Micro-Credentials Exchange Network

Implementation Framework

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Micro-Credentials Exchange Network Implementation Framework

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Domain 1: Policy and Strategic Planning

1. Introduction: Positioning Micro-credentials at your institution

Micro-credentials have quickly become a top priority for higher education. Institutions must therefore intentionally and strategically respond to a growing movement that is identified by the design of flexible and responsive learning pathways relevant for employability. The conversation on micro-credentials for lifelong learning has accelerated at all levels. Considerable effort has been made for building cross-sector understanding and consensus for future action across a broad ecosystem of micro-credential stakeholders. Behind European developments over the past 10 years from both top-down and bottom-up initiatives, a clearer picture is emerging around a consensus-driven micro-credential approach at the national and European level. With the Council of the European Union recommendation for a European Approach to Micro-credentials for Lifelong Learning and Employability, the foundations for the promotion of lifelong learning and professional development have been established, but there still remains many challenges, such as strategic leadership, interoperability and the digital transformation of educational institutions, recognition and quality assurance, to name a few. The following chapter will lay out critical considerations for academic leadership, micro-credential initiative leads, and other core members of a micro-credential design team to ensure that policy and strategic planning are in place for successful implementation plans.

Many micro-credential initiatives are connected with broader European developments as a method for facilitating understanding, uptake, validation and recognition. However practice-based insights rooted from implementation experiences are still very limited in the HE context (Pirkkalainen et al., 2023). In this regard there is still considerable work to bring policy initiatives to practice-based realities where micro-credential design teams must develop and implement short courses of study for uptake by learners. Micro-credentials are considered a core offering of multiple institutions and pan-European alliances of HEIs that are currently designing and piloting micro-credentials through joint programs and exchange networks (MCX 2023, EU4Dual 2023, ECIU 2021) and have become a key feature of the European higher education area (EHEA) skills agenda (European Commission 2021). In order for such exchange networks and alliances to function, however, considerable coordination and strategic planning must occur. Unifying design principles and minimum standard requirements must be followed to ensure learner mobility, interoperability and recognition across national borders, qualifications frameworks and quality assurance agencies.

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The current implementation framework aims to offer practical solutions and guidelines for practice-based development and implementation of joint micro-credential networks for up-take and recognition by answering some common questions.

To begin consideration for policy and strategic planning around joint micro-credential networks, you should be asking:

How should micro-credentials be strategically positioned at your institution?

The basic premise is that **a successful institutional micro-credential strategy needs to answer or at the very least address the 'why?' question.**

Micro-credentials provide an opportunity for a strategic reset and importantly, educational leaders have choices and should be intentional about their strategic planning. Having a clear sense of purpose is crucial to an institution's strategic thinking about micro-credentials. As Figure 1 illustrates, there are many different drivers and attractors promoting micro-credentials. The above-mentioned *Council Recommendation* provides a synthesis of the range of factors that add weight to the importance of micro-credentials. While many of these factors are not unique to micro-credentials and there is a complex interplay between them, broadly they fall into two categories.

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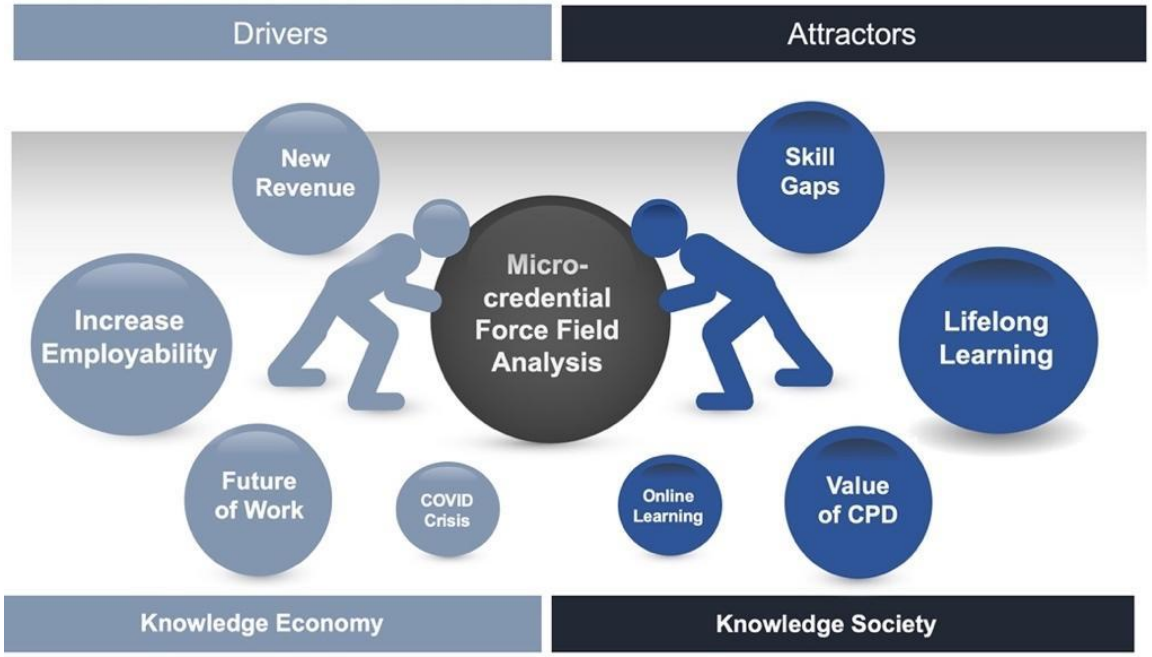

Figure 1: Driver and attractors for the growth of micro-credentials (Brown et al, 2023)

From a **Knowledge Economy** perspective, micro-credentials are seen as a means of recruiting people for the fast-changing labour market through **reskilling or upskilling**. A recent literature review (Brown et al., 2021) revealed that 'increasing employability' is the most dominant driver, with 63% of publications referring to this factor as underlying the micro-credential movement. Similarly, micro-credentials have been part of government responses to foster a job-centred recovery from the COVID-19 crisis. More pragmatically, an increasing interest in micro-credentials across different business and education sectors may be fuelled by the financial attraction of generating new revenue by opening access to new markets. After all, HolonIQ (2021) estimates the global online degree and micro-credential market will total US $117 billion by 2025. As Olcott (2022) observes, at the heart of the current interest in micro-credentials is economics and competition, and therefore business renewal is an important factor driving institutional adoption of micro-credentials.

HEIs are beginning to understand that there could be a new untapped market of potential learners including alumni, an ever larger group, who have already earned credits through MOOCs (Massive Open Online Courses) and other online offerings from different providers. This presents an opportunity for HEIs to increase enrolment and revenue, while better aligning university learning to the skills needed by industry (Sjöö, & Hellström, 2019).

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From a **Knowledge Society** perspective, micro-credentials are a vehicle for creating a more inclusive culture of lifelong learning where everyone can thrive. Brown (2021) found that the aim of 'promoting the lifelong learner' featured as a driver or attractor in 48% of the published literature. Notably, in the EU context, micro-credentials are central to implementing targeted initiatives in the *European Pillar of Social Rights Action Plan* to reduce poverty and promote inclusion and accessibility to training and educational opportunities for a wider range of learners (European Commission, 2021). They are also seen to play a valuable role in delivering on EU policy targets to advance both the digital and green agenda. The key point is a broad spectrum of multifaceted drivers and attractors underlie the micro-credential movement. Jansen and Schuwer (2015) note that HEIs have different motivations for entering the micro-credential market, such as visibility, reputation, innovation, responsiveness to learners, generating income, or reducing costs (cited in Kato, Galán-Muros & Weko, 2020: p. 21).

The question for educational leaders is what weight do you place on these Knowledge Economy and Knowledge Society drivers and attractors in your micro-credential strategy? What is the main driver and what explicit deliverables underpin your decision to invest in micro-credentials?

What barriers exist for your institution when crafting strategic responses to micro-credentialing?

We respond by examining four 'types' of barriers.

Pedagogical barriers relate to the learning design and educational activities and resources that are bound within a micro-credential experience for learners, most often delivered through online and distance modes of learning. There is an entire section of this handbook dedicated to **approaches to teaching and learning**, but the basic premise is to ask how a micro-credential experience might be different from a course within a larger degree program often delivered through a hybrid format. The answer generally relates to a skills-based approach to learning linked with employment-relevant forms of training. The central barrier for many institutions will be building capacity among micro-credential design teams (professors, SME's and learning designers etc.) to shift from hybrid forms of classroom learning, to fully online, asynchronous modes of competency-based approaches to teaching and learning.

Policy barriers, identified by Pirkkalainen et al. (2023 p.53) which could impede the impact of strategic micro-credential planning include the failure to:

- implement national and institutional level strategies created with cooperation between ministries, HEIs and employers.

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- define levels of micro-credentials in accordance with national qualification frameworks (NQFs).
- include micro-credentials in the standards and guidelines for quality assurance in the European Higher education Area (i.e. Bologna process).
- build a Europe-wide trusted platform.
- connect commercial employment platforms to European educational institutions.

Technology barriers, also been identified by Pirkkalainen et al. (2023 p.53), include the failure to support interoperability, portability and learner agency by *not* implementing:

- a reliable, portable and secure technical platform for data exchange.
- open badges and other credentialing technologies that enable transparency and recognition.
- the use of artificial intelligence to personalise the learning and teaching experience.
- open-source tech based on commonly agreed-upon European standards.
- already existing infrastructure instead of 'reinventing the wheel'.
- blockchain technology to link learning to a learner's identity.

Organisational and Structural barriers, these include a range of issues related to organisational structures within universities, including academic faculties to general operations and academic and student services as well as planning and quality departments. The basic premise of organisational and structural barriers lies in stakeholder alignment and engagement and change management implementation.

- Bureaucracy and Institutional Inertia: organizations can be slow to adapt to new trends and technologies. Bureaucratic structures and resistance to change can impede the development of agile responses to micro-credentialing.
- Lack of Coordination: involve a multitude of stakeholders, including universities, governments, accrediting bodies, and employers. Lack of coordination among these entities can hinder the development of a cohesive strategy for recognizing and accrediting micro-credentials.
- Resource Constraints: many institutions operate with limited resources. Developing and offering micro-credential programs requires investments in curriculum development, technology, and faculty training, which can be challenging for institutions with tight budgets.
- Regulatory and Legal Hurdles: institutions must navigate complex regulatory environments that vary by country. Regulations related to education, accreditation, and labour market recognition can present significant barriers to implementing micro-credential programs.

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What challenges will joint micro-credential networks present for your institution?

Because the implementation of a joint micro-credentialing strategy implies a 360 degree ecosystemic view across a range of stakeholders, many challenges exist. Most challenges relate to the domains detailed throughout the rest of this guidebook. Some remedies include ensuring there is:

- Leadership buy-in
- An initiative lead at the institution level
- Faculty and cross-campus collaboration
- Sound pedagogical design
- Technological platform for secure data exchange
- Industry collaboration, alignment and forecasting
- Quality assurance alignment
- Recognition (bilateral or multilateral)
- Joint business and sustainability plan

Why are joint micro-credential networks and programs emerging as a core offering of European University alliances? What educational needs do exchange networks address?

Short, flexible, and credit-bearing learning courses and programmes, delivered through micro-credentials, have been touted as a means to fill the gap between traditional higher education degrees and the in-demand skills that jobs require. There is growing consensus that traditional academic programmes are ill-suited to provide for this unprecedented acceleration in demand for specific skill sets, for example **Green, Digital and Entrepreneurial** skills. Many argue that Higher Education cannot keep up with the increasingly nuanced combinations of rapidly changing expectations posed by students and the demands of the workplace. The micro-credential movement believes that these challenges can be addressed by moving from structured degrees and courses to stacks of smaller credentials and learning pathways, which verify in-demand skills and competences and are aligned with European and national policy developments in higher education and lifelong learning. Skills-based practices through micro-credentialing addresses the need to make pathways to good careers more accessible to a wider segment of the population by emphasising what learners can do, not on the degrees or certificates they've earned.

Lifelong learners should be able to piece together a range of different competencies and areas of knowledge from a range of different learning sources that align with employer requirements, and in turn be able to communicate the totality of their skills and abilities, translating their achievements into future opportunities through verifiable digital

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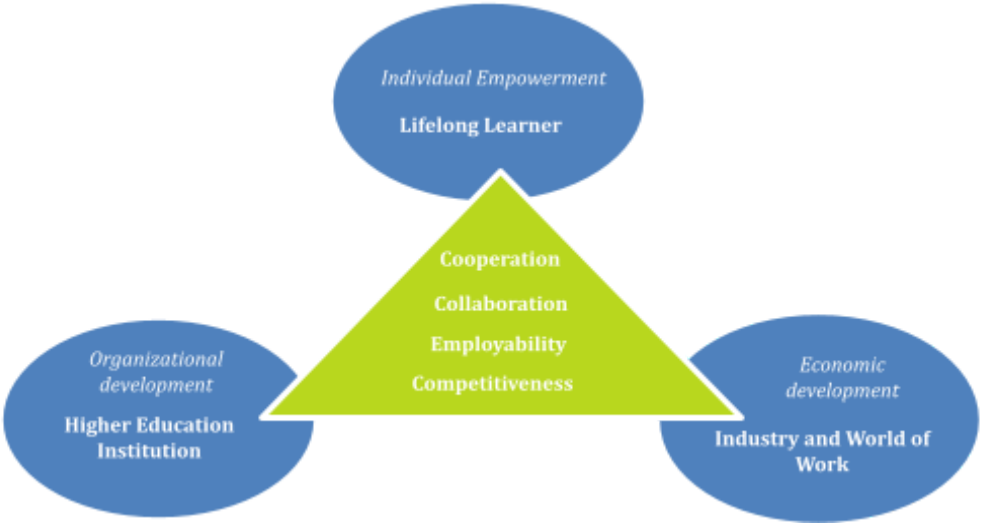
credentials. HEIs are being asked to rise to the twin challenges of digitisation and greening the economy, to do it better by improving access and personalisation, and to do it for cheaper given the economic imperatives of an ageing population. No institution can meet these challenges alone. The future of higher education will involve institutions efficiently providing high quality education in their areas of speciality (deepening their offer), and leaning on collaborations with other institutions to complement it (widening their offer through strategic networks and partnerships).

Joint exchange programs will allow students to assemble portfolios of learning from across **common exchange networks** to make up new forms of qualifications, verifiable credentials and career pathways. Joint Micro-credential exchange networks, such as the MicroCredX project, address the challenges of integrating the strategic training-education-labour stakeholder triangle of 1. Lifelong learners, 2. Higher Education Institutions and 3. Industry and the world of work.



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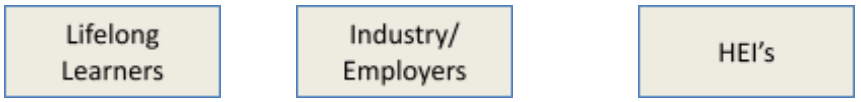

Use Case: MC Exchange Erasmus + Project

MicroCredX's vision of the future is shaped by the need to transform digital higher education through university alliances and strategic networks. MicroCredX will prepare institutions by taking advantage of the opportunities for building new models of unbundled and flexible learning provision, responsive to changes in industry and society. This is rooted in the firm belief that universities must attain more strategic responsibility for employability, agile continuous education and lifelong learning. To this end, MicrocredX's shared educational vision is to build strategic alliances capable of designing responsive and flexible learning and career pathways for lifelong learners, aiming to close the skills gap between higher education and the world of work through continuous education.

What are MicrocredX's objectives for implementing a joint micro-credential exchange network?

By building a joint MCX network, the project will:

- ✔ Work with HE leadership to strategically implement micro-credentials through a common portfolio offering across a Joint network
- ✔ Establish a network of institutions active in preparing students for Industry 4.0 by launching combined course offerings through a joint micro-credential exchange network tailored to emerging labour market needs
- ✔ Enable students to engage in virtual mobilities which foster new learning and career pathways and lead to new qualifications or contributing to existing ones
- ✔ Distil the lessons learnt in implementing a joint micro-credential exchange network into a set of practical tools and guidelines which can build cross-sector understanding, uptake and consensus for future action

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2. Definition and Purpose

Target Audience: Senior leadership, Core members of a MC design team

Does your institution need a common definition for Micro-credentials when building a joint Microcredential exchange network?

Although micro-credentialing is attracting increasing attention across the global higher education community, agreeing on an exhaustive or universal definition is a difficult task. This is particularly true when you consider the varying types of providers, industry partnerships and cross-sector and transdisciplinary approaches that exist to micro-credentialing today.

However, an established and inclusive definition across higher education, vocational education, and industry can help foster better cooperation and interoperability, especially when building joint microcredential exchange networks and programs. Although there is still some debate among researchers and practitioners on the term micro-credential, a common understanding in Europe is emerging. The most recent recommendation from the European Union (2022) on a European approach to micro-credentials for lifelong learning and employability reflects the most recent policy developments in this area.

'Micro-credential' *means the record of the learning outcomes that a learner has acquired following a small volume of learning. These learning outcomes will have been assessed against transparent and clearly defined criteria. Learning experiences leading to micro-credentials are designed to provide the learner with specific knowledge, skills and competences that respond to societal, personal, cultural or labour market needs. Micro-credentials are owned by the learner, can be shared and are portable. They may be stand-alone or combined into larger credentials. They are underpinned by quality assurance following agreed standards in the relevant sector or area of activity.*

Other relevant concepts related to a European approach to micro-credentials are outlined in the most recent EU recommendation (2022), found here.

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What is a Joint Microcredential Exchange Network and should your institution participate in one?

