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European Commission

A European Maturity Model for Micro-credentials in Higher Education

Whitepapers and Guidelines for a Strategy Workshop

Developed by the micro-credentials squad of the European Digital Education Hub

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Executive Summary

The European Maturity Model for Micro-credentials has been developed by the European Digital Education Hub's (EDEH) micro-credentials squad to support senior managers within European higher education institutions (HEIs) or vocational education and training (VET) organisations in their endeavours implementing the EU Council Recommendation on Micro-credentials.

One of the objectives of the EDEH is to help overcome the current fragmentation of digital education policy, research, and implementation practices at the European level. Sharing best practices, peer learning and cross-sector collaboration supports the agile development of digital education policies and practices. User-driven innovation in the EDEH paves the way for a more sustainable, resilient, and inclusive future for education and training in the EU.

The Maturity Model for Micro-credentials consists of three whitepapers reviewing the latest academic insights on new business developments and marketing, technology, and data and quality assurance (QA).

The final part of this document outlines the format of a strategy workshop that may be organised in rectors' offices in order to facilitate a multidisciplinary discussion that will scaffold an implementation strategy. Even though this publication is primarily targeted towards HEIs, we feel that it is applicable in the VET sector as well.

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Introduction

The Recommendation on a European approach to micro-credentials for lifelong learning and employability was adopted by the Council of the European Union (EU) on 16 June 2022. It aims to facilitate the development, implementation and recognition of micro-credentials within and across institutions, industries and countries. Micro-credentials serve as verification for the achievements of short educational activities, such as short courses or training sessions. They provide a flexible and focused approach to assist individuals in acquiring the necessary knowledge, skills, and competences for their development, both personal and professional.

Across the EU and globally, there is a swift expansion in the development of micro-credentials and other short educational programmes and qualifications. A broad spectrum of public and private entities offer these options, catering to the need for more adaptable, learner-focused education and training. They also aim to extend educational and training opportunities to a broader audience, encompassing disadvantaged or vulnerable groups. Nonetheless, without the establishment of common standards that guarantee their quality, transparency, cross-national comparability, acknowledgment and transferability, micro-credentials may not achieve their utmost potential.[1]

The big question is, of course, what can European HEIs do today to give substance to the above-mentioned recommendation?

This European Maturity Model for Micro-credentials contains three literature reviews to support HEIs to get up to speed on the topics of new business models, technology and QA. Furthermore, a management workshop has been designed to support the key strategic players within HEIs to have a meaningful conversation about the current status of their implementation and to provide ingredients for a strategy that will support further implementation of the Council Recommendation.

[1] A European approach to micro-credentials, https://education.ec.europa.eu/education-levels/higher-education/micro-credentials.

PART 1

New business models and marketing

Business models and scenarios for micro-credentials in higher education

Key Takeaways:

1. Micro-credentials can be implemented in diverse ways within institutions and it is difficult to indicate which business models best fit a particular institution. Many underlying factors play a role and the chosen business model(s) have an impact on the internal organisational structures of the institution.
2. Many HEIs are actively engaged in discussions about how to implement micro-credentials into their existing credential ecosystem. Making micro-credentials available to any kind of learner should become part of the DNA of any HEI.
3. Cross-border and cross-discipline implementation of micro-credentials might not be easy, but the joint reflections and efforts of multiple universities resulted in "out-of-the-box" thinking and innovative implementation scenarios for micro-credentials.

While micro-credentials are increasingly used by HEIs to offer accreditation for short-term learning offers and one could state that "micro-credentials look to become an established feature of the credential ecology, both nationally and internationally" (Brown, M. et al, 2021a, p. 248), only a minority of HEIs have developed a strategic and business case on how to implement these micro-credentials. Making micro-credentials available to any kind of learner is and should become part of the DNA of any HEI. The learner should be at the centre of any thinking and business scenarios. Being truly learner centred is not just conceptual but touches to all practices in the educational model of an HEI.

Micro-credentials can have multiple uses from re- and upskilling to personal development opportunities and "there is no simple blueprint to the development and successful execution of a micro-credential strategy" (Brown M. et al, 2023, p. 15). Overall, there is a lack of knowledge and common understanding that "has been recognised as a central challenge to the coherent implementation of micro-credentials across higher education systems" (OECD, 2021, p. 5) and "more holistic and institution-wide approaches are needed to fully transform HEIs into LLL [lifelong learning] institutions" (OECD, 2023, p. 9).

Outside the EU, a wealth of publications demonstrates an increasing interest in these new types of credentials "that are skills- or competency-based, align with industry requirements, employer, community and/or Indigenous community needs and can be assessed and recognized for employment or learning purposes" (Micro-credential Framework for B.C.'s Public Post-secondary Education System, 2021, p. 6). Many HEIs are actively engaged in discussions about how to implement micro-credentials into their existing credential ecosystem (see for an extensive overview Lang, 2023). For example, British Columbia is using short programmes as on-ramps to more learning, preparing undergraduates for the world of work by giving them skills that are recognised and sought by employers, and updating the knowledge and skillset of alumni in response to their changing work environment.

Example from the United States

An interesting example is the development of micro-credentials at the US State University of New York (SUNY) which is also supporting national efforts that recognise high-quality micro-credentials. As a single university spread across 64 campuses, SUNY offers nearly 400 micro-credentials in over 60 disciplinary areas. SUNY campuses are very diverse including community colleges, technology colleges, comprehensive colleges, and doctoral degree-granting institutions (www.suny.edu/microcredentials). The policy of SUNY is that a local university-based micro-credential programme can customise offerings to meet specific needs. SUNY micro-credentials are taught by a SUNY faculty and are of such quality that students can earn academic credit; two rare factors in the US. Furthermore, the connection and involvement of the local communities and stakeholders are crucial. Micro-credentials offerings open up SUNY to new types of potential students, are complementary to their regular students and are therefore named SUNY for All.

SUNY's business model is based on the work of a university-wide task force which brings all stakeholders together in collaboratively developing the practices and procedures that will guide each local programme. This collaboration is essential. Micro-credentials are developed with business, community and P-12[2] partners, as well as informed by market and industry standards. While businesses initially seek specific short-term training, they react positively to training that puts employees on a pathway to a certificate or a degree and they systematically list SUNY micro-credentials as part of their employee benefits programmes.

[2] Public school education system in the United States.

Examples from the EU

Since the publication of the Council Recommendation in 2022, the increased interest in micro-credentials is reflected in an increase in micro-credential focused publications and discussions. National and regional authorities, as well as individual institutions in HE and higher VET, are investigating if these micro-credentials could be a part of and/or a complement to their traditional degree offerings. Questioning the 'how' and 'when' to implement micro-credentials has been less of a subject of actual discussion. A small number of EU researchers, for example Mark Brown and his colleagues Rory McGreal and Mitchell Peters[3] , have studied the variety of business models for micro-credentials, their strengths and weaknesses and which business model fits best (Brown M., et al., 2023). They outline several overall business models for higher education-based micro-credential initiatives (based on Presant, 2020): Sole Institution - the initiative has begun as or evolved to be institution-wide; Institutions Business unit; Peer Consortium - a group of peer institutions with distributed or rotating leadership; Industry Led - a large employer or sector body or key domain-specific skill provider (e.g. technology platform); NGO Led - a centralised leader of grouped individual institutions; and the MOOC led initiatives (Brown M et al., 2023). Regarding the latter, one can refer to the European MOOC Consortium (eadtu.eu) consisting of the European MOOC platforms Futurelearn, FUN, MiriadaX, EduOpen and OpenupEd representing most of the MOOC development work in Europe.

	SOLE INSTITUTION	INSTITUTIONAL BUSINESS UNIT	PEER CONSORTIUM	INDUSTRY LED OR PARTNERSHIP	PROF. BODY LED OR PARTNERSHIP	NGO LED OR PARTNERSHIP	MOOC LED	OPX LED
Description	College or university-wide	Commercial unit or Subsidiary	Strategic alliance	Major company or organisation	Discipline or sector body or association	Independent organisation or charitable trust	MOOC platform	Commercial supplier or partner
Example	PowerEd	Mentem	ECIU University	Skillnet Ireland	British Mental Health Foundation	Institute of Health Economics	Coursera, EdX, FutureLearn	FourthRev
Effort	MED	MED	High	MED	MED	MED	LOW	LOW
Horizon	H1	H2/H3	H2/H3	H1/H2	H1	H1	H2	H2/H3
Risk	LOW	MED	MED	LOW	LOW	LOW	LOW	MED
Autonomy	HIGH	HIGH	MED	MED	MED	MED	MED	LOW
Speed to Market	MED	HIGH	LOW	MED	MED	MED	HIGH	HIGH
Costs	MED	MED	MED	LOW	LOW	LOW	MED	MED
Impact/Benefits	LOW/MED	MED/High	MED/HIGH	MED	MED	MED	LOW/MED	MED/HIGH
Return on Investment	LOW/MED	MED/High	MED	MED	MED	MED	LOW/MED	MED/HIGH
Strengths	Centralised approach with high autonomy over brand, product suite and design and development model	Potential for fast, flexible and "agile" response to changing market needs and opportunities	Bigger footprint, safety in numbers, with shared values and goals driving a vibrant community of practice	Packaged, tested solution with proven brand recognition and cohorts of students	More agility due to one decision-maker and leverages existing community of practice	More agility due to working with just one partner and potential for external funding	Proven online platform and existing market of learners around the globe	Strong industry connections and business model for course development
Weaknesses	Constrained by traditional institutional structures, core business model and organisational culture	Disconnection with faculties, weaker research/teaching nexus and potential for mission creep	Governance can be cumbersome and hard to sustain over time without external funding	Loss of autonomy and potential conflicting goals with more of a vocational focus	Loss of autonomy and potentially reputation if you fail to deliver	Loss of autonomy and need signoff for each step of the process	Loss of brand recognition and limited system integration	Loss of autonomy and high percentage of revenue is shared with partner

Figure 1: Summary matrix of micro-credential business model;
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[3] Brown, M, McGreal, R and Peters, M. 2023. A Strategic Institutional Response to Micro-Credentials: Key Questions for Educational Leaders. Journal of Interactive Media in Education, 2023(1): 7, pp. 1–17. DOI: https://doi. org/10.5334/jime.801.

