evaluation tools and procedures. ▪ Recognition of expertise in online education quality assurance and evaluation. ▪ Fostering a culture of continuous improvement by integrating QM Standards and processes into organisational plans to improve the quality of online education. ▪ Providing professional development in the use of rubrics, tools and practices to improve the quality of online education. ▪ Peer review and certification of quality in online education. Quality Matters provides services based on the quality assurance goals of the institutions in the areas of: ▪ Improving course design (episodic or custom application of criteria). ▪ Creating professional development opportunities.

- Demonstrating quality assurance processes.
- Continuously improving quality assurance processes (going beyond quality thresholds).
- Benchmarking (comparing and connecting across institutions).
- Driving institutional change (sustaining high quality).

Quality Matters has created a number of different rubrics and standards. The General Standards and Specific Review Standards in each rubric are intended to guide higher education institutions through the development, evaluation and improvement of their online and blended courses. Achieving a level of 85% or more in relation to these quality expectations is key to certifying the quality of the courses.

The Higher Ed Course Design rubric is a set of eight General Standards (e.g. learning objectives, assessment and measurement, learning activities, accessibility and usability) and 42 Specific Review Standards used to evaluate the design of online and blended courses. The rubric has a scoring system used by the review team to determine whether a course meets the standards. Essential Standards (3-point Specific Review Standards) must be met during the review, and an overall score of 85% of the maximum possible points is required for a course to attain QM certification.

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