A key driver for the increasing interest in micro-credentialing is that they have become a central feature of the EHEA skills agenda (European Commission, 2021). Joint micro-credential programs and exchange networks are becoming a core offering of multiple institutions and pan-European alliances (Pirkkalainen et al., 2023) allowing learners to upskill or reskill with in-demand competencies in the labour market. Institutions in the EHEA are increasingly motivated to offer micro-credentials and the influence of existing and new partnerships through EHEA funding mechanisms has further incentivised institutions to unbundle traditional programs and courses or design new courses into networked offerings. Based on these developments, a growing need has emerged to conceptualise what a Joint Microcredential Program is.

In response, the *European Association of Distance Teaching Universities* (EADTU) have responded by developing guidelines for the "*Design and Development of a Joint Microcredential programme in Higher Education*" (Henderikx et al., , 2022) as detailed below.

A joint microcredential program:

- is a coherent set of courses in a specific field (usually between 1 to 3 ECTS), requiring a coherent curriculum design methodology with an overall credit load between 20-40 ECTS.
- has an academic and professional profile and seeks academic and professional recognition. They are designed by a higher education institution and possibly co-designed by a labour market organisation (i.e. a public or private enterprise; a professional body; an employment agency).
- typically constructed from a set of courses with a coherent curriculum design

A micro-credential program is significantly less than a bachelors degree (180-240 ECTS) or a masters degree (90-120 ECTS), as represented in Table 1 below, connecting EQF with ECTS through the QF-EHEA from micro to masters degrees.

Table 1 Overarching Framework of Qualifications of the European Higher Education Area (revised 2018)

Educational Level	EQF Level	ECTS Equivalent
Micro-learning Unit	EQF Level 5-8	<1 ECTS

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Micro-credential course	EQF Level 5-8	1 to 3 ECTS
Micro-credential program	EQF Level 5-8	4 ECTS or more (typically 20-40 ECTS)
Foundation Degree (Short-cycle qualifications)	EQF Level 5	120 ECTS
Bachelor Degree (First-cycle qualifications)	EQF Level 6	180 or 240 ECTS
Master's Degree (Second-cycle qualifications)	EQF Level 7	90 or 120 ECTS

A joint micro-credential exchange network can be considered as a precursor to a joint microcredential programme, a method for a collaborative piloting of a coherent curriculum design across several institutions .

A joint micro-credential exchange network:

- is a coherent set of short courses with a specific industry/sector focus, intentionally designed by a consortium or alliance of HEI's with a shared educational vision in order to complement and amplify current program offerings
- has an academic and professional profile at a common and specified educational qualification level (i.e. EQF) which may offer stackability toward a micro-degree (20-40 ECTS)
- will enable virtual mobilities to enhance their studies through new learning and career pathways
- will harmonise institutional policies and regulations for transfer, interoperability and recognition of micro-credentials within the network partnership and ensure openness and transparency so that learners, employers and other credential consumers all have access to critical information in a standardised data format

3. Leadership and Strategic Institutional Responses

What type of institutional leadership is required?

Successful institutional responses to micro-credentialing depend heavily on the right leadership. What type of institutional leadership is required and who will drive the strategy? Do you need a senior academic, project manager or an experienced administrative leader? Do you look within your institution or recruit someone from outside with the type of leadership experience and toolkit required for establishing a new business operation? What specific leadership qualities are you wanting from your leader? While the current leadership literature on micro-credentials is

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little help in answering these questions, there is a wealth of literature on educational leadership and what it takes to successfully lead and execute major teaching and learning projects. This literature should inform your planning and decision-making as appointing the right leader for your institutional context is essential.

Among the limited literature on leadership within the micro-credential movement, Brown et al. (2023) argue that the basic premise is straightforward, micro-credentialing requires transformative leadership which relies on a whole team effort. As Christensen and Eyring (2011, p. 381) put it, you must "get the right people on the bus and in the right seats". The importance of ensuring diversity in deciding who sits in these seats should also be emphasized. Transformative leaders value competing viewpoints as debate, disagreement and even resistance can be a valuable source of insight.

The below image outlines the range of people to be included in an effective micro-credential leadership team. It presents the core team proposed by Bigelow et al. (2022) and identifies many other key interfaces through the institution and beyond. While the importance of the initiative lead cannot be underestimated, the development of a suite of micro-credentials requires employer engagement, subject matter experts, and specialist pedagogical, learning design and educational technology support. The role of the leadership champion who ideally is a member of the senior executive team is also crucial.

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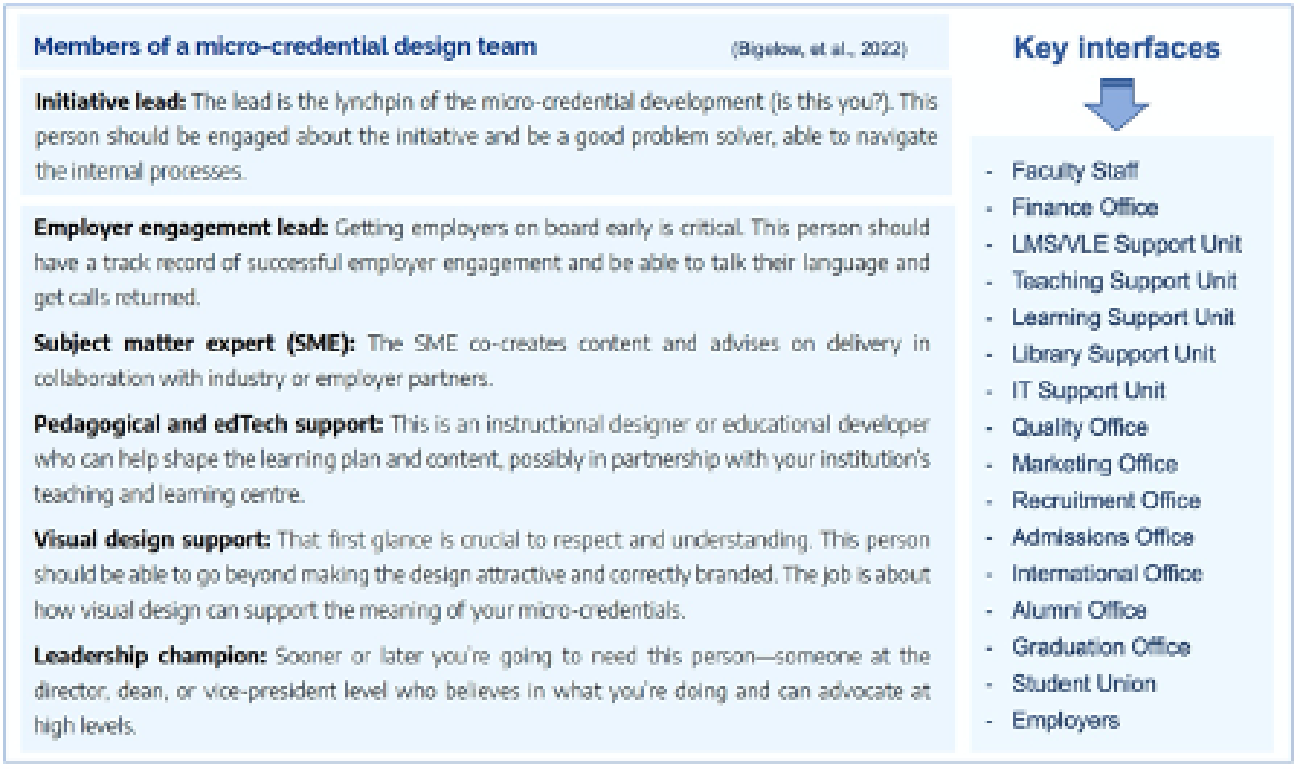

Finally, a successful micro-credential strategy depends on many stakeholders, so institutional silos should be avoided at all costs. An effective strategy should have strong interfaces across the institution, such as a task-force or steering committee on micro-credentialing for more top-down forms of institutional collaborations or an active community of practice for more horizontal and bottom-up forms of collaboration.

How should you mitigate against risk?

After developing a comprehensive implementation strategy, it is prudent to ask: what could possibly go wrong? What would be the worst-case scenario for a failed micro-credential strategy? The answer to this question conjures up the 3Rs: Reputation, Recruitment and Revenue. A nightmare scenario might lead to loss of reputation due to a failed new business venture. Moreover, poor recruitment of new students due to insufficient attention to the demand-side of micro-credentials is another risk. There is also a risk that micro-credentials attract students who might normally pursue a macro-credential, with a resulting loss of income as they fail to continue their studies. This risk has implications for the price HEIs decide to charge students for micro-credentials as the wrong revenue model could easily undermine and potentially dismantle traditional macro-credentials. Importantly, failure to meet your financial

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targets and high costs associated with developing short online courses compared to larger ones generating more income should also be of concern, even when they assemble and adapt lower-cost OER. These worst-case scenarios, and others, highlight the importance of ensuring that educational leaders follow best practice in terms of risk management. Most large HEIs have a risk management framework, which is your friend in terms of further identifying and mitigating risks. As part of prudent strategic planning, it would be advisable for your institution to have a 'plan B' or exit strategy should your micro-credentials fail to achieve the income and recruitment targets you have set for them. After all, micro-credentials would not be the first educational innovation that fails to live up to the hype and without the right leadership some institutions may need to walk away from them.

4. Joint MCX Network: The Concept

Aligning Institutional Policies and Strategic Planning Across the Network

Guiding Policy Questions:

How can cooperation in the EHEA:

-be strengthened in order to cater to the skill demand of employers?

-improve the employability rate of university students?

-raise the profile (3 Rs reputation, revenue, recruitment) of HEIs embracing the adoption of study programme unbundling and micro-credentialing?

Adopting micro-credentials implies overcoming cultural, pedagogical, technological and political obstacles which prevent the progress of skill and competence expression and brokerage that can be greatly enabled by the portability of verifiable digital credentials. A labour-market oriented redesign of targeted university curricula, provided as online courses or MOOCs will cater not only to the needs of students of one's own institution, but also to international students and employees needing retraining or upskilling. Such a shift could also allow interaction amongst these

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three user groups, but it demands substantial organisational change from academic leadership, faculty members and institutions. The same is true for the recognition and portability of digital credentials obtained from outside one's institution and their integration into the curriculum.

Integrating Policy and Strategy into Joint Micro-credential Exchange Network: A Design and Development Roadmap

The following Joint Microcredential policy roadmap is informed by the latest EU policy documents (Henderikx et al., 2022)

• **align with European and national developments:** connect with EU policies related to the European Commission's Proposal for a Recommendation to the Ministers of Education on micro-credentials (European Commission, 2021); connect with national micro-credential frameworks under development; and take advantage of European initiatives under various projects;

• **define the macro-objectives of the exchange network** and link them to broader institutional strategies, such as reconciling continuing education and professional development with learners' living and working conditions, cooperating with public and private sectors and professional organization, developing synergies with other universities for higher quality and making continuing education internationally attractive;

• **build the partnership with universities** based on trust and previous collaborations or common interests in research and innovation. If necessary, involve other stakeholders (professional organisations, employers) for co-design, co-development or co-delivery;

• **compose the joint MC exchange network team** led by a programme team leader, share leadership with the staff of the core MC design team and the respective institutions and involve teaching staff in the design and development of the programme;

• **ensure cross-institutional professional support** through the teaching and learning, internationalisation, ICT for education, legal services and the student administrations;

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• **share a joint educational vision** about the micro-credential programme, based on a needs analysis and learner characteristics. Develop an academic and professional profile and a unique selling point;

• **design the joint micro-credential exchange network** according to current pedagogical principles so that it can be successfully developed and implemented, defining learning outcomes and competences, designing a coherent programme in content and structure, defining modes of delivery, matching media and tools, designing space for flexibility; improving the student's learning experience; determining the study load; making the programme inclusive; and designing mobility modes for students and staff;

• **justify and agree on the joint qualification** to be granted, aligned with institutional qualification structures for continuing education and professional development, accompanied by a joint certificate and possibly a professional qualification;

• **create an educational and technological ecosystem** for the delivery of courses by selecting a digital learning environment, sharing and aligning media and resources, and mutual access to libraries, research and innovation;

• **install a language policy** to make the programme accessible within the partnership and in different geographical areas, possibly translated;

• **establish an admission framework** for the joint micro-credential exchange network until a joint application at the end of the admission procedure, joint admission criteria and a joint credential evaluation with recognition of acquired knowledge and experience;

• **determine joint examination regulations** for the organization of examinations, a joint grading system and the issuance of a joint qualification and qualification supplement;

• **make agreements on a common scheme for quality assurance, linked** to institutional frameworks for quality assurance and based on ESG and the Guidelines for E-learning. Consider the quality assurance system of European university alliance. Use evidence-based quality assurance tools. If necessary, draw up an accreditation plan;

• **develop a joint business plan,** balancing public and private funding and tuition fees within broader institutional frameworks for continuing education. Use micro-credentials as mobility windows in degree education;

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• **develop a student recruitment plan,** including multi-segment recruitment campaigns and prospective student flows;

• **conclude a consortium agreement** in which responsibilities and tasks are laid down.

• **develop a sustainability framework** with a commitment from universities for several years to ensure basic sustainability, an annual institutional review and improvement plan and a medium-term financial plan.

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References

Bigelow, A., Booth, C., Brockerhoff-Macdonald, B., Cormier, D., Dinsmore, C., Grey, S., Harrison, L., Hobbs, A., Lee, S., Maher, P. and McArthur, F., 2022. eCampusOntario's Micro-credential Toolkit. Toronto, Ontario: e-Campus Ontario. Available at URL: https://ecampusontario.pressbooks.pub/microcredentialtoolkit/

Christensen, C., and Eyring, H. 2011. *The innovative university: Changing the DNA of higher education from the inside out.* San-Francisco. Jossey-Bass.

European Commission. 2021. "European Skills Agenda." Accessed 6 May 2023. https://ec.

europa.eu/social/main.jsp?catId=1223

Henderikx, P., Ubachs, G., & Antonaci, A. (2022). Models and guidelines for the design and development of a joint

micro-credential programme in higher education. Global Academic Press. DOI: 10.5281/zenodo.6477131

Pirkkalainen, H., Sood, I., Padron Napoles, C., Kukkonen, A., & Camilleri, A. (2023). How might micro-credentials influence institutions and empower learners in higher education?. *Educational Research*, *65*(1), 40-63.

Domain 2: Unifying Design Principles, Minimum Standards, and Critical Information Requirements

Introduction

Designing micro-credentials in larger networks has obvious benefits. Such joint endeavours allow partner institutions to offer a greater variety of MCs to their students, while spending less time and resources on designing and implementing courses themselves. However, joint MC exchange networks require some preliminary considerations to ensure a smooth and concerted implementation process.

While the term “miro-credentials” was created only recently (it first appeared in Google Search in the year 2013, see Mark Brown et al., 2021), the idea of designing courses or programs that are shorter than traditional degrees and diplomas is not a new phenomenon and well known to the majority of HEIs and private education providers. To create short courses within a micro-credentials exchange network, however, the network partners will need to define unifying design principles and agree on minimum standards and critical information requirements early on. These preliminary steps will allow studnet mobility, learner agency and recognition across national borders, ensuring that the offered MCs meet the requirements of qualification frameworks and quality assurance agencies.

Already the earliest initiatives to launch MCs collaboratively have relied on common design principles and minimum standards. A well-known example is the State University of New York and its micro-credentialing strategy. The SUNY Micro-credentialing Task Force established “guiding principles” the institution’s campuses shall adhere to when implementing MCs. These guidelines advised the campus management and adminstration that their offered MCs shall be “of high academic quality”, “aligned with the campus mission and its strategic goals”, and “portable and stackable”, to name but a few. (SUNY, 2018: p. 4).

The following chapter - domain 2 - will help you determine unifying design principles with your network exchange partners and inform you about minimum standards and critical information requirements. When establishing unifying design principles, you should keep in mind that micro-credentials shall serve both existing and new students,

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alumni, business and industry partners, etc. A good starting point to determine guiding design principles for your joint MC exchange network might be the creation of a working group (Bigelow et al., 2022: p. 9). Close collaboration with relevant stakeholders (the members of the consortium, the HEIs' management board and educational support staff, students, industry partners etc.) will help to discover the right design principles for your institutional strategic priorities and educational setting (Stoddard et al., 2023: p. 7).

Implementing a joint micro-credentials exchange network requires careful planning and coordination among participating institutions, organizations, and stakeholders. Here are three recommendations the MicroCredX team wants to share with you:

1

Agree on common design principles and minimum standards

Partners in a joint MC exchange network should establish a common definition and minimum standards of micro-credentials to avoid misunderstandings and inconsistencies. This agreement should encompass factors like high academic quality, alignment with institutional mission and goals, portability, and stackability.

2

Focus on exchangeability, flexibility, and standardization

Design principles for a joint micro-credentials exchange network should prioritize exchangeability, allowing students to transfer credits earned in one institution to another institution. Additionally, modularization and flexibility in course selection should be offered to students, enabling customization based on their interests and aspirations. Standardization is essential to ensure consistent criteria and quality, enhance recognition by employers and institutions, and maintain the value and credibility of MCs.

3

Foster collaboration and stakeholder engagement

Establish a working group and collaborate closely with relevant stakeholders such as consortium members, management boards, educational support staff, students, and industry partners. This

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collaboration will help determine the right design principles aligned with strategic priorities and educational settings.