The Sole Institution model is the most discussed in literature (72% of publications report this business model according to Brown M; et al. (2021)) but other business models from some European Universities alliances show how a consortium or alliance of diverse HEIs can accelerate micro-credential development. Crossing national borders and/or disciplines does not make effective implementation of micro-credentials easier, but the joint reflections and efforts of multiple universities resulted in "out-of-the-box" thinking and innovative implementation scenarios for micro-credentials.

European University alliances

Several of the European University alliances[4] such as ECIU, ATHENA and EUTOPIA have a learner-centred model with engagement of all stakeholders at their core and already provide micro-credentials. For example, by offering micro-credentials the EUTOPIA Connected Community of Teacher Education opens opportunities for adults with experiences in other sectors to gain through flexible learning pathways (FLP) the necessary teacher competences. ECIU takes it one step further by developing FLP at a single unique university for some specialised courses. The ECIU alliance is not an entity composed of multiple study programmes, but a unique structure where learners are not locked into learning at specific institutions or in one mostly predefined study programme. This is accomplished by an infrastructure that enables FLP by offering the learners a choice of micro-modules from ECIU member universities. The FLP programme offers the opportunity for advanced study in natural, technological, social sciences and humanities. Learners can create a personalised learning path through the selection of challenges, micro-modules, vertical or horizontal learning, individual development plan, and knowledge building. Learners can study micro-modules as standalone elements or can combine them with other micro-modules. They can build more robust competences or stack them to a certificate or a full degree. At the core of the FLP model is the blockchain-secured digital passport for learning records. It allows learners to get credentials from multiple ECIU University institutions in recognition of their learning. In October 2023, ECIU rolled out as first one in the EU a centralised, e-sealed micro-credential using the EDC (European Digital Credentials) platform so that learners can carry their learning data anywhere they go, accessing it at any time and fully owning it.

[4] EU initiative to establish alliances between HEIs for enhanced cooperation, international competetiveness and mobility.

Collaboration between diverse stakeholders in a specialised domain such as the co-construction of micro-credentials with business and government agencies leads to interesting pathways of implementation of micro-credentials. In 2022, the University of New South Wales launched 'Mentem' to work directly with business and government agencies to develop 'contextualized learning' for 500,000 employees by 2030. The University develops for each firm or business an end-to-end training solution involving the companies' subject experts as well as the employees in the design.

National developments

Following the EU Council Recommendation on a European Approach to Micro-credentials for Lifelong Learning and Employability (2022), several EU Member States such as Ireland and the Netherlands actively started to investigate the conditions and processes of implementing micro-credentials on a national level with the active involvement of at least a majority of HEIs. For example, a recent partnership between Dublin City University (DCU) and Skillnet Ireland, a government agency dedicated to promoting workforce learning, has resulted in the development of four micro-credentials aimed at aviation managers. These can be taken individually or stacked together to achieve a graduate certificate.

Another business model is partnering with professional bodies or non-governmental organisations (NGOs), for example like the UK Open University's micro-credential on 'Embedding Mental Health in the Curriculum', offered through FutureLearn and endorsed by the British Mental Health Foundation. In Belgium, the universities of Brussels, Gent and Antwerp have developed a common platform Nova academy to make the public aware of their LLL offering. The micro-credentials that are developed in the Netherlands in the context of the national pilot are subject to a national quality framework based on European Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESGs) that requires all learning outcomes to be assessed against transparent standards. In the Netherlands, the size of the micro-credentials currently ranges from 3 to 30 ECTS (European Credit Transfer and Accumulation System)[5] and they can only be issued to professionals for LLL and not (yet) to degree-seeking students. These micro-credentials are registered in the SURF Edubadges platform which makes them portable and easily verifiable.

[5] EU standard for comparability of academic credits in HE based on workload.

Business models

As micro-credentials can be implemented in diverse ways within institutions, it is difficult to indicate "which business model best fits a particular institution" (Brown, M. et al,2023). Many underlying factors play a role and the chosen business model(s) have an impact on the internal organisational structures of the institution. Brown developed different internal structures for managing micro-credentials within an HEI, work that relates mostly to a Sole Institution business model (see Figure 2 from Brown M. et al, 2023, p. 10).

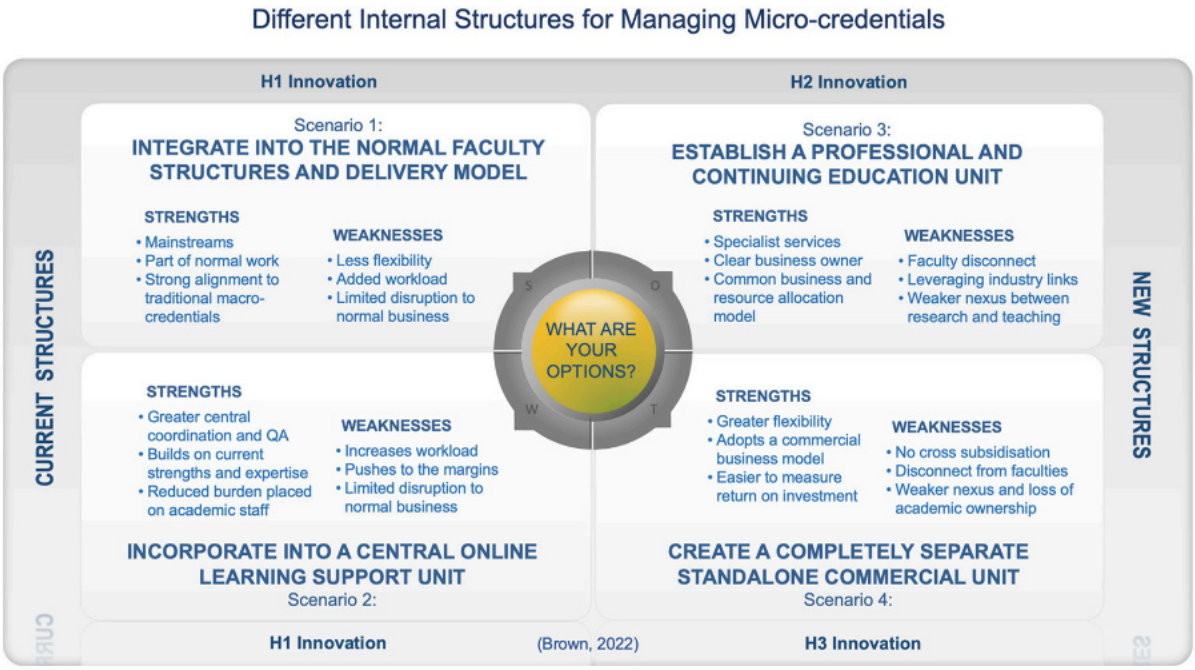

Figure 2: Example of different internal structures for managing micro-credentials;
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Both Scenario 1, whereby micro-credential design, development and delivery is incorporated in normal faculty structures and Scenario 2, whereby the responsibility lies with an existing central unit that already supports online learning, are the most common used structures in HEIs. Both models build on existing structures in the institution. UNESCO research on International Trends[6] of Lifelong Learning in Higher Education found that 53.6 % of 399 HEIs reported having a dedicated central LLL unit, with most common functions being offering education programmes and trainings (73.4%), followed by curricula development and community engagement (both 65.6%) (UNESCO, June 2023, p. 56). While enabling a smooth alignment with degree education, these structures, however, lack flexibility and opportunities for an LLL offer. While most HEIs do not make their business models nor the internal structuring public, some HEIs have provided insight in the design, development of these structures through support tools and procedures (see for example British Columbia campus micro-credential toolkit, Prud'homme-Généreux, A. (2023)).

In Scenario 3, the core model is expanded to a new Professional and Continuing Education Unit dealing with all facets of micro-credentials for all the institution's short course offerings, including both credit-bearing and non-credit bearing micro-credentials. This business model opens up the contours of an HEI improving its main capabilities to reach new learners. In Scenario 4 (e.g., Mentem), the ownership for micro-credentials is with a separate new commercial unit that operates outside of the HEI. This commercial business model is the most flexible and innovative one regarding mode, pace, and place of learning. But it lacks the close engagement of the faculties and the alignment with degree education.

While these 4 scenarios apply well to individual institutions, additional scenarios or combinations have to be considered when one looks into transnational alliances, networks or clusters of HEIs. The development of a separate stand-alone institution next to the other HEI's as in ECIU or a more bottom-up federated model whereby each HEI keeps its autonomy but works along common agreements and procedures will have different benefits and challenges. No one-size-fits-all model exists. Each institution will have to develop its own procedures based on its context and existing systems.

[6] The research report, International Trends of Lifelong Learning in Higher Education, provides a comprehensive overview of the development of LLL in the higher education sector worldwide. It examines how higher education institutions (HEIs) have contributed to LLL and shows the levels of advancement in different areas of implementation. The report is based on the results of an international survey conducted in 2020, which was led by the UNESCO Institute for Lifelong Learning (UIL) in cooperation with the International Association of Universities (IAU) and Shanghai Open University (SOU). Valid responses to the survey were submitted by 399 institutions from 96 countries in all regions of the world.

Future outlook

This section looks into the variety of approaches applied by HEIs. Employing micro-credentials within HEIs requires a transformative process and necessitates a serious reflection on the business model that fits best to the vision and strategies set out by the institution. It is therefore important that HE institution-wide approaches are continuously being analysed and monitored. Further analysis of existing practices within HEIs and in particular of networks of HEIs in the EU (including European University alliances) and beyond is urgently needed. More work is needed in building an evidence base of good practice, identifying characteristics of uptake of micro-credentials in the EU, and producing a set of relevant data that will be openly available.

Micro-credentials open up a much wider debate on the future DNA of HEIs. Should business models be widened to embed the educational model(s) envisioned? Which business models fit the future DNA of HE? How can HEIs be truly learner centred and how can they structure and organise their learning offers and recognition accordingly? Are micro-credentials the right vehicle for widening learning opportunities for all and facilitate more flexible and accessible learning pathways throughout life? We elaborate below on a few of these questions.