The following sections are intended to answer the most pressing questions when establishing a joint MC exchange network for the first time. It is divided into three sections. Each section offers a series of questions and answers, providing the most essential information for all those involved in the process of implementing a collaborative micro-credentialing strategy. Moreover, you will find under each question the relevant target audience and tags, allowing the implementation framework to be personalized at a later stage.

Unifying Design Principles

Do the partners of a joint MC exchange network need to agree on a common definition of MCs?

Finding a common definition will avoid any misunderstandings and inconsistencies in the MC implementation process (Bigelow et al., 2022: pp. 3-4; Stoddard et al., 2023: pp. 7–8). The MicroCredX consortium has adopted the definition provided in the Recommendation of the European Council (see domain 1) which offers enough flexibility to accommodate the micro-credentialing strategies and educational traditions of 5 European HEIs.

What is the purpose of establishing unifying design principles for the implementation of MCs in a larger joint exchange network?

The unifying design principles will enable the mutual exchange of micro-credentials between different providers and platforms. These principles shall help avoid inconsistencies within the network, while still allowing for the necessary flexibility, dynamism and innovation of MCs. The unifying design principles will help overcome barriers in the establishment of a joint microcredential exchange network and during its lifecycel. It is necessary to determine how these new microcredential offerings will complement the consortium's existing academic programs and how they will fit within the broader learning ecosystems. Will the microcredential count toward a bachelor's or master's degree? Does the learner enrolled in an MC course enjoy the same rights and obligations as regular students, such as access

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to learning resources from the library? These are necessary preliminary considerations the consortium partners should focus on. (Stoddard et al., 2023: p. 7)

What could be unifying design principles for the implementation of MCs in a larger joint exchange network?

The partners of the planned joint exchange network will need to agree on the specific unifying design principles they want to follow from the very beginning. As has been stated in the introduction, several precursors to the MicroCredX micro-credentials exchange network have already adopted design principles. The choice of principles varies according to the needs of the network partners. The consortium members of the MicroCredX project, for example, agreed on the following principles:

The Unifying Design Principles of the MicroCredX Consortium

- ☐ **Exchangeability** of MCs within the consortium
- ☐ **Flexibility**
- ☐ **Standardization**
- ☐ **Stackability** (MCs shall coherently fit into a micro-degree (15-30 ECTS))
- ☐ **Contextualised to and transferable** to other study programs
- ☐ **Focused** on key priority areas within the larger context of Industry 4.0
- ☐ **Transferability** in different languages
- ☐ **Aligned** to the demans of industry 4.0 and the green and digital transition
- ☐ **Skills-focused** and **outcome-based** (i.e. not content-based)
- ☐ **User-centred design** guided by UX research

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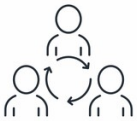
What might be 3 key design principles?

The design principles and minimum standards will vary according to the needs, expectations, and political constraints of the consortium partners. The MicroCredX consortium defined the following 3 key unifying design principles a joint micro-credentialing programme should adhere to:

Exchangeability:



The exchangeability of MCs among partner institutions is at the heart of any joint MC exchange network. It allows students to transfer the credits they earned in one MC at one institution to another degree program at a different partner institution. Thereby, institutions can offer a wider variety of courses from their network partners. The possibility to exchange MCs provides students with more flexibility to tailor their education to their career goals and interests and to enjoy instruction from experts based at other HEIs.

Flexibility:

The modularization of courses (by offering smaller and exchangeable MCs) offers students more flexibility by allowing them to choose which topics to study and when to study them (Bigelow et al., 2022: p. 13). This customization can allow students to choose elective courses, internships, and short study abroad programs that align with their personal and professional aspirations.

Standardization:

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With a standardized system, micro-credentials will have consistent criteria and standards, making it easier for learners, employers, and institutions to understand their value. Moreover, standardized micro-credentials would be more widely recognized and accepted by employers, universities, and other organizations. This would increase their value and credibility. In addition, standardization would ensure that micro-credentials meet a certain level of quality and rigor, and would prevent low-quality credentials from diluting the value of the system.

Several steps will be necessary to bring you standardization efforts to fruition. First, you will need to establish clear criteria for what constitutes a micro-credential, including the required level of learning outcomes, assessment methods, and evidence of achievement. It is then required to develop adequate quality assurance mechanisms to ensure that micro-credentials meet these criteria. You might also want to offer your digital credentials in a standardized way (for example, by using EUROPASS).

What does stackability mean? And should accumulated MCs automatically lead to a full degree?

Stackability implies that MCs can be collected and combined, thereby providing a pathway to a certificate or full degree.

The MICROBOL consortium has argued against the idea that MCs can automatically be 'stacked' into a full degree solely on the basis of the numerical sum of the credits. Full degree programmes usually require further research practices such as the submission of a final thesis and a structured curriculum with few possibilities to choose courses freely (MICROBOL, 2021).

The MicroCredX consortium follows MICROBOL's recommendation. It will not offer the possibility to collect MCs for a full Bachelor's or Master's degree.

Are there other international initiatives that agreed on unifying design principles with regard to the implementation of MCs?

Yes. It has already been mentioned that SUNY created common design principles as part of their strategic planning for their campus-wide implementation of MCs, leading to one of the world's most mature micro-credential eco-system on an institutional level. Another example is the National Microcredentials Framework commissioned by the Australian Government. The Australian framework agreed on the following unifying principles (2021: p: 3):

- Outcome-based
- Responsive to industry-need
- Tailored to support lifelong learning
- Transparent and accessible

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e-Campus Ontario, an organization devoted to support distance and online education in Canada, has identified 4 principles around micro-credentialing in their work.

- Relevance
- Verifiability
- Ownership
- Extensibility

The B.C. government in Canada, agree on the following:

- Access
- Quality
- Relevance
- Collaboration and Coordination
- Employer and Industry Engagement
- Clarity and Transparency

It will be up to the needs of your institution and consortium to select the appropriate unifying design principles, aligned with the mission and vision of your overall Micro-credential strategy. In the below table, you can see a range of recent frameworks, guidelines and toolkits

Recent Frameworks, Guidelines and Toolkits
1. Australia Framework
2. MicroBol Framework
3. BC Government Framework
4. A European Approach to Microcredentials
5. State Univeristy of New York: SUNY
6. Towards a European approach to micro-credentials: a study of practices and commonalities in offering micro-credentials in European higher education
7. Models and guidelines for the design and development of a joint micro-credential programme in higher education

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8. Micro-Credential Users' Guide
9. Designing & Implementing Micro-Credentials: A Guide for Practitioners
10. EMC Common Microcredential Framework
11. ECampus Ontario Microcredential Toolkit

How do MCs become part of meaningful learning pathways?

In order to create meaningful learning pathways, MCs should be developed in a manner that shows how they:

- relate to other credit and non-credit bearing opportunities,
- connect with existing larger units of learning, and,
- remove barriers and create clear and varied pathways for learning.

Meaningful pathways must be designed and operationalized across a range of institutional areas and collaborations, including areas of academic management and operations, such as academic services, planning and quality assurance, professional guidance and career services, and library and learning resources, as well as more academic staff such as program managers and teaching faculty. Identifying and operationalizing learning pathways also has to be a part of strategic leadership and planning, including areas such as business development, corporate development, globalization and cooperation areas, and marketing.

Shall I codesign MCs with the Industry?

If you want to offer MCs responsive to the needs of the Industry, regular conversations with industry partners will be necessary. It's a good practice to get in touch with several industry partners to get a better perspective on the required skills and possible up- and reskilling opportunities (Bigelow et al., 2022: p. 11). Developing institutional alliances with chambers of commerce as well as corporate and industry partners can help identify the skills-demand across different industry sectors and professional profiles, particularly in the context of rapidly evolving labor markets. Focus groups, skills-demand surveys, Labour Market reports and your own institutional skills alignment and labor market analysis research can ensure that your institution generates scientific knowledge to understand skills gaps and educational skills matching in order to better offer personalized learning pathways through micro-credentials.

It is a good practice to involve employers early on in the design process. Moreover, you should be in contact with employer organizations or professional bodies when determining which skills and competencies shall be assessed and what kind of assessment will be appropriate (eCampus Ontario 2022, p. 19)

Please consult also Domain 5: Industry Design and Forecasting.

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What is a clearing house?

A clearinghouse for micro-credentials is a platform that gathers and showcases verified digital badges and micro-credentials earned through various learning activities, such as online courses, workshops, and alternative educational programs. It serves as a centralized hub that allows learners to share, store, and showcase their accomplishments and competencies, while also helping employers and institutions to identify and validate individuals' skills and knowledge. A good example of a clearing house for micro-credentials in Higher Education is the MicroCreds platform. The website offers quality assured and accredited micro-credentials (https://microcreds.ie/). Other examples of clearinghouses for micro-credentials include OpenBadges, Credly, and Acclaim.

Do we need to adopt a common language policy?

Following guidelines from EADTU (Piet et al., 2023 p.60), joint micro-credential offer of programmes and exchange networks should install a language policy. If the should opt your joint exchange network shall be accessible to learners worldwide, you MicroCredX to offer your courses in English or provide English translations / subtitles. The offer consortium has discussed a consortium-wide language policy and decided to as in courses in the national languages (such as Finish, German, Spanish, etc.) as well between English. We are also planning to have clusters of Spanish (exchangeable UOC/MU, German (exchangeable between DHBW/FHJ), Finnish, and English (exchangeable across the whole network) MCs. Regardless of the composition of your consortium and their language backgrounds, it is essential to discuss and implement a clear language policy.

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Minimum Standards

In June 2022, the Council of the European Union published a “Recommendation on a European approach to micro-credentials for lifelong learning and employability” (https://data.consilium.europa.eu/doc/document/ST-9237-2022-INIT/en/pdf). The EU expects HEIs to adopt this European approach (e.g. §7a, p. 17) and come up with a concept for implementation until the end of 2023 (§21, p. 26). The scope includes micro-credentials, as well as policies that can support their effective design, issuance and use. As detailed in Domain 1 on Policy and Strategic Planning, the Council of the European Union defined a micro-credential “as the record of the learning outcomes that a learner has acquired following a small volume of learning. These learning outcomes will have been assessed against transparent and clearly defined criteria. Learning experiences leading to microcredentials are designed to provide the learner with specific knowledge, skills and competences that respond to societal, personal, cultural or labour market needs. Microcredentials are owned by the learner, can be shared and are portable. They may be stand-alone or combined into larger credentials. They are underpinned by quality assurance following agreed standards in the relevant sector or area of activity.” (p. 13)

Hence, according to the Council of the European Union, MCs should be

- focused on learning outcomes.
- transparent and recognized.
- responsive to societal, personal, cultural or labour market needs.
- owned by the learner.
- shareable and portable.
- stand-alone or combined into larger credentials (stackable).
- underpinned by quality assurance.

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The MicroCredX consortium has agreed to adopt these minimum standards. The following section will answer questions that might arise from the Council of the European Union's proposition on minimum standards.

Why should MCs be focused on learning outcomes?

Learning outcomes are verifiable descriptions of the competences and skills the learner will be able to demonstrate at the end of a learning experience. Micro-credentials need to focus and clearly formulate the overall learning outcomes a learner is expected to achieve upon completion. Hence, the employers will know that potential candidates / workforce have acquired or achieved a specific skill set depending on their completed micro-credentials. Learning outcomes should be adapted on the basis of future academic opportunity and employability forecasts. Competency and challenge based education have become increasingly common in higher education, shifting away from traditional forms of curriculum and assessment practices based on theoretical knowledge and examination. Learning outcomes approach derives from the concept of constructive alignment in higher education teaching and learning (Biggs, 1999). Constructive alignment is a principle used for designing teaching and learning activities, and assessment tasks, that directly address the intended learning outcomes in a way that is not typically achieved in more traditional forms of higher education teaching based on lectures, tutorial classes and examinations.

Why does a fair and transparent assessment matter?

A fair and transparent assessment process ensures learners' trust in the value of the micro-credential and facilitates recognition by employers and HEIs. Micro-credentials should therfore be based on the principles of transparency, reliability and authenticity. assessment will validate and attest that specific skills and/or competencies have been achieved.

The Erasmus+ project DigiProf is currently developing transparent assessment methods for online learning. For more information, visit https://eden-europe.eu/digi-prof/.

Why do MCs need to be recognized?

Recognition of micro-credentials by employers and industry organizations can help to validate the skills and knowledge gained through these credentials, increasing the likelihood of career advancement opportunities. It can help to create learning pathways for learners. This means that learners can earn a series of micro-credentials that build on one another, leading to higher-level credentials and advanced career opportunities. If the MCs are not recognized, they cannot be integrated into national and international public learning ecosystems.

Furthermore, recognition of micro-credentials by reputable institutions and organizations can help to establish the credibility of MCs and can help to establish standards for the quality and rigor of MCs in general.

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Should MCs respond to societal, personal, cultural or labour market needs?

Micro-credentials shall be designed and implemented with the intent of meeting societal, personal, cultural or labour market needs. They should be informed by current data and align with relevant industry/sector/professional standards. They will provide opportunities for upskilling and reskilling and can be easily adapted to emerging and constantly changing market needs. Micro-credentials will also address more general needs, such as communication or leadership skills. The acquired knowledge, skills, and competencies have immediate value in the job market and relevance in the professional field/discipline. Micro-credentials can facilitate smooth knowledge transfer, translating the latest research results quickly into learning opportunities for the benefit of the industry and the workforce.

What educational and socio-economic problems will a joint micro-credential programme address?

A joint micro-credential program can address several educational and socio-economic problems.

One of the biggest challenges facing the workforce today is the skills gap - the mismatch between the skills that employers need and the skills that workers possess. Joint micro-credential programs can help address this problem by swiftly providing learners with skills and knowledge that are in high demand by employers at the moment.

In addition, access to education and training can be limited by factors such as geography, income, and educational background. Joint micro-credential programs can help to address these barriers by offering flexible and affordable learning options that are accessible to a wider range of learners.

Last but not least, joint micro-credential programs can facilitate innovation and collaboration between institutions, leading to the development of new and more effective educational models and approaches.

How can a MC be owned by the learner? How can I guarantee that the MCs of the joint exchange network are shareable and portable?

Some institutions already offer their graduates learner-owned credentials. The graduates of the University of California-Irvine, for example, can own and control their credentials personally, no longer needing to rely on the services of their institution's transcript office (Matkin et al., 2020).

The MicroCredX consortium awards the learner for each completed MC between 2 to 5 ECTS. Furthermore, it intends to implement the European Digital Credentials Infrastructure (EDCI). In this way, the learner can store their MCs in their EUROPASS wallet and share it with others. For more information on EDCI, visit https://webgate.acceptance.ec.europa.eu/europass/edci-issuer/#/home.

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Shall MCs be credit bearing?

Micro-credentials are often credit bearing, but there are also non-credit MCs out there. Both, however, can lead towards a higher credential (Matkin et al., 2020). It is important, however, to inform the learner whether the completion of the MC will help him / her transfer into other credential programs (Bigelow et al., 2022: p. 43)

The MicroCredX consortium will offer credit bearing MCs (around 2 to 5 ECTS). Thereby, the learner will have the possibility to get the MC recognized by the consortium partners and other HEIs.

Does the learning volume for a MC need to be expressed in ECTS?

For reasons of exchangeability within the European Education Area, the use of ECTS is recommended, if the two key elements of ECTS, learning outcomes and volume of learning, are understood correctly (see MICROBOL, 2022: p.9).

Henderikx et al. differentiate between MCs that are offered in a formal higher education setting and are, therefore, eligible for ECTS and microlearning units that belong to the non-formal learning sphere and cannot be awarded with ECTS (see Henderikx et al., p. 6).

The MicroCredX consortium decided to express the learning volume in ECTS, thereby facilitating the exchange and recognition of MCs. The consortium is fully aware that ECTS are not widely recognized in the VET sector and among dual partners.

How many ECTS should a MC offer?

The European Commission's Micro-Credentials in Higher Education Consultation Group did not define whether MCs should have a learning volume of 1, 5 or 30 ECTS. The offer can vary in learning volume from 1 ECTS to any volume smaller than a degree at the same EQF level.

The MicroCredX joint MC exchange network will offer MCs with 2 to 5 ECTS.

Should you indicate the NQF/EQF level for each MC?

Indicating the NQF/EQF level for a MC can be helpful, allowing for more transparency and possible stackability. However, it might suffice to describe the learning outcomes (MICROBOL, 2021).

To which NQF/EQF levels should MCs be aligned to?

It has been suggested that MCs offered within a joint exchange network in a higher education setting should be aligned to levels 5-8 (see Henderikx et al., 2021: p. 9). The MicroCredX consortium will offer MCs aligned to level 6. In the near future, MCs should also be exchanged among our partner institutions that equal level 7.

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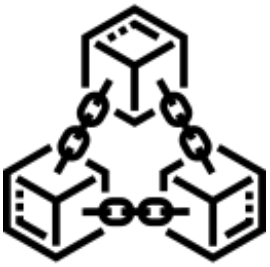
Can acquired MCs be safely stored? How can attempts to tamper with the credentials be prevented?

Yes, there are solutions based on blockchain technology. The MicroHE project developed the piloting portal Credentify for displaying, verifying and sharing microcredential data. It is a decentralized micro-credentials clearinghouse powered by a blockchain network across European universities. It allows the safe transfer of millions of micro-credentials. For more information, see https://credentify.eu/.

Moreover, the Knowledge Innovation Centre in collaboration with DHBW has plans to develop a clearing house. Any information regarding the future clearing house will be published on KIC's website: https://knowledgeinnovation.eu/



What are the benefits of the blockchain technology for the safe storage and exchange of MCs?

Blockchain technology prevents data mismanagement, content forgery and authenticity abuse, allows students to build a personalised digital resumé which would be fully trusted, improves the credential issuing process for education institutions and adds an extra layer of trust and document protection.

What infrastructure shall I use?

A good practice is to get an overview of already developed infrastructures on micro-credentials, digital certificates and recognition processes. To ensure future interoperability with European educational institutions, the MicroCredX consortium will adopt the European Digital Credentials Infrastructure (EDCI). For the EDCI standards, visit https://europa.eu/europass/de/edci-standards.

Selecting a suitable infrastructure for issuing, managing, and storing MCs at your institution can resemble the process of selecting a learning management system or similar technology. Several technological considerations need to be taken into account such as the integration into the existing platforms (Stoddard et al., 2023, p. 9).

Will the learner be able to share MCs with peers, employers and other educational providers?

Micro-credentials need to be shareable and portable, noted on a transcript and/or digital badge so that each micro-credential has value beyond the institution and can be broadly shared with peers, employers and educational providers.

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Will MCs facilitate learner mobility?

Micro-credentials should facilitate learner mobility across institutions, industries, and credentials. A good practice to promote mobility via micro-credentials are the newly founded Eurpean University Alliances. ECIU and ENHANCE already offer micro-credentials to the students of their alliances. The upcoming EU4DUAL European University Alliance will also offer micro-credentials focused on three grand challenges, Future of Work, Green Economy and Healthy Living. These consortia allow students to enrol in micro-credentials offered by partner institutions abroad.

Since micro-credentials are designed to be portable and transferable, learners can take their credentials with them and use them to demonstrate their skills and knowledge to potential employers or educational institutions. This can be particularly valuable for learners who are looking to change careers or pursue further education.

Is quality assurance for MCs necessary?

Quality assurance is essential for micro-credentials because it ensures that these credentials are credible, reliable, and valuable for learners and employers (Bigelow et al., 2022: p. 59). Quality assurance measures can help to establish the standards and criteria that micro-credentials should meet in order to be recognized and valued in the labor market. Furthermore, the existence of adequate quality assurance arrangements will help to build mutual trust necessary for the successful implementation of a joint MC exchange network. Please refer to Domain 6 in this framework to read more on Quality Assurance.

Critical Information Requirements

Critical information requirements are the data required to adequately describe a MC. While the Diploma Supplement provides the most crucial information about higher education degrees for international recognition purposes, there is currently no standardised way of describing micro-credentials. Critical information requirements, however, will

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provide greater consistency and portability and ensure learners can make informed decisions based on the provided information (Australian Government, 2021: p. 12).

Why do I need critical information requirements?

A lack of transparency is one of the reasons for the insufficient trust in MCs. The non-standardized and often insufficient information makes it difficult for learners, employers, higher education institutions and quality assurance agencies to understand the real value and content of micro-credentials and to compare them. The result is a lack of recognition of micro-credentials, whether for further learning purposes or in a labour market context.

It is therefore highly recommended to agree on a list of critical information requirements. The EU (see question below) and countries outside the EU have already recognized the central importance of agreeing on critical information requirements. The Australian Government, for example, provides a list of elements to describe a MC in the National Microcredentials Framework (see Australian Government, 2021: pp. 12-14).

What critical information requirements does the Council of the European Union propose?

The Council of the European Union proposed standard elements to describe a micro-credential. It shall include the following mandatory elements:

i) identification of the learner

ii) title of the micro-credential

iii) country(ies)/region(s) of the issuer

iv) awarding body(ies)

v) date of issuing

vi) learning outcomes

vii) notional workload needed to achieve the learning outcomes (in European Credit Transfer and Accumulation System – ECTS, wherever possible)

viii) level (and cycle, if applicable) of the learning experience leading to the micro-credential (European Qualifications Framework, Qualifications Frameworks in the European Higher Education Area), if applicable

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ix) type of assessment

x) form of participation in the learning activity

xi) type of quality assurance used to underpin the micro-credential

Are there other sets of critical information requirements besides the one the European Union proposed?

Yes. Several governments and HEIs have proposed a standardized description of MCs. The Australian Government, for example, proposes a slightly different set of critical information requirements and minimum standards in its National Microcredentials Framework =(see Australian Government, 2021: pp. 12-14).

Likewise, the ECCOE project has published a report on Quality Criteria for Credentials, which describes the most up-to-date thinking and practice on critical information requirements in the E.U. context.

What are the Dublin Descriptors?

The Dublin Descriptors are a set of five generic statements that describe the knowledge, skills, and competencies that students should have attained upon completion of a Bachelor's, Master's or Doctoral degree programme in Europe. They are intended to provide a framework for describing and comparing the learning outcomes of different degree programmes across Europe, and to promote transparency and recognition of qualifications across national borders.

The MicroCredX consortium decided to use the Dublin Descriptors to structure the learning outcomes within module descriptions. For a more detailed description of the unbundling process and the use of the Dublin descriptors for standardized module descriptions, see the forthcoming paper by Berkling and Hänisch, "Transforming CS Curricula into EU-standardized Micro-Credentials".

What is ESCO?

ESCO stands for European Skills, Competences, Qualifications, and Occupations. It is a standardized classification system used to describe and compare qualifications and competencies across different countries and sectors in Europe.

ESCO is designed to support the development of a European labor market and help job seekers and employers better understand the skills and qualifications required for different occupations. It includes a database of over 25,000 occupations and related skills and competences, which can be used by individuals, education and training providers, and employers to compare and assess qualifications and competencies across different countries and sectors. For more information, consult the ESCO portal: https://esco.ec.europa.eu/en.

This standardized set of definitions and descriptors for skills, competences, qualifications, and occupations can be beneficial for the standardization of learning outcomes. Where possible, the MicroCredX consortium will use the

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ESCO vocabulary to describe the learning outcomes of MCs (see the forthcoming paper by Berkling and Hänisch, “Transforming CS Curricula into EU-standardized Micro-Credentials”).

Should you offer your own MC portfolio or catalogue?

Portfolios or Catalogues might help learners to find suitable MC offers, provide information on the accumulation of credentials and, thereby, facilitate progress on the learners’ individual learning pathways (MICROBOL, 2022: p. 5)

A good example is the MicroCreds platform (https://microcreds.ie/). MicroCreds is a project led by the Irish Universities Association (IUA) in partnership with seven of the founding IUA universities. The website allows learners to explore the micro-credentials on offer and enroll online.

The MicroCredX consortium will rely on the institutions’ IT infrastructure. For the upcoming European University Alliance EU4DUAL a MC platform will be developed.

Conclusion

A joint micro-credentialing exchange network offers several benefits for individuals, educational institutions, employers, and the broader professional community. Institutions and organizations can offer a diverse range of micro-credentials and respond quickly to emerging industry needs, technological advancements, and evolving skill requirements. Learners can access a wide range of micro-credentials from multiple institutions, expanding their options and tailoring their learning experiences to match their career goals.

This domain emphasized the need for defining unifying design principles, minimum standards, and critical information requirements early on to ensure the successful implementation of such a joint network. By taking this preliminary step, a joint micro-credentialing network can ensure consistency, quality, interoperability, scalability, and stakeholder alignment. This lays the groundwork for a successful implementation and operation of the network, fostering a robust ecosystem that benefits learners, institutions, and the broader educational community.

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References

Australian Government. Department of Education, Skills and Employment: *National Microcredentials Framework*. November 2021. URL: https://www.education.gov.au/higher-education-publications/resources/national-microcredentials-framework

Berkling and Hänisch, “Transforming CS Curricula into EU-standardized Micro-Credentials”, forthcoming.

Biggs, John. "What the student does: Teaching for enhanced learning." *Higher education research & development* 18.1 (1999): 57-75.

Bigelow, A., Booth, C., Brockerhoff-Macdonald, B., Cormier, D., Dinsmore, C., Grey, S., Harrison, L., Hobbs, A., Lee, S., Maher, P. and McArthur, F., 2022. eCampusOntario's Micro-credential Toolkit. Toronto, Ontario: e-Campus Ontario. Available at URL: https://ecampusontario.pressbooks.pub/microcredentialtoolkit/

Council of the European Union: “Council Recommendation on a European approach to micro-credentials for lifelong learning and employability”, *Official Journal of the European Union*, C 243, Pages 10-25. June 2022. URL:

European Commission*: Final Report. A European Approach to Micro-Credentials. Output of the Micro-Credentials Higher Education Consultation Group*. December 2020. URL: https://education.ec.europa.eu/sites/default/files/document-library-docs/european-approach-micro-credentials-higher-education-consultation-group-output-final-report.pdf

Henderikx, P., Ubachs, G., Atonaci, A., 2022. Models and Guidelines for the Design and Development of Joint Micro-Credential Courses and Micorlearning Units in Higher Education. Global Academic Press. DOI: 10.5281/zenodo.6477131

Matkin, G., Charles, S., Alexander, J., Cartegena, H., Okhuysen, G., Hayes, G., Helbig, S., Knuff, D., Kurdahi, F., Minhas, J., Olivieri, V., Stephens, C., Kuan, Y. and Jeantet, A., 2020. The University of California-Irvine report of the workgroup on alternative digital credentials (ADCs), 1–14.

McGreal, R., Olcott, D., 2022. A strategic reset: micro-credentials for higher education leaders. Smart Learn. Environ. 9, 9. https://doi.org/10.1186/s40561-022-00190-1.

MICROBOL Working Group on Qualifications Framework and ECTS, Output document and recommendations, June 2021.

MICROBOL. Micro-credentials linked to the Bologna Key Commitments: *Common Framework for Micro-credentials in the EHEA*. March 2022. URL: https://microcredentials.eu/wp-content/uploads/sites/20/2022/03/Micro-credentials_Framework_final-1.pdf

Ministry of Advanced Education and Skills Training: *Micro-Credential Framework for B.C.'s Public Post-Secondary Education System*. September 2021. URL: https://bccampus.ca/wp-content/uploads/2021/11/micro-credential_framework.pdf

Orr, D., Pupinis, M., and Kirdulytė, G., 2020. 'Towards a European approach to micro-credentials: a study of practices and commonalities in offering micro-credentials in European higher education', NESET report, Luxembourg: Publications Office of the European Union.

Stoddard, E., Ruda, A., Trieckel, E. and Gallagher, S. R., 2023. Getting Started with Microcredentials: A Primer for Higher Education Leaders. Northeastern University. Center for the Future of Higher Education and Talent Strategy.

SUNY Micro-Credentialing Task Force Report and Recommendations, January 2018.

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Domain 3: Approaches to Teaching and Learning

1. Teaching modes

1.1. How are teaching and learning influenced through/by the specific characteristics and design of a Micro-credential programme?

In a society of constant change as of today, lifelong learning takes on great importance for employees as well as private individuals. Learning refers to the current situation of a society and the possibilities therein. There are several theories and methodologies on learning which can be distinguished in relational, traditional and reductionist theories. Learning theories such as behaviourism, cognitivism and constructivism do influence learning approaches at present. Generally, the design of MC programmes refers to constructivism.

In contrast to teaching methods, approaches to learning deal with the design of learning and ones' acquisition of knowledge, skills and competences from a learner's perspective.

Related to MC programmes, it is undeniable that the characteristics of the respective educational and economic ecosystem imply changes in various aspects of lifelong learning. Here are seven key considerations, grouped in three areas: vision, organisation and key (re)sources for learning.

- **VISION OF LEARNING:**
    - **Competency-Based Learning:** Micro-credential programmes often emphasise competency-based learning, where learners gain specific skills or demonstrate mastery in particular areas. This approach shifts the focus from traditional lecture-based teaching to more hands-on, practical learning experiences. Educators need to design teaching methods that allow learners to apply their knowledge, practice skills, and demonstrate their competencies effectively.
    - **Project-Based and Experiential Learning:** Micro-credential programmes should incorporate project-based and experiential learning approaches. Educators can design teaching strategies that involve real-world projects, authentic assessments, case studies, simulations, or internships, allowing learners to apply their knowledge in real world work contexts. This hands-on approach fosters active engagement, problem-solving skills and deeper understanding of the subject matter.

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- **ORGANISATION OF LEARNING:**
    - **Flexibility and Modularity:** Micro-credential programmes are designed to be flexible and modular, allowing learners to choose specific skills or knowledge areas they want to focus on. This flexibility enables educators to design teaching approaches that cater to individual learners' needs and goals, often linked to professional objectives and career advancement. Teaching can be customised to address specific learning pathways, linking one or several Micro-credentials in coherent and stackable itineraries, ensuring targeted learning outcomes are achieved.
    - **Collaborative Learning Communities:** Micro-credential programmes should bring together learners from diverse backgrounds and disciplines. Educators can create collaborative (virtual, hybrid, or face-to-face) learning communities where learners can share their experiences, collaborate on projects and engage in peer-to-peer learning. Teaching strategies can involve group work, online discussions and networking opportunities to foster a sense of community as well as encourage collective learning and exchange of experiences.
    - **Continuous Assessment and Feedback:** Micro-credential programmes might emphasise continuous assessment and feedback to track learners' progress and provide timely guidance. Educators can design teaching approaches that involve frequent assessments, formative feedback and opportunities for self-reflection. Data from Learning Analytics can be taken into account, or visualisations of competency achievement can be integrated into the learning experience. This iterative process helps learners understand their strengths, areas for improvement and motivates them to stay engaged throughout the programme.
- **KEY (RE)SOURCES FOR LEARNING:**
    - **Digital Tools and Technology:** Micro-credential programmes should leverage digital tools and technology to enhance teaching and learning experiences. Educators can integrate online platforms, learning management systems, virtual learning environments (VLE) and other educational technologies to deliver content, facilitate discussions, provide feedback and track and visualise learners' progress (learning analytics). These tools can enhance accessibility, collaboration and personalised learning experiences, ensuring an optimal experience in Micro-credential programmes.
    - **Industry Relevance and Partnerships:** Micro-credential programmes widely aim to bridge the gap between academia and industry, offering in-demand skills for employability. Teaching for such programs can be reinforced by building partnerships with industry experts, professionals and organisations, or by integrating labour market intelligence into curriculum renewal and course development. Thereby, educators have the chance to incorporate industry-relevant case studies, guest lectures and real-world examples into their teaching, ensuring learners acquire skills and knowledge in contexts close to reality, directly applicable to their chosen fields. If not, the respective learner will acquire and train transfer skills (across subjects).

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Overall, educators need to adapt their teaching methods to align with the Micro-credential programme features, to ensure effective achievement of learning outcomes for learners.

1.2. What approaches to teaching and learning are important for Micro-credentials?

Learning approaches have experienced consistent changes and development in recent t years, for instance by new technologies, and thus, new possibilities of participation and provision as exemplified through the rise of Massive Open Online Courses (MOOC's). Teaching and learning methods can be distinguished in many categories, depending on the characteristics taken into account. Considering the most relevant for Micro-credentialing programmes, this framework builds upon three categorisations of learning concepts, based on a) the type of learning, b) the format of teaching and learning, and c) the modality.

a) The categorisation based on the **type of learning** comprises three categories:

- **Formal learning** describes an organised, goal-oriented self-regulated learning. This type of learning takes place at institutions to receive a degree or certificate. The objective of formal learning ist to obtain a qualification, e.g. by participating at bachelor or master lectures.
- **Non-formal learning** is not embedded in recognised institutions, thus will not lead to an approved degree or qualification. Examples of non-formal formats include industry based inhouse-seminars referring to corporate learning, general language courses or 'first aid' seminars. Although this learning approach is not implemented in VET- and HE-systems the learning format presents a methodical process in which learning outcomes, assessment and study time are set.
- **Informal learning** does not refer to the traditional learning approaches as described above. Informal learning formats can be further distinguished into conscious and accidental informal learning. While accidental informal learning describes an unintentional and incidental learning of new skills and competences, conscious informal learning presents an intentional approach of learning. The latter learning method implies a self-regulated and goal-oriented process to acquire skills and competences through real time activities. Those actions performed are intended and present an explicit focus on the purpose of learning. This process is also known as a work integrated learning, e.g., daily learning units at the workplace with an experienced tandem partner.

b) The categorisation based on the **format of teaching and learning** in theory and practise includes several options that can be combined, e.g.:

- Provision of study material (written, audio, video) for self-learning
- Lecture (live or recorded)

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- Gamified options (apps, simulation management games, VR, etc.)
- Workshop (in small groups)
- Discussion
- Collaborative joint group work
- Coaching (individual or small groups)
- Job-Shadowing
- Mentoring (by teachers, trainers or experienced staff)
- Collegial advice (by peers)
- Training (in a real work environment or simulation)
- Self-Learning groups (tandems or small groups)
- …

Being short learning units, Micro-credentials offer an experimental space for educators and learners in terms of delivery of learning content. Iterations based on learners' involvement are an option providing for mutual progress of teaching and learning.

c) Referring to the categorisation based on the **modality of learning**, we can classify the options below into three categories:

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Face-to-face	Blended or Hybrid	Online
Work-Based Training (WBT)	Web-seminars	Web-seminars
Challenge-Based Learning (CBL)	Challenge-Based Learning (CBL)	Challenge-Based Learning (CBL)
Mobile learning	Mobile learning	Mobile learning
Learning videos	Learning videos	Learning videos
Serious gaming	Serious gaming	Serious gaming
Workshops	Podcast	Podcast
Virtual and augmented reality	Chat	Chat
	Wiki	Wiki
	Forum	Forum
	(Online) Workshops	Online Workshops
	Virtual and augmented reality	Virtual and augmented reality
	Virtual classroom	Virtual classroom
	MOOC	MOOC

In general, for setting the scene in terms of MC-teaching and learning, the following ideas offer a summary of what should be considered in Micro-credential programmes:

1. Choose which **modality** the Micro-credential programme will have: face-to-face, blended or online. When selecting modality, important considerations include exchangeability and learner mobility within the micro-credential programme.
2. Clarify which **type of learning** the Micro-credential learning experience is based: formal, non-formal and/or informal learning. It can be one, some or all of them, depending on the learning outcomes and the objectives of the programme.