How can business models of HEIs embed the micro-credential strategy within an increasing networked and interconnected higher education landscape?

The European University alliance initiative has accelerated the establishment of multi-campus universities that aim to expedite international collaboration in teaching, research and community engagement among European universities. While micro-credentials initially were addressed by only a few European University alliances, today it is the rule rather than the exception. It is important that these alliances and networks support further exchange of educational models, technologies and business models to improve practices in higher education institutions; pilot innovative practices, make micro-credentials part of institutional policies and strategies, shaping regional and governmental policies, and partner with the European Commission. Micro-credentials demand for a trans-national cooperation bridging the divides between disciplines and involving all stakeholders in society that are facing a growing and changing need for competences.

Micro-credentials are not just a topic for the HE agenda. VET, LLL, continuing education and adult education are increasingly interested in using the micro-credentials potential. The impact of micro-credentials on further and continuing training in the labour market is not fully understood yet and we need to examine how micro-credentials interact with existing qualification and certification systems.

Are micro-credentials the right vehicle for stimulating more flexibility and widening access to learning pathways throughout life?

Micro-credentials are looked at as a new way for individuals to build a personalised skills-profile by collecting and 'stacking' learning efforts in a flexible way, at their own pace and according to their own priorities. This learner-centredness requires a mind shift in the institutions on all levels. The implementation of micro-credentials goes beyond the recognition of learning outcomes and is inherently connected with the underlying educational model and its organisational context. Micro-credentials can function as a vehicle to look into the transformation of the educational landscape as a whole, including validation of former learning, insight in skills demand, FLP, innovative teaching and professional guidance of staff, adjusted QA mechanisms, involvement of research and stakeholders in society, etc. Innovative educational models and business scenarios should therefore not be addressed in isolation but as dynamic and interconnected issues. As indicated by FLECSLAB[7] , the interrelations between these components are part of the DNA of each HEI and will result in different ecosystems that create the best fit between the educational offering and the profile of the non-traditional learner looking for additional skills.

How can micro-credentials support HEIs with more flexible learning pathways in a sustainable way?

The debate on micro-credentials is leading to discussions on how educational institutions can open up towards different types of learners and more specifically can enhance a LLL journey. Today, the allocation of resources to HEIs is still dominated by the number of students and their study results/ECTS in degree types of programmes (bachelor/master/PhD). How can HEIs be supported by micro-credentials' types of tools for combining their responsibilities at degree level with responding to the growing volume of higher educated learners that are facing needs for new competences in their professional and personal lives? In FLECSLAB, for instance, it is crucial to have trainers who are motivated for delivering the contents for such an approach. These trainers are key to creating an environment that efficiently manages and guides the work of both staff and students. Additionally, they play a vital role in forming partnerships that contribute to a sustainable academic offering. This is needed to reflect on the integration of micro-credentials into existing credential and accreditation systems and the funding mechanisms that are triggered by it, so that it allows for a feasible combination of old and new responsibilities of HEIs. This relates to integrating a LLL component into the DNA of the academic system and recognising that HEIs have an important role as providers of LLL.

[7] Flexible Learning Communities Supporting Lifelong Learning Across Borders (Erasmus+ project from EUTOPIA university alliance), https://flecslab.eu/.

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PART 2

Technology and data for micro-credentials

Technological requirements for micro-credentials

Key Takeaways:

1. It is advisable to consider the lifecycle of micro-credentials as well as changes required to underlying technical systems and processes to enable the successful implementation of a micro-credential strategy.
2. Aligning with the European Learning Model (ELM) allows for the comparability, transparency and portability of all data related to learning.
3. The European Digital Identity (EUDI) wallet positively impacts how citizens and businesses can digitally identify themselves when accessing public and private services throughout the EU, using their smartphone in a secure and convenient manner.

This section outlines key strategic technological considerations for micro-credentials in the context of a European educational institution. These considerations are grouped under four main headings: European developments; document lifecycle management; micro-credentials and digital badges; and future outlook.

European developments

The first of the strategic technological considerations for micro-credentials relates to important developments at a European level that will in time have a significant impact on the implementation of micro-credentials: the ELM; authenticity; and Europass services.

European Learning Model

The ELM v.3, launched by the European Commission in 2023, is a systematic standard to describe metadata about learning. The ELM is a data model for interoperability of learning opportunities, qualifications, accreditation and credentials in the EU, developed by the European Commission. It is designed to document all types of learning outcomes throughout Europe, covering both non-formal and formal education, along with the validation of non-formal and informal learning. Its purpose is to offer a unified way to represent various educational and professional qualifications, including attendance, examination scores, degrees, diplomas, diploma supplements, professional certifications, employer endorsements, and any other learning-related credentials[8]. As part of the tasks set forward in the Europass Decision, the ELM will help further the goals of the European Skills Agenda, the European Education Area and the Digital Education Action Plan. Up until now, almost every sector, country and level of education and training has had its unique way of providing data related to learning. This fragmentation has hindered possibilities for the creation of common systems and the exchange of information. By establishing a single vocabulary for learning in the EU, ELM aims to bolster the recognition of and trust in qualifications and digital credentials across Europe, supporting the fight against fraud. Aligning with the ELM allows for the comparability, transparency and portability of a high amount of data related to learning. By providing a tool to ease processes for recognition of prior learning, the ELM contributes to the wider goals of the European Commission to promote labour and learning mobility in the EU. The data richness of the ELM supports the visibility of skills and contributes to an approach that prioritises the recognition of skills. The ELM has a multitude of uses as indicated in Figure 3.

[8] https://op.europa.eu/en/web/eu-vocabularies/dataset/-/resource?uri=http://publications.europa.eu/resource/dataset/snb.

Figure 3: Most common uses of the ELM; © European Commission

The ELM has been built using the starting points provided in Annex VI of the European Qualifications Framework Council Recommendation on "Elements of data fields for the electronic publication of information on qualifications with an EQF level" as well as Annex I "European standard elements to describe a micro-credential" of the Council Recommendation on a European Approach to Micro-credentials. With over 480 properties, the ELM allows for the capture and validation of all learning related data, including formal, non-formal and informal learning. The ELM caters for the needs of general education, VET, HE, adult learning, and labour market training. This allows for the creation and portability of rich data, for instance for the documentation of courses and qualifications, and European Digital Credentials for learning. Its uses are not limited to a single sector and address actors in employment, skills, education and training alike.

Authenticity and portability

One of the key recommendations made by the European Commission targets the authenticity of the micro-credential. It is stated in the Proposal for a Council Recommendation on a European approach to micro-credentials for lifelong learning and employability that "Micro-credentials contain sufficient information to check the identity of the credential-holder (learner), the legal identity of the issuer, the date and place of issuance of the micro-credential".

At a European level and within Member States, a variety of authentication services or identity and access management systems are used by organisations to authenticate users in the system. For example, the EU Login authentication service (previously ECAS) is a point for user authentication to a wide range of Commission information systems for organisations and for individuals. In some countries (but not all EU Member States), this system also allows user to link their eiD (electronic ID) to their national electronic identify card to access services. Beyond the eID, other identification and trust services can already be used with legal effect across the EU thanks to the trust framework created by the eIDAS Regulation (e.g., eSignature, eTimestamp, Qualified Web Authentication Certificate, eSeal and the Electronic Registered Delivery Service).

At a national level, several Member States have implemented or are in the process of implementing integrated digital authentication systems for national public services using national identity documents (such as the eiD mentioned before) and digital IDs systems (such as ITSME in Belgium or SPID in Italy). The implementation of such systems is not uniform across countries and, in many cases, involves the use of third-party systems, developed and managed by private entities, and a complex process for individuals to register their digital ID and to access the services.

EUDI Wallet

In the near future, European citizens will have the possibility to use the new EUDI Wallet, which will be available to EU citizens, residents, and businesses who want to identify themselves with a secure single digital ID for all online services. The EUDI-Wallet will enable the portability of the micro-credential. This service will be available for both online and offline public and private services across the EU. The EUDI Wallet and underlying Architecture Reference Framework (ARF) should be taken into account by organisations when developing a micro-credential strategy. The EUDI Wallet positively impacts how citizens and businesses can digitally identify themselves when accessing public and private services throughout the EU, using their

smartphone in a secure and convenient manner. It will allow citizens to control their personal data stored within the wallet. Importantly, this personal data will also include degrees and micro-credentials. The EUDI wallet facilitates the portability of the micro-credential and allows the owner to share their credentials across borders in a safe and privacy-friendly way.

Finally, in most cases, single education and training institutions have in place their own student registration and identification system, again using a variety of tools (physical and digital) and not always linked or connected to the national identification systems.

To conclude, ensuring the authenticity of the users accessing micro-credentials constitutes major challenges for a European integrated system for managing micro-credentials. The implementation of a trustworthy identity and access management system for organisations and users to access credentials lifecycle across the EU is a work in progress.

Services: Europass

Europass, a free online tool of the European Union, helps to plan one's personal educational path and professional career and should be taken into account for the strategic technical considerations of implementing micro-credentials in an educational institution. All European citizens can use Europass to document and present their skills, competencies and qualifications acquired at school, university or during learning or training periods abroad, in a clear and uniform manner. More than 30 European countries are currently participating in the Europass initiative, and it offers access to a range of online tools including a digital credential builder, issuer, viewer and a credential wallet.

In summary, this section highlights the strategic technical considerations of relevant European developments relating to data models, authenticity, and services to the implementation of micro-credentials targeting a transparent European Education Area, labour market, and exchange of credentials across borders. Therefore, it is advisable to adhere to the recommended standards such as W3C-VC that are described in detail in the ARF, to ensure compatibility of the micro-credential infrastructure with the EUDI Wallet and Europass.

Document lifecycle management

When looking at the micro-credential as a digital certificate, it is important to understand the specific requirements of the lifecycle of the documents associated with the micro-credential as presented in Table 1.

	ISSUER (Educational Institution)	HOLDER (Learner)	VERIFIER (3rd party)
1	The micro-credential template is created by the educational institution.		
2	The template is filled with learner meta data and signed.		
3	The micro-credential is archived for purposes of verification, revocation and reissuing.		
4		The learner may download the micro-credentials to their EUDI wallet and share the micro-credentials with a verifier.	
5	When deemed necessary, the Issuer may revoke the micro-credential		
6			Upon sharing by holder, a verifier can check the validity (e.g., is the micro-credential revoked?) of the micro-credential with the issuer.

Table 1: Micro-credential Document Lifecycle Management;

The micro-credential is considered an official transcript of records and should be kept available for a significant period of time, since it is commonly used in the LLL context. GDPR compliance is required since the document contains personal data. The lifelong hosting of personal certificates for issuing, verification and revocation-purposes requires significant effort and resources. It is advisable to consider collaboration and hosting of micro-credentials on a national level, rather than an institutional level. Traditionally it is the issuing organisation that is considered to be the proprietor of the credentials that it issues (i.e. when it comes to verification and validation, they are the authentic source of proof and information), but ideally, micro-credentials, as well as any other types of credentials, should be owned by their holders (i.e. learners that are certified), and credential validation and verification should be built-in credential features, having no dependence on any third parties. However, this can be difficult to implement, and further complicated as a learner should be able to go back to the authentic source to request a reissue of the credential should they ever lose their credentials (e.g., damage to their devices, etc.).

The European Digital Credentials for learning initiative, shown in Figure 4, takes a slightly different approach to credential building, issue, storage, verification and sharing.

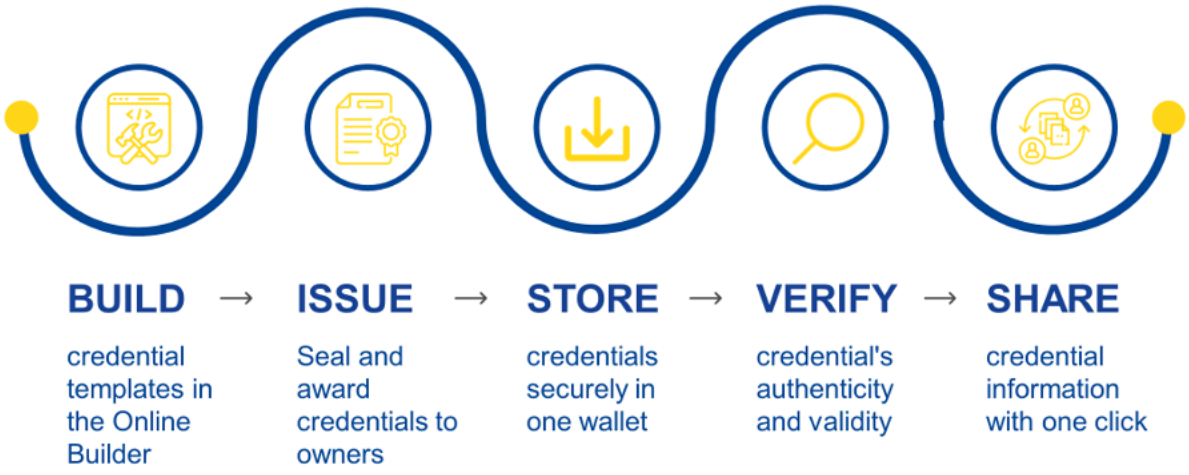

Figure 4: European Digital Credentials for learning Infrastructure system functions, presented at the MCE Empowering Seminar on 16 February 2024; © European Commission

Micro-credentials and digital badges

While HEIs have traditionally viewed awards as a result of ECTS credit accumulation, in recent years the recognition of smaller parcels of learning has become increasingly popular. Micro-credentials and digital badges are a relatively new concept and lend themselves to a wide variety of educational knowledge, skills and competence achievement. Technically, one could state that the micro-credential is the certificate and the digital badge is the envelope carrying the certificate. Additionally, they can certify the outcomes of small, tailored learning experiences. Although a micro-credential theoretically can be issued on paper like a traditional certificate, it is common practice to issue a micro-credential in the form of a digital document, such as a signed PDF or 'badge'. The digital badge usually contains an image, some metadata and a verification method. The European Commission (2020) recommends that micro-credentials should be measurable, comparable and understandable, containing clear information on learning outcomes, workload, content, level, and the learning offer, as relevant. Importantly, they should be portable and owned by the learner.

It is advisable to ensure that institutions' Learning Management Systems (LMS) or Student Information Systems (SIS) are capable of supporting digital badges in order to ensure portability of the micro-credential. This may involve customising or integrating plugins that can manage micro-credential issuance, tracking, and validation. It is advisable to implement a credentialing platform that allows the creation, distribution, and verification of micro-credentials using digital badges. While the purpose is not to be prescriptive, technology such as Open Badges, or the European Digital Credentials for learning infrastructure can be integrated into the existing systems among others. In addition to the open initiatives mentioned in this paper, there are also numerous commercial options on the market.

Future outlook

The preceding three sections outlined the strategic technical considerations for micro-credentials relating to European developments; micro-credential document lifecycle; and digital badges. This section builds on the micro-credential discussion by proposing three key questions that are evolving as the discussion and implementation of micro-credentials matures.

How can HEIs ensure that their technical infrastructure will support the strategic aims of their micro-credential strategy?

Micro-credentials, as defined in the above-mentioned Council Recommendation, can certify short, accredited courses designed to meet the demands of learners, society, enterprises and organisations. They are intended to be highly flexible, bite-sized and accessible way of upskilling and reskilling which poses a challenge for educational institutions that are primarily focused on supporting learners engaging in traditional undergraduate or postgraduate programmes. It is advisable to consider the lifecycle of the micro-credential and changes or adaptions required underlying technical systems and processes to enable the successful implementation of a micro-credential strategy. For example, workflows for the recruitment and registration of students may need to be adapted to ensure timely registration of the learner while maintaining the integrity of the registration process and securing the authenticity of the learner. Institutions currently implementing micro-credentials have reported the need to develop specialised marketing strategies to increase the awareness of micro-credentials and target recruitment. Adaptions of the existing technologies and processes will also present new opportunities and information that can be used to improve the learning design.

Some of the EDC services the European Commission offers, i.e. a readily available infrastructure and implementation support, allow organisations to explore the values and benefits, and familiarise themselves with digital credential issuing processes before committing to the adoption of the technology (that is also readily available by the provision of open source).

How will artificial intelligence and generative text impact on the technological infrastructure for micro-credentials?

The development of artificial intelligence in general, and (large) language models in particular, is taking place at a staggering rate. The ESCO (European Skills, Competences, Qualifications and Occupations) Member States Working Group has executed a pilot project for linking learning outcomes of qualifications with ESCO skills with the use of artificial intelligence. "The performance of the mapping algorithm showed promising results. On average, an ESCO concept selected by participants was in 44.65% of cases the first concept suggested by the algorithm, between the first 3 concepts in the 63.98% of cases, between the top 5 concepts in the 70.35%. This indicated that lower efforts were required in order to identify relevant skills compared to the second phase" (ESCO, 2022). This implies that soon, portals with learning offerings will probably be able to compare learning outcomes from micro-credentials. Additionally, boards of examiners may use algorithms such as this one to recognise prior learning and determine whether a prospective learner could be granted an exemption, based on learning outcomes already achieved.

How can educational institutions prepare for significant growth?

Begin with the end in mind and digitise wherever possible. Most HEIs have traditionally seen their degree programmes as their core business. Having said that, it will not be long before LLL will be considered a core business as well and learners will participate in shorter courses more frequently. In order to prepare for significant growth of LLL enrolment, it is recommended to automate administrative processes wherever possible. Are usage statistics of the enrolment portal generated automatically and do they contain actionable data? Is the portal automatically filled with eligible courses or is this a manual process? Is it possible to verify the identity of the learner digitally or does the learner manually have to identify at a physical desk? Is the creation and issuing of the micro-credential automated, based on results in the Student Information System (SIS) or is extra (manual) effort required? These are some of the questions for institutions to address in this regard.

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PART 3

Quality assurance

Definitions and frameworks

Key Takeaways:

1. According to the European Commission, micro-credentials "are underpinned by quality assurance following agreed standards in the relevant sector or area of activity". This mention of QA distinguishes the definition from the Council Recommendation on a European approach to micro-credentials from other existing definitions used globally.
2. A comprehensive external quality approach combines self-assessment, external review and processes for improvement. The essential principle is that micro-credential providers' internal QA system needs to be evaluated externally, ideally by an entity independent fr om the organisation running the QA system.
3. Registries of (alternative) providers are mentioned as a possible tool for external QA, in order to build public trust in micro-credentials. The Database of External Quality Assurance Results (DEQAR) is currently being extended to be able to map alternative providers of micro-credentials that are working in compliance with the ESGs.

The following section gives an overview of the topic of QA of micro-credentials as well as current initiatives of various stakeholders.

In recent years, various fundamental initiatives and projects have developed definitions for micro-credentials, including UNESCO, the Microbol project and the European MOOC Consortium. The following section is based on the definition of the Council Recommendation on a European approach to micro-credentials for lifelong learning and employability.

According to the definition of the European Union, micro-credentials are a record of the skills and knowledge acquired by a learner by completing a short amount of learning. The assessment of these learning outcomes is based on clearly defined and transparent criteria. Micro-credentials, the result of such educational experiences, aim to equip learners with specific skills, knowledge and abilities that meet cultural, personal, societal or labour market needs. They belong to the learner, are shareable and portable. Micro-credentials might exist independently or be integrated into more comprehensive credentials. "They are underpinned by quality assurance following agreed standards in the relevant sector or area of activity" (Council of the European Union, 2022). The fact that QA is mentioned in the definition underlines its importance in relation to micro-credentials.