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3. Decide which **teaching and learning format** fits better for the type of learning chosen. Keep in mind the roles of students and teachers in the respective format

2. Learning Design

2.1. Which are the specific characteristics and design of a Micro-credential programme?

The usefulness of a Micro-credential is closely related to the careful extraction of feasible subject areas for constituting a small learning unit. Keeping in mind the idea of a learner-centred approach, the following guidelines may help professional teachers in Higher Education in designing the content and structure of a micro-credential. The aim is to grant the learner a positive experience in a relevant competence area focusing on an enclosed topic.

- **Step 1 | Analyse**

  analyse curricula and existing modules as well as student cohorts in selected, accredited courses. Online learning requires self-discipline and suitable self-organisation, therefore, if you choose online modality, focus on advanced students.

- **Step 2 | Select**

  Select one topic according to the following criteria:

It will create a reasonable and useful learning experience for the target group of students	It presents a self-contained learning experience
The acquisition of knowledge and competences for this topic should be enabled through	Students workload to learn about the topic should comply with the envisaged number of hours (incl. assessment tasks),

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online-teaching pedagogies	respectively the adequate planned amount of ECTS

Use your professional and subject experience for determining the scope of the Micro-credential. Consider that different, related, single topics finally could be combined for making up a Short Learning Programme (SLP) by pooling several micro-credentials.

- **Step 3 | Describe**

Describe learning outcomes and competencies for the new learning unit and map them with ESCO[1] or other relevant competence frameworks.

- **Step 4 | [Re-]Design**

[Re-]Design and outline a teaching and learning scenario according to requirements of self-contained units for digital use, reflecting on how to ensure, enable and encourage:

Competence-based and self-regulated learning	Interaction between the content and learners
Virtual collaboration among learners	Reflection and critical thinking

- **Step 5 | Arrange**

Arrange and align appropriate elements of teaching and learning, involving students where possible, e.g.

  - Supporting scripts
  - PDF files for download
  - Videos or podcasts
  - OER to be integrated (e.g. YouTube, tutorials, e-books, papers…)
  - Collaborative tasks
  - Assignments

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- (Self-)Assessment tasks (e.g. quizzes, short essays, peer assessment, pitches, take home or open book exams, case studies)

All of them, according to the principle of Constructive Alignment (Biggs & Tang, 2010).

- **Step 6 | Create**

Create digital learning materials consistently, using existing tools, infrastructure and available platforms for design, distribution and process management. Consider inclusiveness and accessibility. Focus on effective, efficient and appealing learning materials.

- **Step 7 | Combine**

Combine components to form a Micro-credential. Then check if assessment tasks match the learning outcomes adequately and calculate the workload for the learners. Don't forget to set a distinctive name or headline for the course.

- **Step 8 | Describe Assessment**

Describe assessment topic, requirements, type/format and method, supervision and identity verification, as well as grading criteria according to the ECCOE Model for Digital Credentials[2].

- **Step 9 | Pilot**

Pilot the whole material sequence of the planned Micro-credential, if possible, in your institution. Prepare the students accordingly.

- **Step 10 | Collect feedback**

Collect feedback from stakeholders (students, other educators, faculty, learning support department…) and adapt single parts of the micro-credential course, or re-arrange the whole setting.

- **Step 11 | [Iterate]**

If needed, repeat steps 5 to 10.

- **Step 12 | Celebrate**

Celebrate the successful process and achievement! A new Micro-credential is born!

- **Step 13 | Complete**

Complete institutional data, credential data, curriculum characteristics etc. to suit the ECCOE Model of Digital Credentials (in accordance with the applicable ELM[3]) . If approved by your institutional processes, the

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micro-credential can be part of your institution's Learning Opportunity Catalogue. Issuing the Micro-credential as a certificate should be enabled for those who have proven the achievement of the micro-credential learning outcomes by an appropriate assessment. Specific learners' data need to be added. Recognition by other Higher Education providers in the European Union will be facilitated.

- **Step 14 | Integrate (optional)**

Integrate the new Micro-credential into the formal curriculum of your institution or - due to the feature of stackability - to form a Short Learning Programme comprising several Micro-credentials.

This information regarding Q1 is part of DigiProf training Material O3 :
Ursula Göz, Rimantė Čepauskienė (2022). *Ensuring digital and micro-credentialization of learning as a part of transparent assessment for recognition of learning outcomes.*

2.2. Which are the key issues of Micro-credential programmes?

There are some key issues to consider as implications when designing a Micro-credential programme:

1. **Structure of the MC programme.** To ensure interchangeability in Europe, the guidelines determined by Europass[4] and the relevant ELM, specifying organisation and structure, must be followed. Thus, HE institutions will appreciate if the Micro-credential course can be subject to sharing and exchange. Students will benefit if the issued Micro-credential can be exchanged efficiently between European universities and institutions and easily recognised for further qualification.
2. **Assessment of Learning achievements.** This will be crucial for a MC to be recognised. Therefore, a transparent declaration of assessment methods linked to learning outcomes is needed. This must be done with a competency-based approach. Learners should be evaluated based on their demonstrated skills and competencies rather than solely on academic performance. Assessment methods can include practical assignments, projects, portfolios or real-world simulations.
3. **Short duration and potential stackability.** Unlike traditional degree programs, MC programs are designed to be completed in a relatively short duration. A single Micro-credential usually comprises 3 to 5 ECTS. They focus on targeted learning outcomes and provide learners with specific skills or knowledge to meet immediate professional needs. If stacked for pursuing a new level of qualification, the total duration of a MC program can vary, but it is typically shorter than a full degree programme, likely around 30-40 ECTS.
4. **Exchangeability.** By managing mutual recognition and concomitant administrative and operational structures, smart Micro-credential design can support educational institutions, employers and learners

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likewise by enhanced transferability of skills, increased career opportunities, flexibility in educational pathways, enabling collaboration among stakeholders, recognition of achievements and continuous professional development.

3. Support & Guidance for teachers

3.1. How can teachers be supported in the process of designing a Micro-credential?

Teachers are key to the development of Micro-credentialing programmes. Therefore, care must be taken to motivate them in their choice, design and evaluation. For this task, it is useful to consider the following points:

- **Create a Micro-Credential reference team:** Micro-credentialing is a team sport. Establishing a dedicated Micro-Credential (MC) reference team within the HE institution can provide crucial support and guidance to teachers. This team should consist of experienced educators, instructional designers, audio-visual designers, administrators, students and other relevant stakeholders. The reference team can serve as a resource for teachers, offering guidance, expertise and assistance throughout the design and implementation of the MC program. Provision of information on available Micro-credentials (best practise) and helping teachers to navigate the ECCOE/ELM requirements can be offered accompanied by a regular hotline for any concerns or questions that arise. Below is a list of internal stakeholders who should be included in an effective micro-credential team (adapted from Bigelow et al. 2022 and Brown et al., 2023).

- **Develop a design guide:** It is essential to develop a design guide that is tailored to the specific context of the HE institution and the profile of the teaching staff involved. This guide should outline the key principles, criteria and recommendations for designing Micro-credentials within the institution. It should consider factors such as the institution's mission, vision and strategy related to micro-credentialing,, educational model, available resources and the professional development needs of the teaching staff. Further, the MC design guide should provide for a detailed process protocol with clear instructions and standards regarding Micro-credentials. Furthermore, concepts for developing the curriculum, assessments, learning resources and support mechanisms required for successful completion of the offered Micro-credentials should be implied. For guaranteeing quality, the design guide should be updated regularly to meet the dynamic of evolving European, national and institutional conditions.

- **Training and professional development:** To support teachers in designing and developing a Micro-credential programme, it is crucial to provide training and professional development opportunities. Teachers should be equipped with the necessary knowledge and skills to engage effectively with the MC programme. This can include workshops, seminars or online courses that

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familiarise teachers with approaches to micro-credentialing, objectives, learning design, assessment methods and available support services. Ongoing professional development sessions, supervision or coaching can also be conducted to address emerging needs, provide updates and foster a culture of continuous learning. Pace of progress and workload for educators when developing Micro-credentials should be considered and monitored to prevent overload and keep up motivation.

- **Communication and engagement:** Open and effective communication is key to supporting teachers in their decision-making and participation in the development of MC programmes. Regular communication channels should be established to keep teachers informed about (changing) conditions, available micro-credentials, application processes, deadlines, and any program updates. Engaging teachers through newsletters, workshops, or informational sessions can help build their understanding, motivation, and commitment to the MC program. Additionally, creating opportunities for teachers to provide feedback and share their experiences can contribute to programme improvement and strengthen the sense of ownership and collaboration.

By implementing these measures, institutions can provide comprehensive support to teachers as they make decisions and invest engagement regarding Micro-credential programmes. The MC reference team, design guide, training and communication strategies, all work together to empower teachers, ensure a smooth implementation process, and foster a positive learning experience.

3.2. How can teachers' exchange and international experiences be fostered?

Encouraging the participation of teachers in micro-credential programmes that promote international cooperation, experiences and exchange can have a significant impact on their professional growth and expand their horizons. To facilitate these opportunities, various strategies can be employed. Here are some approaches to promote such exchanges:

- **Exchangeability of the MC programmes:** Incorporation and recognition of international MC-modules or -courses within the institution's Micro-credential programme can contribute global perspectives, international best practices, or specific cultural contexts. Furthermore, exchange could complement the HE-institution's teaching and MC-portfolio, by providing content which is not available in the respective institution, e.g. virtual lab experiences and simulations. Inviting guest lecturers from other countries, or leveraging online platforms for virtual exchanges can provide teachers and learners with insights and diverse perspectives from around the world.

- **Development of joint Microcredential programmes:** Such endeavours can foster the exchange of international experiences among teachers and students. By collaborating with educational institutions from different countries, MC-modules or -programmes can be designed to incorporate diverse

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perspectives and global best practices. Thus, a unique and rich approach to the topic worked on can be created. Joint MC- programmes offer opportunities for teachers to engage in cross-cultural collaborations (in presence or in VLE), participate in international modules or courses, and interact with educators as well as students from around the world. Through joint Micro-credential programmes, teachers can broaden their knowledge, gain exposure to different educational systems, practice other languages and develop a global network of professional connections. In the end, both learners and teachers can benefit from it.

- **Professional development grants or scholarships:** Provide funding support,scholarships or other incentives specifically designated for teachers who develop (joint) MCs to participate in international professional development activities and exchange. This can include attending conferences, workshops or training programmes in other countries, but also teaching in international partner universities. By offering financial assistance, institutions can remove barriers and incentivise teachers to seek international experiences that complement their Micro-credential programmes.

3.3. How to support efficient teaching experiences in Micro-credential programmes?

Supporting efficient teaching experiences in Micro-credential programmes can be achieved through various measures. Here are some ideas to consider:

- **Educational Support Centre:** This centre would provide specialised assistance that combines both educational technology and pedagogy. It would be staffed by a team of educational technology experts and educational developers who would provide guidance and support to teachers in developing Micro-credential programmes. The centre would offer workshops and training on the effective use of technological tools, the design of online learning activities, adequate assessment concepts and the implementation of innovative pedagogical strategies focused on MC programmes. In addition, the centre would be available to answer queries and provide resources and materials related to teaching and learning in micro-credential environments. Through an Educational Support Centre, teachers can get the desired support to make the most of teaching opportunities in micro-credential programmes and improve the quality of their teaching experiences.

- **Regular exchange in multi-partner community:** Promoting regular exchange within a multi-partner community can significantly support efficient teaching experiences in Micro-credential programs. Creating a collaborative platform or online peer-community where teachers can share ideas, resources and best practices fosters a vibrant and supportive learning environment. Educators are empowered to autonomously learn from each other, gain new insights and explore innovative teaching and assessment strategies. Encouraging participation in webinars, conferences or workshops involving multiple programme partners can also enhance collaboration and professional development opportunities.

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These ideas can be useful for institutions to provide educators with the necessary support and resources and ensure efficient teaching experiences in Micro-credential programmes, also contributing to a conducive learning environment and empower teachers to deliver effective and engaging instruction.

4. Support & Guidance for students

4.1. How can students be supported as they decide to enrol in a MC?

Learners are the key stakeholder in the development and implementation of Micro-credentialing programmes. Therefore, their motivation towards their choice, learning process and assessment should be taken care of. For this task, it is useful to consider the following points:

- **Flexibility of learning.** This refers to pathways, timing, access and mode of implementation (digital/hybrid learning). Micro-credentials can contribute to making qualifications more personalised. This flexibility in learning pathways offers learners advantages in the increasingly demanding labour market. Students can acquire competencies relevant to employers by participating in Micro-credentials, thus contributing to their employability and facilitating access to the world of work. In addition, Micro-credentials can validate certain skills developed by learners in other types of learning or during practice periods, through recognition of prior learning programmes.

- **Meaningful content for personal development or job opportunities.** Students should be provided with Micro-credential programmes that offer meaningful content aligned with their personal development goals or desired job opportunities. The program should be designed to address relevant skills, knowledge and competencies that are in demand in their chosen field (by employers, mainly). By offering content that is applicable and valuable to their career aspirations, students are more likely to be motivated and engaged throughout the Micro-credential programmes.

- **Guarantee Micro-credential recognition and portability.** It is essential to establish mechanisms that guarantee the recognition of Micro-credentials earned by students, particularly in joint MC programs. This can involve working closely with industry stakeholders, professional organisations or educational accreditation bodies to ensure that the Micro-credentials hold value and are recognized by employers or other HE institutions. Transparent and reliable processes for credential verification and documentation are crucial to building trust and enhancing the credibility of the MCs obtained by students.

- **Stackability understandable to learners.** Promoting the stackability of Micro-credential programmes can provide students with a clear pathway for continuous learning and progression. MC-programmes should be designed to allow students to accumulate multiple related Micro-credentials over time, eventually

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leading to larger qualifications or certifications. By facilitating the stacking of Micro-credentials, students can see the incremental value of their learning achievements, maintain their motivation and have a more flexible approach to their educational journey, tailoring it to their specific needs and goals.

A learner-centred approach should be the core of any development and implementation of Micro-credentials. Taking into account the points addressed, students can become the real protagonists of their learning in Micro-credentialing programmes.

4.2. How can students' (virtual) mobility and international learning experiences be fostered?

There are two keys to foster student virtual mobility and international learning experiences in Micro-credential programmes:

- **Involving International Office, Academic Service or Student support centres.** Such units can play vital roles in facilitating student (virtual) mobility and international learning experiences in Micro-credential programmes. The International Office can establish partnerships with HE institutions abroad, provide information about the opportunities of MC-programs and coordinate exchange of Micro-credentials. Students can be informed about benefits and challenges of international experiences in Micro-credential programs as well as assisted with visa processes and logistical arrangements. The Academic services or Student support Centre ought to offer guidance and support to students, providing resources, workshops or counselling on recognition and usability of international MCs, e.g. stackability within Micro-credential programmes (combining both, own and others)..

- **Enabling learning cooperation via Virtual Learning Environments (VLEs).**Technology offers a vast variety of chances to harness VLE for fostering learning cooperation and international experiences. Integrating tools like discussion forums, video conferencing and collaborative project spaces within VLEs allows students from different countries to interact, collaborate and learn together, expanding the range of Micro-credential programs. Virtual collaboration and exchange can be established, enabling students to engage in joint projects or participate in online courses with peers from other HE institutions, providing an immersive and cross-cultural learning experience.

4.3. How to support efficient student learning experiences in Micro-credential programmes?

Supporting efficient learning experiences in Micro-credential programs involves implementing various strategies across a range of academic and student support services. Here are two points to consider:

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- **Academic and Student Support Center.** Consideration of micro-credential programmes by such support Centres can provide valuable assistance to learners. They can offer resources, guidance and workshops specifically tailored to the needs of Micro-credential learners. It can provide support in areas such as study skills, time management, research techniques and accessing relevant materials. The Academic and Student Support Center serves as a hub for learners to seek assistance, clarify concepts and enhance their learning strategies, ultimately contributing to more efficient and effective learning experiences, also in Micro-credential programmes (above all, in pursuit of stackability).

- **Well-designed VLE for Micro-credentials.** A well-designed virtual learning environment is essential for efficient learning experiences in Micro-credential programmes. The VLE should offer a variety of learning materials and resources to cater to different learning preferences and styles. It should provide opportunities for learners to engage in virtual group work, discussions and collaborative projects, enabling them to exchange ideas, share (real) experiences and learn from each other. By fostering interaction and collaboration, the VLE boosts engagement and promotes a sense of community among learners of the Micro-credential programmes, enhancing their overall learning experience.

Fostering student virtual mobility, international learning experiences, and efficient learning in micro-credential programs requires the involvement of key units such as the International Office and Academic and Student Support Center. Tailored resources, guidance, and workshops to enhance the study skills and learning strategies of micro-credential learners are crucial for motivation and engagement of learners, and eventually for the success of the whole idea of Micro-credentialing.

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References

Bigelow, A, Booth, C, Brockerhoff-Macdonald, B, Cormier, D, Dinsmore, C, Grey, S, Harrison, L, Hobbs, A, Lee, S, Maher, P and McArthur, F. 2022. eCampusOntario's micro-credential toolkit. Toronto: e-Campus Ontario. Available at https://ecampusontario.pressbooks.pub/microcredentialtoolkit/.