Another reference point that clearly shows the importance of QA are the 10 principles that highlight the key characteristics of the European approach to micro-credentials, that should be followed when designing and issuing micro-credentials. The first of the 10 principles states that "Micro-credentials are subject to internal and external quality assurance by the system producing them (e.g. the education, training or labour market context in which the micro-credential is developed and delivered). Quality assurance processes must be fit-for-purpose, be clearly documented, accessible, and meet the needs of learners and stakeholders. External quality assurance is based primarily on the assessment of providers (rather than individual courses) and the effectiveness of their internal quality assurance procedures." (European Commission, 2021).

Regarding external QA the following standards/frameworks are cited as references:

- Annex IV of the European Qualifications Framework recommendation, where applicable;
- the Standards and Guidelines for quality assurance in the European Higher Education Area (ESG), where applicable;
- the European quality assurance reference framework (the EQAVET Framework) in the field of vocational education and training, where applicable

In addition to these well-established standards and frameworks in the field of HE and VET, there is also a mention of other QA instruments, including registries and labels, to build public trust in micro-credential (European Commission, 2021).

In parallel to the previously mentioned references, the central elements of internal QA are also mentioned. Providers should make sure that internal QA covers all the following elements:

- "the overall quality of the micro-credential itself, based on the standards referred to below
- the quality of the course, where applicable, leading to the micro-credential
- learners' feedback on the learning experience leading to the micro-credential; and
- peers feedback, including other providers and stakeholders, on the learning experience leading to the micro-credential" (European Commission, 2021, p. 3).

The recommendations of the European Commission, as presented, emphasize the importance of QA with respect to micro-credentials. The following section takes a closer look at some of the recommendations made and presents initiatives and projects that deal with implementation in practice, including with regard to alternative providers.

External quality assurance of the effectiveness of internal quality assurance procedures

As outlined above, the European approach to micro-credentials emphasizes that external QA should be primarily based on the assessment of providers and the effectiveness of their internal QA.

This is also in line with the recommendations of the MICROBOL project: To ensure suitability and prevent unnecessary strain on institutions, external QA should concentrate on how institutions incorporate micro-credentials within their current or new processes. It is important for external QA to verify that HEIs providing micro-credentials maintain a reliable and robust internal quality monitoring system. Given the considerable scope of programme level external evaluations, applying the same procedures to micro-credentials would not be appropriate, because micro-credentials represent smaller amounts of learning and are designed to be regularly updated to meet societal demands (MICROBOL, 2022).

Based on these recommendations, the following options for external QA could be considered:

- Accreditation/licencing procedures (external QA procedure as part of a regulatory requirement)
- Professional and employer certifications
- External QA certification schemes, e.g., ISO
- (MOOC) Platform certification schemes – quality assessment of courses before offering them via the platform (Camilleri et al., 2022).

It is emphasized that a combination of self-assessment, external review and processes for improvement is required for an external quality approach to be comprehensive. It is essential that the internal QA systems of micro-credential providers need external evaluation, ideally conducted by an independent entity (Camilleri et al., 2022)

It is a matter of concern for the relevant QA agencies as well how meaningful external QA can be carried out with the procedures currently in place as they tend to focus on institutions and degree programmes.
QA agencies are now discovering that short courses are a growing part of institutional provision and ought to be reviewed as well — not at the level of individual courses or modules, but by making sure that HEIs have a functioning internal QA system in place to cover them (van der Hijden/Martin, 2023).

To explore the possibilities of external QA in relation to micro-credentials, The European Association for Quality Assurance in Higher Education (ENQA) established a Working Group in 2021, which presented its findings in the fall of 2022.

Alongside examples of external QA practices based on case studies from member agencies, the ENQA Working Group also presents overarching recommendations for the design and implementation of external QA processes for micro-credentials in its final report. A clear recommendation to focus on the institutional level and the effectiveness of internal QA processes within the framework of external QA is not formulated. Rather, it is recommended that external QA procedures should be flexible and, where appropriate, rely on existing arrangements. In cases where internal QA systems have repeatedly demonstrated their effectiveness, the external QA procedures for micro-credentials should consider how the characteristics specific to micro-credentials are integrated into internal QA (Greere et al., 2023).

In addition to the underlying recommendation that external QA should focus primarily on the assessment of providers and the effectiveness of their internal QA procedures the European approach to micro-credentials explicitly mentions several standards and frameworks, as described above. These are discussed in more detail below.

Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESGs)

The ESGs are not standards for quality, nor do they prescribe how the QA processes are implemented. They provide guidance, covering the areas which are vital for successful quality provision and learning environments in HE. They apply to all HE offered in the European Higher Education Area regardless of the mode of study or place of delivery (ESG, 2015).

The previously mentioned ENQA Working Group also investigated the applicability of the ESGs to micro-credentials. The question of the applicability of the ESGs to micro-credentials is not so much whether they apply, but how they apply, i.e., which special features of micro-credentials need to be taken into account (Greere et al., 2023).

The Working Group defined the specifics for ESG Part 1 (internal QA) and Part 2 (external QA). Based on the previously mentioned recommendation to focus in particular on the effectiveness of internal QA, the findings relating to the standards for internal QA are set out below.

The ESG Part 1: Standards and Guidelines for internal quality assurance cover the following areas:

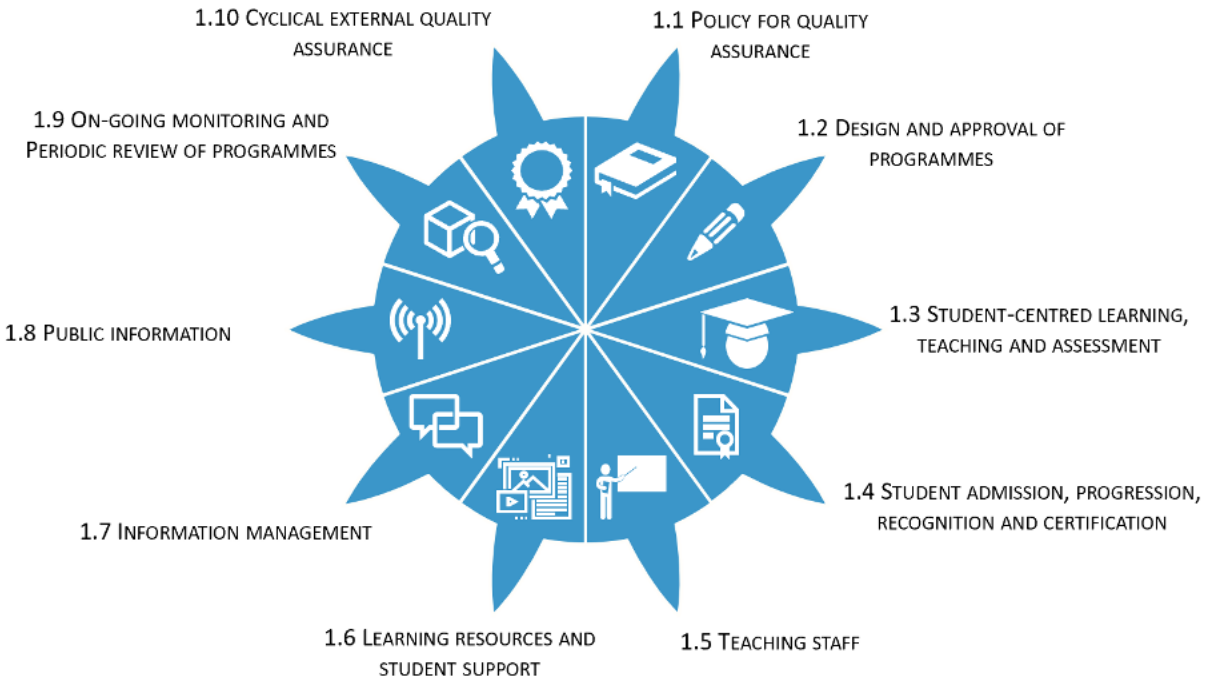

Figure 5: © Kerstin Schoerg, licensed under CC BY 4.0

In the course of preparing the report, the ENQA Working Group sent out a questionnaire to capture existing practices in the European Higher Education Area. In the course of this survey, the relevance and applicability of the individual standards were also inquired about. Among others the most relevant standards identified are ESG 1.1. "Policy for quality assurance" and ESG 1.2. "Design and approval of programmes" (Greere et al., 2023). The findings in relation to these two standards are briefly outlined below.

Standard 1.1. "Policy for quality assurance"

Institutions should adopt and publicly disclose a QA policy that integrates into their strategic management. This policy should be developed and implemented by internal stakeholders using suitable structures and procedures, with the inclusion of external stakeholders in the process (ESG, 2015).

With regard to ESG 1.1. the Working Group defined the following areas in focus: The institutional strategy should explicitly consider LLL and micro-credentials; the specific characteristics of micro-credentials are taken into account as part of internal quality management; options for recognition and stackability are formally considered; due diligence is applied to professional collaborations and academic partnerships, the involvement of representatives of the labour market and industry is increased (Greere et al, 2023).

Standard 1.2 "Design and approval of programmes"

Institutions should implement procedures for the creation and approval of their programmes. These programmes should be structured in a way that ensures they achieve their established objectives, especially the targeted learning outcomes. The qualification awarded upon completing a programme should be clearly defined and shared, reflecting the appropriate level within the national qualifications framework for HE and aligning with the Framework for Qualifications of the European Higher Education Area (ESG, 2015).

With regard to the standard 1.2, the ENQA Working Group noted that micro-credentials need to fit into the wider offer of an HEI, but at the same time they should be a category of its own. They should have clear and explicit objectives in line with the LLL strategy of the institution and they require separate structures, but also specific budgets allocated for their design and offer. In addition, the use of a common language like learning outcomes, ECTS, European Qualifications Framework (EQF)/National Qualifications Framework (NQF) level, etc. is needed as well as engagement of all relevant stakeholders in both design and approval which is even more important. Also, the specific needs of the market, industry, personal development or society at large should be taken into account. Stackability also needs to be considered in the design phase (stand-alone micro-credentials vs. micro-credentials based on existing courses) (Greere et al, 2023).