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

Göz, U., Čepauskienė, R. (2022). Ensuring digital and micro-credentialization of learning as a part of transparent assessment for recognition of learning outcomes. DigiProf project training material. https://teacamp.vdu.lt/course/index.php?categoryid=15

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[1] To find the competencies according to the ESCO classification, check here: https://esco.ec.europa.eu/en/classification/skill_main

[2] For more information, visit this website: https://eccoe.eu/wp-content/uploads/sites/28/2022/03/O4-OPC-Visual_context.pdf

[3] For more information, check this site: https://europa.eu/europass/en/node/2128

[4] For more information, go to Europass website: https://europa.eu/europass/es/skateholders/european-digital-credentials/interoperability

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Domain 4: Technologies and Platforms

4.1. Portability and Interoperability

The **portability of miro-credentials** refers to the ability of easily carrying or moving those credentials. To make micro-credentials portable, issuers should ensure that micro-credentials are **owned by the learners themselves**. They can be securely stored securely and easily shared by learners through **digital wallets**[1] like **Europass**, that complies with the General Data Protection Regulation. This credential storage infrastructure is based on **open standards and data models**, ensuring compatibility and smooth data exchange. As explained in chapter 4.2, the Europass digital credential wallet also allows for easy verification of data authenticity (European Union Council, 2022).

However, it's worth noting that some learning providers create "walled gardens" when their credential storage infrastructure is not based on open standards and data models - so transparency and portability are limited to their own systems, aiming to keep users tied to their offerings. While this may be a valid business model, promoting competition between individual micro-credentials (rather than micro-credential vendors) and ensuring full transparency and portability would bring more long-term benefits to the micro-credential market as a whole (Source: Guide to Design, Issue and Recognise Micro-Credentials).

The interoperability of micro-credentials refers to the ability of computer systems or software to exchange and make use of information within micro-credentials. To enable micro-credential interoperability, providers should, where relevant, **make use of freely available standards and technologies that enable interoperability** via the following steps:

1. Describe micro-credentials using the EU standard elements for transparency (See Chapter 2).
2. Issue verifiable digital credentials using the European Learning Model.

The chapter is finalised with key considerations for the development of online platforms for micro-credential exchange taking into recent best practices.

[1] Digital credential wallets serve as a centralized repository for individuals to securely and conveniently manage their digital credentials and share them with others when needed. Trusted wallets are based on an open standard called Verifiable Credentials (VCs) which employ tamper-evident technology to ensure the integrity and immutability of the credentials.

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4.2. The European Learning Model and European Digital Credentials for Learning

The European Learning Model (ELM) is a multilingual data model designed to unify the lexicon used for describing learning experiences across Europe. By establishing a standardized model at the European level, the free movement of workers and learners can be facilitated by enabling their information (data points) to be compared, transferred, and understood transparently (Europass, n.d.).

To ensure the supply of of the most vital data points on learning opportunities, qualifications, accreditations and credentials, the ELM applies a set of specific rules and restrictions. These rules, for instance, mandate the inclusion of essential data points, in a standardised format with multilingual labels that can be linked with international, intersectoral or domain specific skills taxonomies to ensure coherence and interoperability (Europass, n.d.).

The ELM's ontology can illustrate the relationship between the data points and/or data point clusters through knowledge graphs, a screenshot of which is demonstrated in Figure X below. Knowledge graphs are key to powering AI models and algorithms that can then be leveraged to enhance various tools and systems, including skills assessment tools, personalized learning pathways, job recommendations, and automated guidance systems, benefiting European citizens (Europass, n.d.).

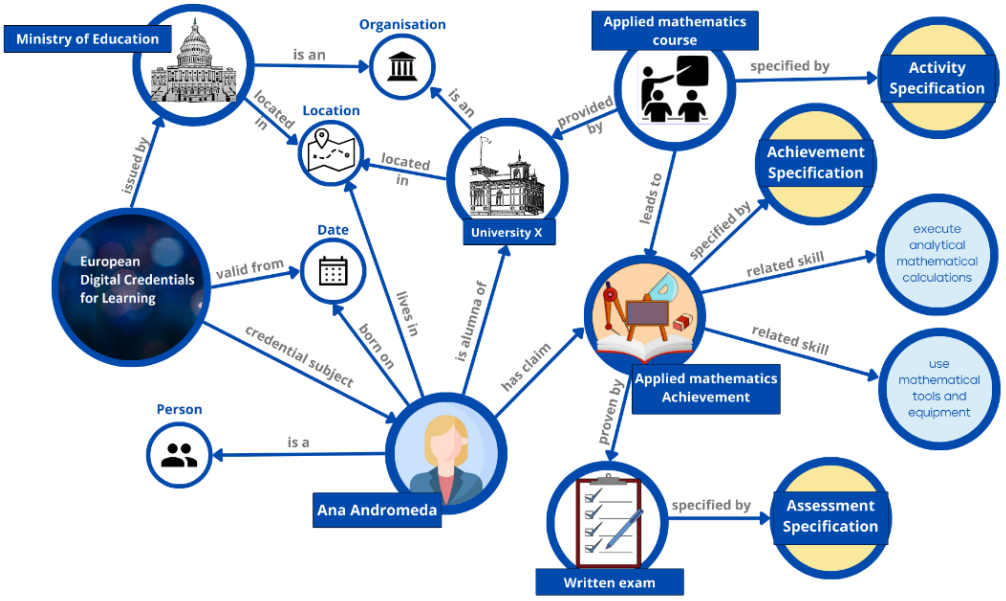

Figure XX: A screenshot of a knowledge graph demonstrating the relationship between the data points related to a digital credential including the holder's identity, the accreditation of the organisation which issued the credential and the claims describing the qualification. Source: Europass (n.d.).

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A **step-by-step guide to** help build, customise, **issue and use European Digital Credentials for Learning** is available here. It includes an explanation of how to:

- Verify your organisation as an issuer of credentials,
- Use the credential data preparation tools
- Issue sealed (making it able to detect tampering), portable, and interoperable credentials to designated recipients.

4.3. Issuing Verifiable Digital Credentials

Increasingly, all types of **credentials need to be issued in formats that can be understood by computer systems**. To ensure that micro-credentials can be recognized in the digital realm, it is necessary for computer systems to both comprehend the information within a micro-credential as well as **verify the authenticity of the micro-credential**.

To achieve this, **using a structured data format will enable information about a learner's accomplishments to be encoded**. Unlike unstructured formats such as scanned documents or PDFs that are intended for human processing, structured data can be queried by computer systems to extract meaningful information. This enables systems to automatically match a learner's skills with relevant job opportunities. Examples of such data models include the European Learning Model, Open Badges, and the Comprehensive Learner Record. Among these, **the European Learning Model is specifically designed to align with the recommended EU properties of micro-credentials** as outlined in the Council Recommendation (2022).

The figure below describes the main steps for how the authenticity of a credential and the awarding institution can be verified (Source: Guide to Design, Issue and Recognise Micro-Credentials).

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Verifying the authenticity of **credential**	Verifying the authenticity of the **institution**
↓	↓
How? **Digital Signatures** (cryptographic protocols attached to an electronic document verifying content and identity to the sender while being able to indicate modifications or tampering to the document)	*How?* Credentialing software can automatically **query publicly available databases of trusted quality institutions** (e.g. DEQAR*) to ensure the reputation of the institution and that it is not a diploma mill.

*https://www.eqar.eu/about/projects/deqar-project/about-deqar/ as at 15 June 2023.

While implementing digital signatures may involve additional costs and complexities, among the benefits of implementing them include:

- it is **more cost-effective** to produce a digital signature than a paper equivalent;
- it is **extremely difficult to reproduce a digital signature** unless you are the issuer;
- it reduces the need for the issuer to verify the document after issuance and
- it **enables the recipient to seamlessly and instantly share the credential** with third parties.

Supporting these principles is **the European Digital Credentials for learning, which as described in Chapter 4.2, can be freely utilized by micro-credential providers to issue verifiable credentials**. This system adheres to the requirement of using structured data by implementing the European Learning Model. The credentials are available in both human-readable diploma format and computer-readable code, supported by an extensive range of authenticity checks.

4.4. Enabling Micro-Credential Exchange Across Borders

Multiple developments are ongoing internationally to facilitate the cross-border exchange of micro-credentials. Prior literature and large international initiatives highlight interesting new ways for this (Digital Credentials Consortium, 2021; European Commission, 2020; RMIT, 2021). **Self-sovereign identity (SSI)** is one of the proposed ways to enable users to control their data and educational credentials (Sedlmeir et al., 2021).

Although the work is still at an early phase, **European Blockchain Services Infrastructure** (EBSI), a large-scale initiative by the European commission leverages blockchain technology to enable institutions to

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manage micro-credentials (EBSI, 2022; Kiiskilä et al., 2023). In addition to EBSI, European Digital Credentials for learning (EDC) has developed a common way for European institutions and learners to manage and store their verifiable credentials in a digital wallet and have complete control over them as to who and when to share them. For instance, the main value proposition of EBSI is to **simplify the way digital credentials can be issued, managed, and verified by higher education institutions while giving the ownership of them to the learners**.

The solutions for managing micro-credential exchange can be multifold. The platforms could be focused on storing and exchanging the learning opportunities (e.g., MOOC platforms, micro-credential clearinghouses) of European Universities, micro-credential networks and educational institutions. The platforms can also be for managing the digital credentials, meaning the proofs that the learner receives from completing the learning opportunities, such as verifiable digital credentials, badges and certificates. Although many of such platforms are only starting to surface, a recent study by Kiiskilä et al. (2022) identified multiple **key features that such platforms could consist of**:

- **Managing different types of micro-credentials** (e.g., badges, e-certificates, verifiable digital credentials)
- **Issuing mechanisms** for awarding micro-credentials
- **Portfolio management** for collecting, importing, organizing and stacking of micro-credentials
- **Sharing mechanisms** for exchange of micro-credentials
- Pathway management tools for visualizing and documenting **personalized learner guidance**
- **Attachments to the proofs**, e.g., skill and competence data, awards and achievements data
- **Verification mechanisms** for the authenticity of the micro-credentials

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References

Digital Credentials Consortium white paper: (2021). https://digitalcredentials.mit.edu/docs/white-paper-building-digital-credential-infrastructure-future.pdf

EBSI, 2022. “EBSI wiki -.” [Online]. https://ec.europa.eu/digital-building-blocks/wikis/display/ebsi

Europass, n.d. “Introduction to the European Learning Model” [Online]. https://europa.eu/europass/en/node/2128

Council of the European Union., 2022. Council recommendation on a European Approach to micro-credentials for lifelong learning and employability. Retrieved from https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32022H0627(02)&&qid=1681813795208

Kiiskilä, P., Hanafy, A., & Pirkkalainen, H. (2022). Features of Micro-credential Platforms in Higher Education. In CSEDU (1) (pp. 81-91).

Kiiskilä, P., Pirkkalainen, H. & Kukkonen, A. (2023). HOW CAN EUROPEAN BLOCKCHAIN SERVICES INFRASTRUCTURE BE USED FOR MANAGING EDUCATIONAL DIGITAL CREDENTIALS? SCIS23 conference proceedings.

RMIT creds: https://www.rmit.edu.au/creds/the-creds-difference

Sedlmeir, J., Smethurst, R., Rieger, A. and Fridgen, G., 2021. Digital identities and verifiable credentials. Business & Information Systems Engineering, 63(5), pp.603-613.

Domain 5: Industry Alignment and Forecasting

Skill-needs agenda

Existing studies & surveys on future skills (technical industry)

In recent years, there have been carried out several studies about future skill needs for employees. Regarding the ongoing digitization and digital transformational process, these megatrends evoke changes in work environment, tasks, labour market and job profiles due to technology innovations that are being implemented in more and more companies (cf., Cedefop 2022, S. 10). Further mega trends such as the demographic change, green transition and globalisation evoke changes and developments leading to a demand of further skills and competences of employees independently of their job profiles, qualification, and industry sectors. Regarding the increasing digital transformation process and Industry4.0, there are studies examining especially technical future skills on account of technological innovations. However, the studies present there is a demand of future skills implying technical expertise as well as methodological, social and personal skills and competences due to the changes and developments digitization causes. The COVID-19 pandemic has also further dynamised the digital transformation both at the organisational and individual levels. Megatrends such as demographic change and their impact on active labour as well as globalisation evoke additional challenges related to retraining and ensuring knowledge in companies (cf., Stifterverband für die Deutsche Wirtschaft e.V. 2021, S. 4).

What are technical skill- and competence-needs?

The advancing digital transformation and increasing implementation of technological innovations in the working environment involve nearly all sectors and business units due to factors such as networked systems, sensors and increased use of technical tools and technologies. As a result, technologies and technical innovations are playing an increasingly pivotal role within numerous business units: Cyber Physical Systems (CPS) as well as Machine-to-machine (M2M)-communication are used in production and procurement of materials and products, business units such as marketing and sales implement Customer Relationship Manangement (CRM) systems and Big Data technologies to optimise and improve customer management and advertising (cf., Münchner kreis 2020, S. 2). As a consequence, the employed technologies generate and produce an enormous amount of data and information. Therefore, competences in using technologies, **dealing with large amounts of data** and **digital literacy** implying **cyber security**, **cyber safety** and **human-machine-interaction** are decisive for employees (cf., Münchner kreis 2020, S. 5). Moreover, technical competences referring to Science, Technology, Engineering, and Mathematics (**STEM)** and skills of

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programming and **coding** are supposed to increase their importance for employees (cf., Stifterverband für die Deutsche Wirtschaft e.V. 2021, S. 10–12). The **evaluation of collected data** into relevant information, e.g. with the help of big data technologies and the use of artificial intelligence in products and processes, must be critically questioned for decision-making and also considered from an ethical point of view. Furthermore, employees also are required to present expertise and professional competences referring to one's field of work and particularities of the respective industrial sector. In addition, regarding the expected increase in customer requirements and agile innovation processes, it is expected that in the future more project-oriented working methods will be implemented in companies and employees will therefore **need to emphasize customer orientation (cf., Forum für Ausbilder 2022)**.

What do future methodological skill demands implay?

In order to master the transformation brought about by the megatrends and to help shape the ongoing changes, apart from technical expertise and professional competences it is expected that further methodological as well as social and personal competences will be necessary for employees. Pursuant to the realised studies on future skills, identified future methodological competencies include **interdisciplinary thinking**, **self-organisation**, **process thinking**, **complex problem solving**, **project**, **time,** and **financial management (cf., Stifterverband für die Deutsche Wirtschaft e.V. 2021, S. 12).**

The continuing digital transformation process also causes changes regarding the organisation of companies and favours an internal interlocking of business units within a company, also described as vertical integration. As a result, the expanding interlocking requires a wider range of knowledge which encompasses expertise beyond the respective field of activity of an employee. Therefore, there is a demand for employees to possess not only domain-specific knowledge but alos the ability to **cooperation, to think interdisciplinary** and understand **processes**. The increasing implementation of technical innovations in companies fosters more complex problems due to further integration and interlocking. In order to tackle these challenges, **competences such as complex problem-solving** as well as **creativity**, **innovation**, **cooperation ability** will be decisive. **Leadership skills** and **conflict management** are therefore also important competencies for employees. Moreover, the continuous change evokes the requirement of competences referring to **change and risk management** for the labour force.

What do future social skill-demands imply?

The ongoing process of change, evoked by digitalisation in companies, also emphasises the relevance of social-communicative competences and teamwork. Due to the increased vertical and horizontal integration, **team competences** and **collaboration skills** are increasingly expected to ensure efficient performance (Forum für Ausbilder 2022; vgl., Institut für Arbeitsmarkt- und Berufsforschung der Bundesagentur für Arbeit 2017). The more complex demands evoked by digitalisation require **interdisciplinary cooperation** from employees in changing teams with coworkers of different qualifications and functions. Regarding the increased horizontal networking, the importance of **communicative** and, not least, **intercultural skills** is also growing (vgl., Institut für Arbeitsmarkt- und Berufsforschung der Bundesagentur für Arbeit 2017). However, communication skills do not only refer to **analogue** and **foreign**

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language communication, but also to **virtua**l and **digital exchange** between project partners, customers or even suppliers (vgl., Forum für Ausbilder 2022). Other social competence requirements include **emotional intelligence**, **independence**, **empathy**, **tolerance** and an **open mindset towards learning**. According to the Deloitte study, **leadership skills,** present an accelerating relevance for the labour force, especially with regard to more project-oriented forms of work (vgl., Deloitte 2021). **Digital ethics** also shows another important competence for employees due to the increasing automation, increasing implementation and use of robots and artificial intelligence. The evaluation of collected data into relevant information, e.g. with the help of big data technologies and the use of artificial intelligence in products and processes, must be critically questioned for decision-making and also considered from an ethical point of view.

What do future personal skill demands imply?

With regard to personal skills, employees are expected to be **responsible**, **flexible**, **adaptable**, **resilient** and **reflective (vgl., Deloitte 2021)**. Increased collaboration inevitably requires workers to be flexible not only in terms of content, considering diverse collaborations with companies and industry sectors, but also in terms of time, due to the ongoing globalisation and different working time zones (vgl., Institut für Arbeitsmarkt- und Berufsforschung der Bundesagentur für Arbeit 2017). Technological innovations evoke shorter intervals of new innovations and which leads to a shortened half-life period of technical knowledge and skills, so employees have to adapt and expand their knowledge accordingly in a short time. Continuous training is crucial for everyday work, especially given the progressive and rapid changes. Furthermore, these ongoing developments also require an **open mindset towards lifelong learning** in order to accommodate appropriate knowledge and competences (vgl., VDMA Bildung 2020). The constantly progressing change and transformation process in the economy also requires an **open error culture** and **resilience** from employees. Due to advancing globalisation and the existing climate crisis, **competences in** the area of **sustainability** and **green transition** will also gain in importance in the future. **Personal responsibility** and **independence** are also important for the continuous adaptation process in order to continue to effectively shape the ongoing digital change process in the future (cf., Deloitte 2021).

Use case: Verify identified future skills on national level with industry partners surveys

Due to the ongoing changes and developments evoked by several megatrends and their varying influence on industry sectors, it is crucial to investigate and continually verify future skills and competence demands on national as well as sectoral levels. In order to attest recent and actual skill needs in thy industry, surveys present one possibility to gain insights into present working requirements. Expert groups as well as interviews and desk research are also ways to find out about the industry's current needs. A survey concerning competence demands and requirements of the industry was last conducted in winter 2022 with the dual partners of the DHBW Heidenheim, which present a broad representation of the current economy of the region and thus include various industrial sectors. The target group of the questionnaire was experts from the companies and institutions of the dual partners of the DHBW Heidenheim, who provide comprehensive internal information on the current skills of the employees, the skill and competence needs of the company or institution, as well as the necessary measures for re- and upskilling and development of

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competencies with regard to the expected company-specific effects due to the current megatrends and developments in the economy and society. The central task of strategic human resource management is to ensure the critical and competitive human resources to the value chain and thus to contribute to the long-term sustainability of the company. Strategic management also includes strategic human resources development, in order to promote professional competencies so that employees can achieve and realise goals in a targeted, systematic and methodological manner (cf. goals in a targeted, systematic and methodical manner (cf., Lindner-Lohmann et al. 2016, S. 196). Therefore, company representatives from the areas of strategic human management from the field of strategic human resource management and strategic personnel deployment management and strategic personnel deployment were selected as the target group. Relevant variables for the identification of need include, in addition to the awareness and relevance of microcredentials in relation to employees and companies or institutions, above all the identification of future competence requirements as well as possible skill gaps due to external factors such as the megatrends. The subdivision of possible future skills according to the Heyse/Erpenbeck categories provides the possibility to identify possible thematic focuses of recorded competence gaps while analysing the results (cf., Prifti et al. 2017, 48).

Sector-specific skills and competences

Environmental factors and megatrends do have varying impacts on nearly all business sectors. Moreover, there are also different implications to detect in country-specific economies and companies. The effects and changes of the advancing digitization process concern companies across different business sectors differently and have different degrees of impact on various divisions and as a consequence evoke different competence demands. Especially sectors such as ICT and manufacturing industry are highly concerned by the effects of the digital transformation process and present skills gaps referring to automation and digitization (cf. Kato 2020, p. 14). In addition, production processes, products and working conditions are changing in accordance with impacts of megatrends such as sustainability, climate change, green transitions and environmental directives (cf., Cedefop 2022, S. 104). Regarding decarbonization, employees, especially in manufacturing sectors, require competences and skills, for example, for the change in production from combustion engines to electric engines and electric cars. The progressive digital transformation of the economy as well as trends in decarbonisation and green transition evoke changes in the manufacturing industry. These changes include shifts in production methods with regard to alternative engine development, resource conservation and also the difficulties in global supply chains (cf., Cedefop 2022, S. 104). Regarding the results of the participants and their estimated high relevance for personal and methodological competences in this sector, the continuous developments and related impacts on production methods and products could explain the influence on those categories of competences, leading to an increasing demand for stress management and flexibility for employees, innovation, and change management. The manufacturing sector in particular has seen a lot of investment in new technologies and systems in recent years. Globally, the capital expenditure of the industrial manufacturing sector, which belongs to the manufacturing industry, amounted to € 294 billion last year which was significantly higher compared to the transport industry's € 104 billion investment digital transformation products. The implementation of new technologies and networked systems evokes new competence requirements for employees. Through the use of networked technologies, data and information are constantly being generated that contain relevant knowledge for companies. In order to identify the central information contained in

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the data volumes, employees therefore need competences in the area of data and information management. The increasing amount of technologies and automated and networked systems in companies consequently foster the demand for digital skills from the labour force, but also employees working in an advanced or manufacturing environment are required to present critical thinking and the ability of human-machine-interaction. Furthermore, due to the fourth Social Taxonomy of the EU Sustainable Investment Framework (Social Taxonomy) since July 2021 competences referring to sustainability and green transition are crucial for employees working in the finance and insurance sector. However, domain-specific knowledge and respective competencies will continue to be crucial in every occupation and business division (cf., Reich 2021, S. 328).

Skill-needs forecasting

In the current highly dynamic and competitive labour markets it is essential for employers as well as employees to invest in the development of skills and competences. The foretelling of skill needs presents several difficulties not only due to I4.0 and the impact of digitization that is not clear yet. Furthermore there are megatrends affecting the labour market, workforce and working environment. As a result those impacts evoke changes and development regarding economy needs as well as tasks of employees and production processes. Trends such as the advancing digitization and automation process as well as green transition, demographic change, decrease of active labour population and the impacts of the pandemic situation cause various challenges and developments in economic needs and requirements regarding skills, competences and knowledge of employees.

There is an increasing demand and trend in Europe for high-skilled employees leading to a demand for higher and further qualifications for employees and students. It is estimated that demand for higher formal qualifications will increase due to changes in several industries and their corresponding employment requirements. Furthermore, the average level of qualifications for new job opportunities will also rise due to the fact that more highly and better qualified employees will apply for job offerings which do not require high qualifications (cf., Mara Brugia 2018, S. 41). This phenomenon is also known as a qualification inflation. Sectoral and occupational developments referring to employment have a relevant impact on qualifications of current as well as future employees. The influence of ongoing megatrends inter alia digitization and green transition evoke constant changes regarding requirements of skills and competences as well as occupational profiles and thereto qualifications. Especially technological changes have impact on sectoral occupational offerings. As a result, current employees are required to be open-minded towards reskilling and upskilling to acquire further qualifications necessary for new occupations and to adapt to changing tasks and requirements. According to a recent study by Cedefop, qualifications referring to ISCED levels 5 to 8 present an increasing requirement in the world of work. Those qualifications imply professionals referring to EF levels 6-8 as well as technicians and associate professions referring to EQF levels 3-5 (cf., Mara Brugia 2018, S. 60). The number of highly qualified employees are expected to increase by 26 mio. In the EU by 2030. Moreover, the demand for lower qualifications is projected to decrease by 2030, whereas the demand of employees with intermediate qualifications will increase moderately (cf., Mara Brugia 2018, S. 43).

According to recent studies, it is expected that the working age population in Europe will be increasing in upcoming years. However this forecast presents variation of the trend across European countries. Contemporaneously to the

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increase of working population experts estimate a decline of employments in Germany and eastern European countries due to the ageing population in the respective countries. Especially in primary and basic manufacturing sector the declining employments are expected. Regarding the shift towards service sectors, this sector is estimated to present the main drivers of employment. The presented differences in countries as well as sectors should be taken into account regarding the skills forecast.

The two main factors evoking the changes in occupational employment are:

- Industry effects: structural changes in economy (Automation impacts on production and products e.g. hybrid and electric cars)
- Occupational effects: technologies and further tools/inventions that influence skills and competence demand

Regarding the various megatrends, especially advanced manufacturing as well as the automotive sector present significant impacts and structural changes due to e.g., digitization, green transition, demographic change or globalization. With regard to the automotive sector, there is a shift to detect towards the production of clean vehicles (cf., Mara Brugia 2018, S. 35). As a result, it is estimated an increase in demand for employees referring to material science, computer analysis, as well as chemical, electrical, industrial, material and mechanical engineering.

Learning pathways

The economy, and with it the world of work, is currently in a constantly changing situation. In order to stay competitive and successful, it is necessary for companies to focus on upskilling and training their workforce and prepare them for the future. Learning pathways present an efficient tool for learners as well as employers to close skill gaps and meeting the competence demands of the labour force to build competitive human capital. Within these learning pathways, learners can acquire in-demand skills and required competences (cf., Sara Austin 2022). These goal-oriented units of teaching experiences present well-structured and clearly outlined pathways in order to foster growth and facilitate re- and upskilling for learners. The clearly structured sequences of courses to take can support learners to stay motivated to acquire demanded skills and to even get started with further education and training with the help of well-known paths. According to a recent study of OECD on lifelong learning, employees and learners are expected to take responsibility of improving their own skillsets and acquire necessary new competences to remain their employability. Learning pathways can provide learners to take on greater responsibilities, improve the performance and to cultivate effective habits. Therefore, national governments aim to ensure, that learning pathways are flexible and accessible across higher education and encompass all stages of student and learner journeys (cf., Sara Austin 2022).

Due to the ongoing changes evoked by megatrends such as digitisation, green transition, demographic change as well as globalisation and their influence on the working environment, adapting skillsets and competences is key for employees as well as students. As a result, higher educational institutions are faced with an increasing amount of learners with diverse needs and educational histories (cf., Martin und Furiv 2022, S. 24).

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Especially new learning formats such as MOOCs (Massive Open Online Courses) and micro-credentials provide flexibility to learners that make education, re- and upskilling more accessible to a multitude of learners without local or time restrictions. Although, due to the lack of a clear European definition and guidelines of micro-credentials, this new format of education is not yet fully accepted and still questioned by employers as well as HEIs and learners and presents a high uncertainty among users. To date, learning pathways that aim to bridge the gap between labour market requirements and qualifications that adequately prepare students for the work environment are found to be the least developed. In this context, the recognition of informal and non-formal learning presents a fundamental role in the problem of learning pathways (cf., Martin und Furiv 2022, S. 24). To further promote flexible learning pathways that sufficiently prepare students according to the skill and competence demands of the industry, regulations are crucial. The challenge is to find a balance between regulations and supply autonomy of educational institutions in order to adapt learning opportunities (cf., Martin und Furiv 2022, S. 28).

In order to develop and offer flexible learning pathways, collaboration between institutional bodies and the labour market/industry is inevitable. Industry trends can present a point of reference for institutions on labour market demands. However, the providing educational institutions need a deep understanding of existing and emerging skill gaps.

There are various opportunities for educational institutions that want to offer courses within the framework of learning pathways to gain a deeper understanding and up-to-date information on industry needs. With regard to the group of employers, increased cooperation with company representatives could take place within the framework of an annual survey. Company representatives are asked to participate in a survey on competence needs in the company on behalf of the local regional economy. As a result, it is possible to constantly react to changing requirements and changes in work requirements and to adapt the corresponding courses for reskilling and upskilling employees. The difficulty here, however, is, on the one hand, that regional economies show a mixture of diverse sectors and therefore the requirements can be very diverse, so that sectoral differences must be highlighted in the evaluation of the results. In any case, the choice of the sample of participants should be representative.

Furthermore, there is the possibility of forming a working group in the region to promote cooperation between educational institutions and industry. Here, too, the participants should have a representative representation of the local economy. In the discussions of the working group, company representatives can primarily address the competence needs of the working world in regular meetings and provide insights into current and future company developments in order to be able to act with foresight. The possibility of a dynamic exchange can also promote mutual understanding, e.g. Skills needs and upskilling measures for specific occupations or qualification groups, so that adequate offers can be developed with regard to the level of education.

Not to be forgotten is the group of alumni. This user group of learning pathways can provide highly relevant information for learning pathways. Since alumni usually start their first professional employment in the first year after graduation and gain their first experience in the world of work. Therefore, alumni can report relevant information on current skills mismatches. Therefore, it is immanent to build and maintain a network with alumni in order to identify current mismatches between teaching and business as well as to pursue possible upskilling and reskilling measures in later years in order to use and offer micro-credentials accordingly to the use cases for learning pathways.

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References

Cedefop (2022): Microcredentails for labour market education and training. First look at mapping microcredentials in European labour-market-related education, training and learning: take-up, characteristics and functions. Luxembourg: Publications Office of the.

Deloitte (2021): From survive to thrive: The future of work in a post-pandemic world. Online verfügbar unter https://www2.deloitte.com/content/dam/Deloitte/global/Documents/HumanCapital/gx-the-future-of-work-post-covid-19-poc.pdf,, zuletzt geprüft am 15.04.2023.

Forum für Ausbilder (2022): Kompetenzen für die Industrie4.0. Online verfügbar unter https://www.foraus.de/de/themen/foraus_109404.php, zuletzt geprüft am 15.01.2023.

Institut für Arbeitsmarkt- und Berufsforschung der Bundesagentur für Arbeit (2017): Wirtschaft 4.0: Digitalisierung verändert die betriebliche Personalpolitik.

Lindner-Lohmann, Doris; Lohmann, Florian; Schirmer, Uwe (2016): Personalmanagement. 3., aktualisierte Auflage. Berlin, Heidelberg: Springer Gabler.

Mara Brugia (2018): Skills forecast. Trends and challenges to 2030. Luxembourg: Publications Office of the European Union (CEDEFOP reference series, 108).

Martin, Michaela; Furiv, Uliana (2022): SDG-4: Flexible Learning Pathways in Higher Education – from Policy to Practice. An international comparative analysis. Paris: International Institute for Educational Planning.

Münchner kreis (2020): Kompetenzentwicklung für und in der digitalen Arbeitswelt. Positionspapier 2020 des MÜNCHNER KREIS-Arbeitskreises "Arbeit in der digitalen Welt". München: Münchner Kreis.

Prifti, Loina; Knigge, Marlene; Kienegger, Harald; Kremar, Helmut (2017): A Competency Model for “Industrie 4.0” Employees. In: *Proceedings der 13. Internationalen Tagung Wirtschaftinformatik*, (WI 2017, S. 46–60).

Reich, Sandra (2021): Sustainable Finance. Nach der grünen Klassifizierung auf dem Weg zur sozialen Taxonomie. In: *Die Aktiengesellschaft (Vol. 66 (Issue 22)),*

Sara Austin (2022): How to use learning pathways to close skills gaps.

Stifterverband für die Deutsche Wirtschaft e.V. (2021): Diskussionspapier Nr. 3: Future Skills 2021. 21 Kompetenzen für eine Welt im Wandel. Essen: Stifterverband für die Deutsche Wirtschaft e.V.

VDMA Bildung (2020): Ready for Industrie4.0? Ergebnisse des Onine-Kompetenzchecks.

Domain 6: Quality Assurance Alignment

Introduction

Quality assurance is an indispensable facet when it comes to fostering trust and transparency within society. This holds particularly true in the context of micro-credentials, which are concise, skill-focused and more focused than traditional degree programs. As such, robust and transparent quality assurance processes are needed to ensure their value and relevance. Yet, the approach to assuring the quality of micro-credentials can vary significantly, involving considerations such as the definition of micro-credentials, the quality assurance frameworks employed, and alignment with National Qualifications Frameworks (NQF), all of which contribute to the credibility of these educational credentials.

Quality assurance (QA) mechanisms covering the wide variety of types of micro-credentials are diverse and include national QA systems, recognised international QA systems (e.g. ISO quality standards or excellence awards such as EFQM) and other systems, such as those provided by large companies with their own training institutions and/or programmes. Furthermore, quality assurance, as understood in the European Qualifications Framework (EQF), and reinforced by the European Standards and Guidelines for Quality Assurance in Higher Education (ESG), as well as the ISO 9000 family standards, is fundamentally underpinned by an organisation's internal quality culture or quality assurance policy, which translates into the application of quality principles, policies and processes in the day-to-day operations of the institution.

1. Policy and guidelines for quality assurance

What types of policies and procedures are needed to establish an effective quality assurance framework for micro-credentials?

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Establishing an effective quality assurance framework for micro-credentials requires a comprehensive set of policies and procedures that encompass both national and institutional levels.

National regulations should balance autonomy, avoiding excessive rules that hinder innovation and constrain institutions and providers. Generally, the contemplated policies revolve around:

- Providing a clear and standardised definition of what constitutes a micro-credential (minimum and maximum duration, the credit value, and the criteria for awarding and recognizing micro-credentials).
- Defining quality standards and criteria that micro-credentials must meet related to micro-credentials' development, implementation, quality assurance, recognition and technology infrastructure.
- Providing procedures for accrediting or recognizing institutions or organisations that offer micro-credentials.
- Fostering policies for the development of national catalogues either specifically for micro-credentials or else by integrating them in the general catalogue of learning opportunities.

At national level, a majority of European countries are presently engaged in discussions or actively in the process of formulating initiatives related to the establishment of national policies for micro-credentials (IMINQA, 2023). The MicroCreds project[2] in Ireland or the Dutch Microcredentials Pilot[3] are some examples of nationwide initiatives for policy development.

On the other hand, institutions should develop policies and procedures that address key aspects of micro-credentials to:

- Establish guidelines for the design and development of micro-credentials aligned with the institution's strategic goals (see Domain 1), sector standards and best practice in teaching and learning process.
- Design and implementation procedures to ensure that intended learning outcomes associated with the micro-credential are clearly defined and communicated to learners before they enrol in the program.
- Assessment and evaluation policies to ensure that assessments and evaluations are designed and implemented in a way that is valid, reliable, and aligned with the intended learning outcomes of the micro-credential program.