As with external QA, the Working Group also formulated overarching recommendations for the design and implementation of internal QA processes. Among other things, it is recommended that policies, promoted by any given provider, cover micro-credential activities in meaningful ways. Furthermore, the internal quality monitoring for micro-credentials should be more frequent or take different approaches compared to procedures for traditional degrees (Greere et al, 2023).

Despite the findings presented above, especially regarding the design and approval of programmes, it remains to be seen how these processes can be designed efficiently in order to ensure sufficient quality on the one hand, while not losing agility as a special feature of micro-credentials on the other.
One possible solution could be a risk-based approach when it comes to micro-credentials as described by Camilleri et al. (2022).

Within the project Implementation and Innovation in QA through peer learning (IMINQA), which is funded by the Erasmus+ program, QA of micro-credentials is also a focus area. In a recently published report of the project, based on secondary research, a survey and interviews, the following results were presented in relation to internal QA processes:
Many institutional efforts related to the development of micro-credentials typically begin at the grassroots level. However, representatives from HEIs recognise the vital importance of strategic planning, guidance, support, and a well-informed decision-making process in the creation and provision of micro-credentials. For instance, at the University of Limerick, the establishment of micro-credentials is considered a top-tier strategic objective. To advance this objective, the institution's executive committee established the Micro-credential Advisory Group, which also oversees the QA aspect of micro-credentials.

All HEIs that are piloting micro-credentials and contributed to the IMINQA report have established a decision-making process, which is scheduled for evaluation and potential updates at the conclusion of the pilot project. Typically, this process involves various decision-making bodies at different levels of management. In most instances, it includes a faculty council or academic steering committee responsible for evaluating, providing advice on, and approving micro-credential proposals at the faculty level. The proposal may then undergo assessment by an LLL committee or commission, which assesses factors such as alignment with learner and societal needs, interdisciplinary aspects, involvement of other stakeholders, and delivery methods, among others. In some cases, an evaluation is conducted by the internal QA department, which assesses formal criteria such as ECTS credits, learning outcomes, and assessment methods. Final approval may necessitate the endorsement of a higher-level body within the HEI's governance structure (Cirlan, 2023).

Another example of an internal QA process for micro-credentials is that of the British Columbia Institute of Technology (BCIT). Compared to traditional programmes, micro-credentials go through an accelerated review process. At BCIT, as at many other educational institutions, the higher the degree, the more stakeholders are involved in the programme approval process.

A proposal for a micro-credential is created, the dean signs off on it, after which it is sent to the "agile quality committee," which has a special interest in micro-credentials and badges. The dean then presents it to a dean's council: micro-credentials at BCIT go through a formal approval process, but it is very straightforward (Prud'homme-Généreux, A., 2023).

European Quality Assurance for Vocational Education and Training (EQAVET)

As previously presented, the European Quality Assurance Reference Framework for Vocational Education and Training (EQAVET) is also cited as a reference for QA.

The framework is based on a QA and improvement cycle and a selection of descriptors and indicators which are applicable to quality management at both VET system and VET provider levels.

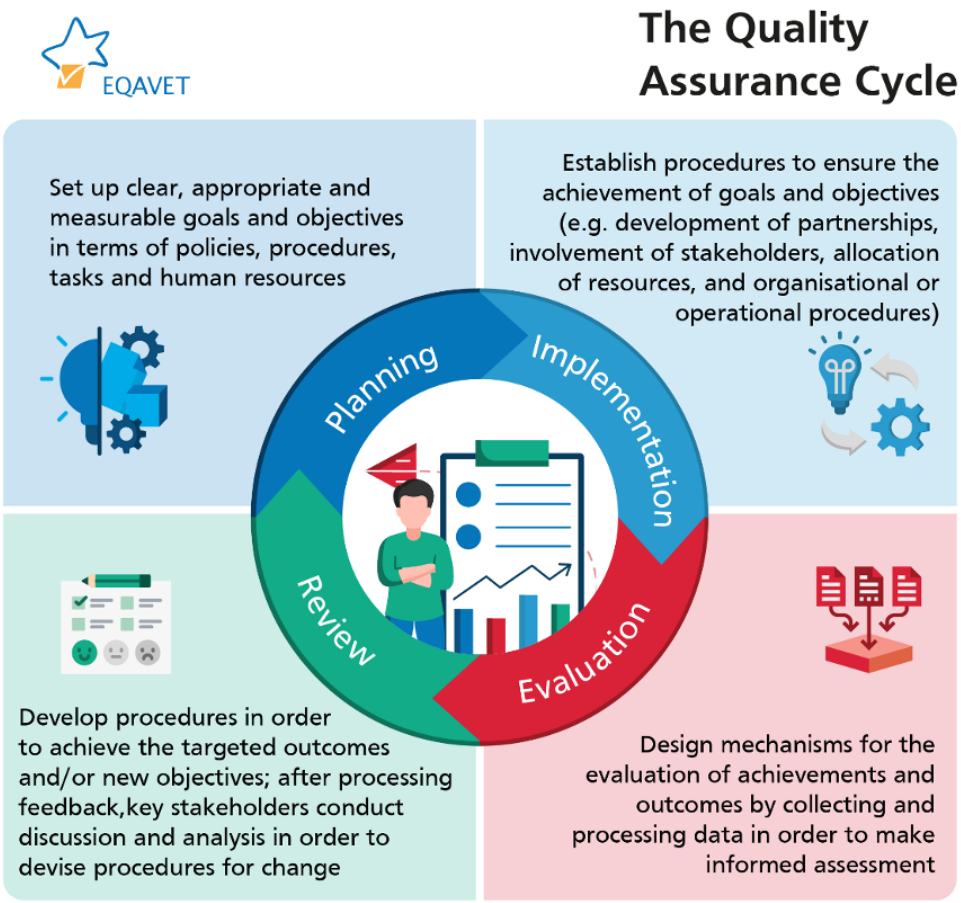

Figure 6: The Quality Assurance Cycle; © European Commission

EQAVET does not mandate a specific QA approach or system. Instead, it offers a framework of common principles, indicative descriptors and indicators designed to assist in evaluating and enhancing the quality of VET systems and provisions. As such, EQAVET can be viewed as a 'toolbox' from which users can select the descriptors and indicators they find most applicable to their QA system's needs.

"The EQAVET Framework can be used by VET providers and in VET systems to support the QA of:

- Learning environments (e.g., school-based provision, work-based learning, apprenticeships, formal, informal and non-formal provision)
- All types of learning contexts (e.g., digital, face-to-face and blended)
- Public and private sector VET providers
- VET awards and qualifications at all levels of the European Qualifications Framework " (European Commission, https://ec.europa.eu/social/main.jsp?catId=1536).

As previously mentioned, indicators were formulated at both the system level and provider level. The indicators at provider level are presented below.

Indicators for each phase of the quality cycle: provider level

1.Planning	2. Implementation	3. Evaluation	4. Review
• European, national and regional VET policy goals/objectives are reflected in the local targets set by the VET providers • Explicit goals/objectives and targets are set and monitored, and programmes are designed to meet them • Ongoing consultation with social partners and all other relevant stakeholders takes place to identify specific local/ individual needs • Responsibilities in quality management and development have been explicitly allocated • There is an early involvement of staff in planning, including with regard to quality development • Providers plan cooperative initiatives with relevant stakeholders • The relevant stakeholders participate in the process of analysing local needs • VET providers have an explicit and transparent quality assurance system in place • Measures are designed to ensure compliance with data protection rules	• Resources are appropriately internally aligned/assigned with a view to achieving the targets set in the implementation plans • Relevant and inclusive partnerships, including those between teachers and trainers, are explicitly supported to implement the actions planned • The strategic plan for staff competence development specifies the need for training for teachers and trainers • Staff undertake regular training and develop cooperation with relevant external stakeholders to support capacity building and quality improvement, and to enhance performance • VET providers' programmes enable learners to meet the expected learning outcomes and become involved in the learning process • VET providers respond to the learning needs of individuals by using a learner – centred approach which enable learners to achieve the expected learning outcomes • VET providers promote innovation in teaching and learning methods, in school and in the workplace, supported by the use of digital technologies and online-learning tools • VET providers use valid, accurate and reliable methods to assess individuals' learning outcomes	• Self-assessment/self-evaluation is periodically carried out under national and regional regulations/frameworks or at the initiative of VET providers, covering also the digital readiness and environmental sustainability of VET institutions • Evaluation and review covers processes and results/outcomes of education and training including the assessment of learner satisfaction as well as staff performance and satisfaction • Evaluation and review includes the collection and use of data, and adequate and effective mechanisms to involve internal and external stakeholders • Early warning systems are implemented	• Learners' feedback is gathered on their individual learning experience and on the learning and teaching environment. Together with teachers', trainers' and all other relevant stakeholders' feedback this is used to inform further actions • Information on the outcomes of the review is widely and publicly available • Procedures on feedback and review are part of a strategic learning process in the organisation, support the development of high-quality provision, and improve opportunities for learners. • Results/outcomes of the evaluation process are discussed with relevant stakeholders and appropriate action plans are put in place

Table 2: Indicators for each phase of quality cycle;
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Both the QA cycle and the indicators seem suitable to be applied to micro-credentials as well when these are applied. However, as in the case of the ESGs, some aspects will have to be considered more strongly to adequately address the specific characteristics of micro-credentials.

In November 2022, an EQAVET Peer Learning Activity (PLA) on QA of micro-credentials in VET took place online with 70 participants from 28 countries. In numerous countries, micro-credentials represent a novel concept currently undergoing discussions, exploration, or pilot programmes. QA processes vary and not all micro-credentials are quality assured based on quality standards set at national level.

Micro-credentials are frequently offered within the context of continuing vocational education and training (CVET), which displays significant heterogeneity both across the EU as a whole and within individual countries. Furthermore, there is no comprehensive QA framework governing CVET. Nevertheless, there are close links between the EQAVET indicative descriptors, and the European principles set out in the Council Recommendation on the design and award of micro-credentials.

The participants of the PLA identified that, among other things, principles, regulations, and laws related to quality standards and QA of micro-credentials, as well as the duration of procedures and costs for validation/ QA of micro-credentials need further discussion at national level and further exchanges at European level (European Commission, EQAVET PLA, 2022).

Quality assurance of non-formal education

As mentioned above, providers and programmes in CVET are very heterogeneous and there is no comprehensive QA framework governing CVET. One initiative that deals precisely with this situation, among others, is the project "MICRO QUEST: Innovative Quality Evaluation Strategy for Micro-Credentials in non-formal VET in Europe".

In order to facilitate the widespread adoption of micro-credentials throughout Europe, the MICRO QUEST project is committed to delivering an innovative quality evaluation strategy for micro-credentials in non-formal VET in Europe. This endeavour will result in the creation of four key project outcomes:

- Investigation research
- A practical guideline for VET providers
- Training workshop for VET providers
- MICRO QUEST Network (online network for VET providers offering quality micro-credentials).

The first project result, the research report, examined how the QA of micro-credentials can be done professionally and reliably in practice, especially in the field of non-formal VET. For this purpose, six quality management approaches were analysed - EQAVET, EQF, ECTS, ISO17024, ISO 9001 and Total Quality Management (TQM). From the point of view of the project partners, ISO17024 seems to be the most suitable role model.

ISO 17024 establishes an international standard for organisations that provide certification for individuals. It comprises a collection of internationally accepted criteria and prerequisites designed to guarantee the quality of an individual's certification. This ensures that the competencies of an individual align with the stipulated requirements of the certification scheme or qualification.

This standard is internationally accepted, structures, documents, organisations and political acceptance already exist and its application should therefore be clearly considered. Moreover, considering that the European Commission has ambitions to make micro-credentials accessible and transparent on a global scale, extending beyond the confines of the EU (given that the concept of micro-credentials largely originated in North America), an international standard for QA situated outside of Europe but on a global level would be the optimal solution (MICRO QUEST, 2022).

In the report “European Micro-Credentials. A Guideline for Vocational Education and Training Providers”, the project partners go one step further and explain the requirements of ISO 17024 in more detail. In addition, the individual steps of the application of ISO17024 for the QA of micro-credentials are explained step by step (MICRO QUEST, 2023).

The use of ISO17024 for the QA of micro-credentials is also currently being driven forward as part of another project. As part of the MICROIDEA project (MICRO-credentials: Identifying, Developing, Testing and Assessing innovative approaches), which has been running since January 2024, a micro-credential system linked to ISO/IEC17024 will be developed (EfVET, 2024).

Registries and labels

Registries of (alternative) providers, as previously outlined, are mentioned in the Council Recommendation as well as possible tools for external QA, to build public trust in micro-credentials.

In Europe, EQAR has developed a Database of External Quality Assurance Results (DEQAR), which includes a list of programmes and HEIs accredited according to the ESGs.

DEQAR was recently extended to be able to map alternative providers of micro-credentials that are working in compliance with the ESGs (or alternative providers of micro-credentials that are accredited by an EQAR registered agency) as well. A visual distinction between providers (HEIs and alternative providers) was planned for a better overview (Zhivkovikj, 2023). In order to meaningfully map alternative micro-credential providers, the existing elements were expanded. The new section in DEQAR on “other providers and micro credentials evaluated through methodologies aligned with the ESG” was presented in February 2024 (Zhivkovikj, 2024).

Future outlook

So far, the section provided an overview on the topic of QA as well as current initiatives across sectors. Based on these, three questions are posed that could lead to the further development of the discourse on QA of micro-credentials.

How can external QA of micro-credentials evolve to meet the needs of different stakeholders?

As part of the report "Quality Assurance of Micro-credentials" by the ENQA Working Group, four case studies are presented that provide examples of options for the external QA of micro-credentials:

- Ex-ante EQF Level 6 and 7 accreditation of short learning programmes by AQU Catalunya;
- Regulatory subject-group external QA of micro-credentials by HAKA Estonia;
- Programme-level validation by Quality and Qualifications Ireland (QQI);
- Voluntary institution-level accreditation of providers of micro-credentials by the British Accreditation Council (BAC).

The case studies presented cover both regulatory and voluntary approaches and reflect experiences at programme as well as institutional level within their respective national context.

The findings presented by HAKA Estonia are of particular relevance with regard to the external QA of micro-credentials offered by non-formal providers:
The assessment of continuing education institutions in Estonia from 2019 to 2022 revealed shortcomings in the institution-based quality assessment process. While some providers excelled in certain study programme groups, their performance varied across different groups, leading to failed assessments. The institution-based approach did not allow for the demonstration of quality in the study programme groups in which the providers did well. Based on this experience, it was decided that a provider wishing to offer micro-credentials needs to undergo an assessment of the study programme group in which the micro-credential is to be offered. This approach of assessing field-specific expertise is essential as it is difficult to ensure that a small non-formal training institution can assure high quality training in every possible field (Greere et al., 2023).

In addition to this insight, it is emphasized that the target group must be taken into account and "educational jargon" should be avoided. For example, non-formal education providers who are practitioners and offer high-quality specialist programmes but have no previous experience of QA may find it difficult to understand the process. Furthermore, all relevant stakeholders should be involved in designing the process and pilot the assessment model (Greere et al., 2023).

How can the existing hurdles in the area of QA be further reduced across the various sectors?

The (possible) lack of experience in relation to external QA processes is just one area where it is important to create a common understanding and work together across sectors.

Another hurdle lies in the usage of diverse terminology. It is important to note that this does not imply a difference in quality expectations. Rather, it signifies a lack of standardisation in academic language, including terms like credit value, learning outcomes, and clear assessments. Until a common (academic) language and associated educational principles are used across sectors, including non-traditional providers, the potential for legitimising and recognising micro-credentials will remain somewhat limited. Therefore, translation of these concepts will be crucial, especially for purposes such as QA, stacking and recognition (van der Hijden/Martin, 2023).

The use of learning outcomes, among other things, is often seen as a way of overcoming this hurdle. The description of learning outcomes and the method of assessment used to measure those outcomes may be the most important and difficult element of the common standards for micro-credentials proposed by various bodies. If learning outcomes are to become an effective and efficient step in establishing equivalence and recognition, much work remains.
If left unstructured, the descriptors of learning outcomes created by each provider could overwhelm the exchange of information, and make search and comparison too costly. An agreed taxonomy of learning outcomes – or an artificial intelligence solution – seems to be a prerequisite for progress (OECD Education Policy Perspectives No. 40, 2021).

The solution to these remaining issues, particularly with regard to the QA of micro-credentials, lies in increased cooperation across sectors.

How could transparency take the discourse about the QA of micro-credentials to the next level?

Transparency builds trust. The importance of transparency as a cornerstone for the success of micro-credentials is also shown by the fact that transparency is named as the second key principle in the European approach to micro-credentials. Clear information regarding learning outcomes, workload, content, level, and learning opportunities should be provided. It is recommended that information on providers of micro-credentials are published in registers or included in existing registers, for example the DEQAR, if QA is carried out in accordance with the ESGs.

Quality and transparency are closely linked. This is also demonstrated by the fact that the above-mentioned QA frameworks contain standards relating to the publication of information e.g., the ESGs (ESG 1.8 Public Information). Here, however, the main focus is on information such as intended learning outcomes, qualification profiles, teaching and learning activities and assessment. But what information is actually provided by micro-credential providers in regard to QA?

Mark Brown and Josep M. Duart analysed the available information on the QA of micro-credentials of institutions that could be considered early adopters with regard to micro-credentials. The Ontario Micro-credential Portal, the Australian MicroCred Seeker Portal, and the Irish MicroCreds Portal, among others, and the institutions offering micro-credentials on these portals were used for the analysis. In summary, very little information was available regarding QA processes. This indicates a significant gap in the aspect of public accountability within QA (Brown M./Duart J.M., 2023).

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PART 4

Management discussion and workshop

Management discussion and workshop

In order to facilitate a fruitful management discussion in the HEI boardroom that will result in an ambitious strategy for micro-credentials, we have developed a model for a workshop that enables experts within an HEI to share where they stand today and what their next steps could be.

Recommended workshop participants

Ideally, the workshop is held with eight to twelve senior managers. The LLL officer, focussing on new business opportunities, the CIO, focussing on the technological requirements, and a senior QA officer who is responsible for the quality of the educational offerings. All the mentioned specialists should bring at least one or two colleagues to participate in the discussion. The final attendee is of course a representative from the HEI board of directors, for instance the rector. Lastly, we recommend the presence of a note taker.

The goal is to facilitate a fruitful discussion that will lead to strategic insights and actionable goals. The multidisciplinary nature of this workshop requires all participants to actively listen to each other's viewpoints on the status quo and proposed next steps. Given the current status of the micro-credential in most HEIs, we suggest taking at least three to four hours for the workshop.

Workshop process

1. **Preparation:** Participants read the papers enclosed in this document before the start of the workshop and try to find answers to the boardroom questions, listed on the next pages.
2. **First indication:** Participants 'score' their individual answers to the questions on a whiteboard or canvas (see Boardroom canvas for HEI management discussion) using green, yellow or red sticky notes. Green indicates that the HEI is on track, yellow indicates good progress with substantial room for improvement, and red means that serious effort is required for the next step.
3. **Explanation:** Participants explain their 'first indication' to the others in the room and illustrate why a specific colour was selected, followed by a multidisciplinary discussion about the 'first indication' and required next steps.
4. **Review:** The first indication may be changed based on the discussion and concrete actions for the HEI strategy should be formulated. Note that the 'green indicators' probably require actions as well.
5. **Final question:** "Have we gathered enough insights to take the next step and establish the HEI strategy and if not, what is still lacking and where can we find more information?"
6. **After the workshop:** The note-takers share minutes and a potential follow-up is decided on.

Guiding questions to start

After reviewing the existing literature on micro-credential marketing, business models and QA, guiding questions for HEI management were formulated below. These should be considered, regardless of the type of provider and the framework to be applied.

The questions remain rather on a meta-level to discuss fundamental aspects of micro-credentials in relation to marketing, business models and QA, e.g., in the context of a workshop. These guiding questions do not claim to be exhaustive.

HEI management questions on marketing and business development

Triple Helix collaboration

1. Are micro-credential offerings developed in cooperation with government and the labour market in order to increase relevance, and in what way?
2. Is labour market feedback applied in the development of new courses and the improvement of existing offerings and if so, how?

Pathways and stackability

3. Are micro-credential pathways documented on the portal and do they allow prospective learners to determine their next step(s)?
4. Are micro-credentials 'stackable' and is it possible for the learner to stack a specific set of micro-credentials towards a full degree?

Substance and recognition

5. Does HEI staff consider micro-credentials to be substantially important and as relevant as degree programmes, or is LLL mainly considered a side issue?
6. Are the micro-credentials recognised by other HEIs and if so, which ones? Only within a certain alliance, regionally, nationally, or even across borders?
7. Are procedures for the recognition of prior learning in place and documented on the portal? Do learners understand how they can obtain recognition of prior learning?

Learner centred

8. Is learner feedback used in order to improve the portal and current offerings?
9. Is learner feedback made publicly available in a transparent way?
10. What does the HEI do in order to assure that the offerings meet the learner's demands?

HEI management questions on technology

Authenticity

1. Is the HEI able to verify the identity of the learner upon enrolment, assessment and issuing of the micro-credential?
2. Can the integrity of the micro-credential - upon request - be digitally verified at the authentic source?

Portability

3. Is the micro-credential portable and owned by the learner?
4. Is the learner able to request a reissue of the micro-credential in the case of data-loss?
5. Is the micro-credential compatible with the W3C Verifiable Credential standard and can the learner download the VC to their EUDI wallet?

Micro-credential portal

6. Are the micro-credential offers listed on a portal where learners can enrol? Is this a local-, regional-, or national portal?
7. Do the offerings on the portal include learner feedback? And if so, how?
8. Does the portal include personalised career advice? And if so, how?

Growth

9. Is the HEI ready for substantial growth or is there still (some) manual labour involved in management of the portal and enrolment processes?
10. Is the credentialling platform connected (via an API) with either the Student Information System or Learning Management System to fully automate the issuing of credentials upon completion of a course?

HEI management questions on quality assurance

Strategy

Before QA processes and criteria per se are discussed or revised, it must first be determined what definition of micro-credentials is used by the institution and which status micro-credentials (should) have within the framework of the strategy of the institution offering the service. In addition to the business model, the (type of) anchoring in the strategy also influences existing QA guidelines and the associated processes.

1. How does the integration of micro-credentials align with the institution's mission, priorities, strategic objectives, values, and overall vision?
2. What is the rationale for your institution to provide micro-credentials?
3. How do micro-credentials fit into the portfolio of the existing offering?

Policy

In crafting a micro-credential policy, each institution should initiate the process by reviewing their current policies and procedures (Prud'homme-Généreux, A., 2023, p. 119).

4. How could existing policies be applied to micro-credentials?
5. If existing policies cannot be used as is, how could they be modified to cover micro-credentials?
6. In case it is necessary to create a new policy for micro-credentials - how will the policy be integrated into the institution's existing governance mechanisms?
7. Should the possibility to develop micro-credentials be concentrated within a central entity at your institution, or should multiple distinct groups possess the capability to create them?
8. How can (possible) stackability of micro-credentials be considered within policies?

As previously illustrated, the QA of micro-credentials, and therefore the guidelines and criteria, are not unrelated to the chosen business model.

Process for programme approval, changes and retirement

The process of developing and approving micro-credentials is, understandably, given a great deal of attention as part of QA. However, due to the (often) specific focus of micro-credentials on employer and community needs, another process is also of particular importance - that of programme retirement.

Procedures should provide guidance on the execution of each of the phases in the micro-credentials' life cycle: programme proposal, modifications, and discontinuation (Prud'homme-Généreux, A., 2023, p. 116).

9. How would someone who is interested in proposing a new micro-credential would go about doing so? Can existing processes for design and approval of programmes also be applied to micro-credentials? If not, how could it be adapted to be fit-for-purpose for micro-credentials?
10. What is the process for modifying micro-credentials? What degree of alteration triggers a review of a programme? Do elements of a micro-credential, when modified, automatically initiate a review process?
11. Is there a clear process for retiring a micro-credential? Who may suggest the discontinuation of a micro-credential? Who should be informed (internal and external stakeholders)?

Design of micro-credentials

12. How are the stakeholders relevant to micro-credentials involved in existing programme design processes? Are changes necessary in the design process with regard to micro-credentials?
13. How is learner input integrated into the design (and approval) of a micro-credential in order to ensure that the programme meets the needs of learners?
14. How is the situational context of prospective learners analysed and considered in the design of programmes?
15. How are skills gaps analysed to ensure the programme is targeting the right skills?
16. How is labour market research used to investigate the gaps in the competencies that employers want to hire?
17. How are possible employers consulted during the design process of micro-credentials?
18. How is ensured that assessment methods authentically capture how learners would use this competency in the workplace?
19. How is it ensured that assessment is something an employer would regard as evidence that learners are capable of performing relevant tasks in real workplace situations?

Information management

Usually, programmes undergo an initial QA review before approval, and subsequently, they are subject to periodic assessments to confirm their continued alignment with the institution's quality standards.

For instance, the design of a programme, including its learning outcomes, assessment methods, and learning activities, is a fundamental measure of the quality of a degree. It is likely that these aspects would also serve as indicators of quality for micro-credentials. However, given the practical and task-oriented nature of micro-credentials, assessing the quality of a programme might be more valuable when based on its outcomes rather than its inputs. For instance, did individuals who completed the micro-credential manage to secure employment? Did their employers express satisfaction with their skill level? Was the micro-credential recognised by other institutions as a foundation for further education or training? (Prud'homme-Généreux, A., 2023, p. 145).

20. To what extent is it tracked so far whether graduates have found a job in the respective field? What data is available so far about graduates? Are these data sufficient to measure the quality of micro-credentials?
21. How is it taken into account whether employers are satisfied with the competences of the graduates? Which data are available?
22. How is it tracked/could we track whether other institutions have recognised the micro-credential for other programmes?

On-going monitoring and review

In terms of the (expected) shorter shelf-life of micro-credentials or the more frequent need to modify them:

23. At what intervals are reviews of programmes currently conducted? Are these also suitable for micro-credentials?

Feedback

In addition to the focus on results, the review of the entire life cycle is also of relevance for micro-credentials. The quality of a micro-credential hinges on adhering to best practices and upholding quality standards throughout every phase of its development and execution. For instance, a micro-credential that neglects to conduct a thorough needs assessment or environmental analysis might appear well-structured from an educational standpoint, but it may not be considered high-quality because it fails to address the actual needs of learners or employers (Prud'homme-Généreux, A., 2023, pp. 145).

24. Do existing QA processes look at indicators of the entire life cycle of a programme (analysis, design and development, launch and implementation, evaluation)? If not, which is/are missing?
25. How is **learner feedback** on the programme collected and used in the improvement of programmes? Is the current method also suitable for micro-credentials?
26. How is **employer feedback** on the precision of competencies and learning outcomes, the match of assessments with real-world practices and the authenticity of content and activities collected and used for the improvement of programmes?
27. How is **peer review** used in the existing internal QA procedures for the improvement of programmes? Is this approach also suitable for micro-credentials?

Teaching staff

The educators responsible for delivering a micro-credential programme must possess the requisite qualifications, expertise, and practical experience. In conventional post-secondary assessments, the emphasis often lies on academic credentials and research achievements. However, within the micro-credential framework, industry knowledge and experience should also be considered as a vital aspect. There are two essential skill sets needed for effective micro-credential instruction: a deep understanding of the programme's content and the capacity to facilitate learners' development (Prud'homme-Généreux, A., 2023, p. 163).

28. How will it be ensured that teachers have sufficient knowledge in the target field of the micro-credentials? Which indicators could be used for this (hands-on experience in the field, industry experience, experience in adult education, etc.)?

Public information / transparency on quality assurance

Lack of confidence in the quality of micro-credentials is often cited in surveys and studies as one of the main reasons, which hinders the implementation but also recognition of micro-credentials.

Against this background, it is even more important to provide sufficient information on how micro-credentials are quality-assured for all interested parties and stakeholders.

29. What information should be made publicly available to meet the needs of all stakeholders (e.g., prospective learners, employers, other institutions accepting the micro-credential, government agencies, etc.)
30. What information regarding the QA of programmes has been published so far?
31. How can the QA of micro-credentials be made as transparent as possible, as well as understandable and comprehensible?

Recognition of learning

Do credentials of current programmes contain all the mandatory elements of micro-credentials defined by the European Commission (identification of the learner, title of the micro-credential, country/region of the issuer, awarding body, date of issuing, learning outcomes, workload (in ECTS wherever possible), level and cycle if applicable, type of assessment, form of participation in the learning activity, type of QA used)?

Expected outcome

The outcome of the workshop is a comprehensive understanding of the institution's status and possible future directions. By engaging in this structured evaluation, participants will gain insight into areas needing development, guiding strategic resource and technology investments. The use of the maturity model will enhance internal communication through a shared vocabulary as well. And, finally, it is our hope that it will facilitate better long-term planning and can serve as a roadmap for institutional change.

Boardroom canvas for HEI management discussion

A European Maturity Model for Micro-credentials – boardroom canvas										
Questions:	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
New Business										
Technology										
Quality Assurance										

1. First indication: The experts score their individual answers to the questions on a whiteboard or on this canvas (printed on A1 paper) using green, yellow or red post-its. Of course, green indicates that the HEI is on track, yellow indicates good progress with substantial room for improvement, and red means that serious effort is required in order to take the next step. Make notes on the post-it explaining the current situation.
2. Explanation: The experts explain their 'first indication' to the other experts in the room, and illustrate why a specific colour was selected, followed by a multidisciplinary discussion about the 'first indication'.
3. Discussion: The first indication may be changed based on the discussion and concrete actions for the HEI strategy may be formulated. Note that the 'green indicators' will probably require actions as well. Write down the concrete actions on a new post-it and stick it over the first post-it.

Figure 7: Boardroom canvas for HEI management discussion;

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