[2] https://www.iua.ie/ourwork/learning-teaching/microcreds/microcreds-project-overview/

[3] https://www.versnellingsplan.nl/en/Kennisbank/pilot-microcredentials/

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- Recognition and accreditation policies to ensure that the recognition and accreditation of micro-credentials are based on rigorous standards and criteria that are developed in consultation with industry experts and stakeholders.
- Quality assurance procedures to ensure that the micro-credential program is subject to regular quality assurance monitoring, evaluation, and continuous improvement.
- Transparency policies to ensure that information about the micro-credential program, including intended learning outcomes, assessment criteria, recognition and accreditation, and costs, are transparent and easily accessible to learners.
- Stakeholder engagement policies to ensure that stakeholders, including public employment services, industry partners, faculty, and learners, are engaged in the development, implementation, and ongoing evaluation of the micro-credential program.

What are the appropriate standards for quality assurance that can be applied to micro-credentials?

The standards for quality assurance should meet the unique characteristics and needs of micro-credentials in terms of their format, delivery mode, target audience, learning outcomes and recognition.

In this sense, the standards and guidelines for quality assurance in the European Higher Education Area (EHEA) are a widely recognized set of standards and guidelines for quality assurance in higher education across Europe and can be applicable for the quality assurance (QA) of micro-credentials (ESG, 2015). While they were primarily designed for use in traditional degree-granting programs, they are broad, flexible and adaptable enough to be applied to a variety of educational contexts, including micro-credentials (ENQA, 2022). The European Standards and Guidelines (ESG) "*apply to all higher education offered in the EHEA regardless of the mode of study or place of delivery*" (ESG, 2015).

The ESGs consist of a collection of fundamental principles and recommendations that can be suitable for the specific aims and objectives of individual institutions or programs. As such, they are flexible enough to be used for the unique characteristics and requirements of micro-credentials. Furthermore, the ESG emphasise the importance of assessing student learning outcomes, which is a key aspect of quality assurance in micro-credentialing. By assessing student learning outcomes, institutions can ensure that their micro-credentials are providing learners with the skills, knowledge and competences they need to succeed in their careers.

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What are the benefits of micro-credential providers, stakeholders and quality assurance agencies working collaboratively to develop and implement effective quality assurance mechanisms for micro-credentials?

Micro-credential providers, stakeholders, and quality assurance agencies can collaborate to establish effective quality assurance mechanisms for micro-credentials. By involving stakeholders in the development and implementation of quality assurance mechanisms for micro-credentials, it is more likely that the mechanisms will be relevant in meeting the needs of all stakeholders. Additionally, quality assurance agencies play a fundamental role in ensuring the quality of micro-credentials, developing standards and criteria and providing guidance and support.

What are the advantages and disadvantages of implementing internal and external quality assurance mechanisms for micro-credentials?

Implementing both internal and external quality assurance mechanisms reinforce trust and credibility on micro-credentials, and facilitate their recognition and transferability across different contexts. The Council Recommendation on micro-credentials (European Commission, 2022) underlines the significance of external quality assessment primarily focused on evaluating providers rather than individual courses, as well as highlighting the efficacy of internal quality assurance processes in ensuring the quality of micro-credentials.

Internal quality assurance mechanisms are designed to ensure that micro-credentials meet predefined quality standards and include a set of processes that are established by the delivering institution. Overall, internal quality assurance mechanisms can help to ensure that micro-credentials meet quality standards and provide learners with a valuable learning experience. By implementing these mechanisms, institutions can ensure that learners acquire the knowledge, skills and competences needed to succeed in a particular sector.

External quality assurance of micro-credentials can be an important mechanism to ensure their credibility, validity, and value of the institution that offers them. Due to the concise and focused nature of micro-credentials, external quality assurance is not necessary nor relevant for the individual evaluation of micro-credentials. Consequently, external quality assurance should guarantee that institutions providing micro-credentials have robust and consistent systems in place for internally monitoring their quality. Quality assurance agencies can also play an important role in the external evaluation of the micro-credentials offered by alternative providers even though clear national regulations need to be developed to support it.

micro-credentials can take two forms: they can either be components integrated into established, pre-accredited programs or they can exist as independent, standalone lifelong learning offerings. The external evaluation of the

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quality of the former is already comprehensively addressed through program or institutional assessment processes, as observed in the Belgian Flemish Community. On the other hand, quality assurance agencies, such as the Catalan University Quality Assurance Agency (AQU Catalunya), are now paying closer attention to lifelong learning provisions during their external institutional-level evaluation procedures for the latter (IMINQA, 2023).

Which type of accreditation - program, institutional, or professional - is relevant for ensuring quality assurance of micro-credentials?

Ultimately, the type of accreditation or quality assurance framework that is most appropriate for micro-credential programs will mainly depend on the national and institutional context.

Given the shorter and more focused nature of micro-credentials, program accreditation is not practical or necessary. Program accreditation is a lengthy and rigorous process that typically involves a review of the curriculum, faculty, resources, and outcomes of the program. Alternatively, micro-credentials may be included into internal quality assurance mechanisms, which can focus on the development of intended learning outcomes, reliable and valid assessments, and conducting periodic evaluation and review.

On the other hand, institutional accreditation could be useful for micro-credential programs offered by universities, as it would provide assurance that the institution as a whole meets certain quality standards. Institutional accreditation assesses the overall quality of an institution, including its programs, faculty, facilities, student services, and/or their quality management system.

In addition, micro-credentials may also be subject to recognition or endorsement from industry bodies or employers, which can help learners to gain recognition for their achievements and increase their employability. In some cases, micro-credentials may be developed in collaboration with industry partners or designed specifically to meet the needs of a particular industry or profession, as exemplified by the Project Management Institute (PMI), which grants accreditation of micro-credentials in specialised areas of project management. In these cases, industry accreditation is very valuable for ensuring that the micro-credential meets the standards and requirements of that industry.

2. Promoting transparency and mutual trust

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How will the micro-credential program be evaluated to ensure that it is meeting the needs of the learners and delivering the expected outcomes?

To ensure that a micro-credential program is meeting the needs of learners and delivering the expected outcomes, it is important to establish an evaluation framework which would include *ex ante* (before the issuance of the micro-credential) and *ex post* (after the issuance of the micro-credential) evaluation. This framework should be designed to assess the effectiveness of the program in achieving its intended goals, as well as identifying areas for improvement.

Ex ante quality assurance involves evaluating the micro-credential before it is launched or made available to learners (AQU, 2021). This includes assessing the curriculum, instructional materials, assessment methods, faculty qualifications, and other aspects of the micro-credential program internally to ensure that it meets established quality standards. *Ex ante* quality assurance can help to ensure that the micro-credential design is coherent for learners to gain the knowledge, skills and competences they are intended for.

Ex post quality assurance involves evaluating the micro-credential after it has been completed by learners. This includes assessing learner outcomes, feedback, and satisfaction to ensure that the micro-credential is meeting the needs of learners and providing them with the skills and knowledge they were designed and developed for. *Ex post* evaluation can help to identify areas for improvement and make changes to the micro-credential program to ensure that it remains relevant and valuable over time.

The evaluation framework may involve both formative and summative assessments. Formative assessments are conducted throughout the program to monitor the learners' progress and provide feedback to improve their learning experience. Summative assessments are conducted at the end of the program to evaluate the learners' proficiency in the identified skills and knowledge areas.

To ensure that the micro-credential program is meeting the needs of learners, evaluations should also consider feedback from learners themselves. This feedback can be gathered through surveys, focus groups, or other forms of feedback mechanisms. Learners' feedback can provide valuable insights into the effectiveness of the program design and delivery, as well as identifying areas for improvement. For instance, The State University of New York (SUNY) collects extensive sets of data to analyse the success of their micro-credentials program and the employability of their graduates.

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Who will be responsible for designing, delivering, and assessing the learners of the micro-credential program, and what are their qualifications and expertise?

It is important to ensure that the individuals or team responsible for the micro-credential program have the necessary qualifications and expertise to effectively design, deliver, and assess the program. This may include advanced degrees in relevant fields, certifications in instructional design or adult learning, experience designing and delivering digital learning experiences, and subject matter expertise in the area being taught. It is also important to consider any specific requirements or standards for micro-credential programs set by relevant accrediting bodies or industry associations.

What is the approach for gathering learner feedback, and what is the intended purpose of this feedback?

The ability for learners to grade and review micro-credentials on the platform also helps maintain transparency and encourages course providers to consistently deliver high-quality content and effective learning experiences. Learners' feedback contributes to the continuous improvement of the courses and micro-credentials offered on the platform. One example of a micro-credential platform where learners can provide feedback and grade the micro-credentials is Coursera. In addition to written reviews, learners can also rate courses using a star-based system, which provides a quick and easy way to gauge the overall satisfaction of previous participants. This user-generated feedback plays a crucial role in influencing others to choose courses that align with their interests and learning goals.

What is the process for handling complaints and appeals from learners, and how will this process be transparently communicated?

In order to ensure that learners are treated fairly and that their concerns are heard and addressed, it is important to establish a clear and transparent process for handling complaints and appeals. The process for handling complaints and appeals should be communicated to learners through various channels, such as a website or student handbook, so that they are aware of their rights and responsibilities in the event of a dispute. Information should include details on how to make a complaint or appeal, what to expect during the process, and how long it may take to receive a resolution.

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How will the privacy and security of learner data be ensured?

In order to ensure the privacy and security of learner data, the micro-credential program should establish clear policies and procedures for collecting, storing, and processing learner data. The micro-credential program should ensure that the digital infrastructure used to deliver and administer the program, such as learning management systems (LMS), databases, and cloud services, have appropriate security and authentication measures in place to protect learner data and ensure that only authorised personnel can access learner data. The program should comply with applicable laws and regulations related to data privacy and security, such as the General Data Protection Regulation (GDPR).

What steps will be taken to ensure that the micro-credential program is inclusive and accessible to all learners, regardless of their background or circumstances?

Micro-credentials have the potential to serve as targeted interventions aimed at promoting inclusivity and expanding educational and training access, thereby enabling a broader range of learners to seize career opportunities. The diverse pool of learners include marginalised and vulnerable populations, namely individuals with disabilities, seniors, those with limited qualifications/skills, minority groups, migrants, refugees, and individuals who face socio-economic challenges or reside in remote areas with limited opportunities (Tinsley *et al.*, 2022).

Targeted implementation of micro-credentials can help address societal challenges, such as the SDGs, or specific challenges within education and training systems and labour markets, such as gender-based discrimination and other biassed assumptions (e.g. pertaining to academic choices, educational practices, and materials). By doing so, micro-credentials can facilitate seamless transitions from higher education to work (Council of the European Union, 2022).

How will the micro-credential program be marketed and promoted, and how will this marketing be transparent and accurate?

The marketing and promotion of micro-credential programs should be transparent and accurate to ensure that learners are aware of the benefits and limitations of the program. The marketing efforts should be focused on providing relevant and useful information about the micro-credential program, including its objectives, curriculum, requirements, and expected outcomes.

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The development of specific national catalogues of micro-credentials or integrating micro-credentials in general national catalogues of learning opportunities promotes transparency and accuracy on micro-credentials, providing detailed information on the micro-credentials, with clear and concise descriptions of each micro-credential and their associated competencies, skills, and knowledge. This information should be easily accessible and understandable, with no misleading claims or promises. One such example is the MicroCreds portal[4] created by the Irish Universities Association (IUA) or the Ontario (Canada) micro-credentials portal[5] of the Government of Ontario and the province's colleges, universities and Indigenous Institutes. In addition, there is an open discussion on the development and inclusion of accredited micro-credential providers in official registers at national or regional levels (IMINQA, 2023).

The micro-credentials can also be promoted through social media, email marketing, webinars, and other relevant channels. The marketing efforts should emphasise the program's quality, relevance, and value proposition, and should avoid any false or exaggerated claims. Promoting micro-credential offers within a joint micro-credential exchange network is also a way to effectively promote micro-credential offers, collaboration and communication among several institutions. These networks allow institutions to establish a standardised format for presenting micro-credential offerings, including clear descriptions, learning outcomes, and credit equivalencies. This consistency ensures transparency and ease of understanding for learners, making it easier for them to navigate and select relevant micro-credentials.

3. Labour market and quality assurance

How can we ensure that industry or sector-specific skills and knowledge will be included in the micro-credential program to make sure that it meets the needs of the labour market?

In order to ensure that the micro-credential program addresses the needs of the target labour market, it is essential to engage with industry stakeholders and conduct regular labour market research to identify emerging skills [EHH1] [JA2] gaps and trends. By staying up-to-date on the latest labour market needs, micro-credential programs can remain relevant and responsive to learners' needs and ensure their success in the workforce.

To identify the skills gaps and opportunities that a micro-credential program can address, several types of labour market research can be conducted. By conducting these types of labour market research, a micro-credential program

[4] https://microcreds.ie/

[5] https://microlearnontario.ca/

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can be designed to address the specific skills gaps and opportunities in the target labour market, making it more effective and relevant to learners and employers.

Collaborating with skills intelligence systems can significantly enhance the design of micro-credentials by providing valuable data-driven insights into the current and future skill demands of the labour market. Skills intelligence systems use advanced data analytics and artificial intelligence to collect, analyse, and interpret data from various sources, including job postings, employer requirements, industry reports, and workforce trends. The Burning Glass Institute[6] is an example of a skills intelligence system that is widely used to inform workforce development and education initiatives. Burning Glass collects and analyses millions of job postings from various sources, along with other labour market data, to provide detailed insights into the skills demanded by employers.

How can the micro-credential program be designed to be flexible and adaptable to changes in the labour market, and how can feedback from employers be incorporated to ensure ongoing relevance?

To create a micro-credential program that remains flexible and responsive to labour market changes, a dynamic approach with agile curriculum development is essential. By adopting this agile process, the program can quickly adapt to shifting market demands, ensuring ongoing relevance and value for learners and employers alike. Regularly reviewing and updating the program's content and learning outcomes becomes imperative to align with emerging industry trends and technological advancements. This proactive approach guarantees that the micro-credential program stays up-to-date and equips learners with the skills they need to thrive in the ever-evolving job market.

Offering stackable credentials that allow learners to build upon their existing skills and knowledge is another valuable strategy. By providing modular components, learners can customise their learning journey based on their specific career goals and the current demands of the job market.

By incorporating feedback from employers and regularly updating the micro-credential program, it can stay at the forefront of the ever-changing job market, providing learners with relevant skills and knowledge that match current industry demands.

[6] https://www.burningglassinstitute.org/

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How can partnerships with employers, industry associations, and other stakeholders be established to ensure that the micro-credential program is aligned with the needs of the labour market?

Establishing partnerships with employers, industry associations, public employment services and other stakeholders is crucial to ensuring that the micro-credential program remains closely aligned with the needs of the labour market. These partnerships may include:

- Establishing advisory boards comprising representatives from relevant industries, businesses, and associations,
- involving employers and stakeholders in the development and review of the program's curriculum,
- exploring opportunities for work-integrated learning, such as internships, co-op programs, or project partnerships,
- hosting industry events and workshops or,
- offering customised micro-credential to meet the specific needs of individual employers or industry sectors.

How can the micro-credential program be evaluated to ensure that it is producing graduates who are ready to meet the needs of the labour market and contribute to the success of their employers?

To assess the program's relevance to the labour market needs, it is essential to collect and analyse labour market data. This includes tracking employment rates and job growth trends in the industries targeted by the micro-credential program. Analysing graduates' job outcomes, such as time to secure employment and the sectors they enter after completing the program, provides valuable insights.

Monitoring online job postings is another useful approach to identify the specific skills and qualifications sought by employers. Comparing these requirements with the skills taught in the micro-credential program helps evaluate alignment and uncover any potential gaps. By leveraging such labour market data, the program can continually adapt and ensure it meets the evolving demands of the job market.

Once data has been collected, it should be analysed to identify trends and patterns. This can help identify areas of strength and weakness in micro-credential programs, as well as opportunities for improvement. Based on the data collected and analysed, micro-credential programs can be modified to better meet the needs of the labour market and ensure that graduates are equipped with the skills and knowledge required to succeed in their chosen careers.

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References

Agència per a la Qualitat del Sistema Universitari de Catalunya AQU, 2021. Ex Ante Accreditation of Short Learning Programmes.
https://www.aqu.cat/en/doc/Universitats/Metodologia/Ex-ante-accreditation-of-short-learning-programmes

ENQA Working Group, 2022. Quality Assurance of Micro-Credentials: Expectations within the Context of the European Standards and Guidelines (ESG). September 2022. Available at: https://www.enqa.eu/wp-content/uploads/1.-IntroductionWG.pdf (Accessed 18/07/2023)

ESG, 2015. The Standards and guidelines for quality assurance in the European Higher Education Area (ESG), Available at:
https://www.enqa.eu/esg-standards-and-guidelines-for-quality-assurance-in-the-european-higher-education-area/

European Commission. 2022. Council recommendation on a European approach to micro-credentials for

lifelong learning and employability 2022/C243/02. Brussels: European Commission. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.C_.2022.243.01.0010.01.ENG.

IMINQA, 2023. Approaches to Quality Assurance of Micro-credentials: A report on policies and practices to assure the quality of micro-credentials in the European Higher Education Area (IMINQA).

MICROBOL, 2021b, State of play in the European Higher Education Area. Available at: https://microbol.knowledgeinnovation.eu/wp-content/uploads/sites/20/2021/02/Microbol_State-of-play-of-MCs-in-the-EHEA.pdf.

MICROBOL, 2022. MICROBOL Common Framework for Micro-credentials in the EHEA. Available at: https://microbol.knowledgeinnovation.eu/wp-content/uploads/sites/20/2022/03/Micro-credentials_Framework_final-1.pdf

SUNY, 2023. Our Story: Building SUNY's Microcredential Program and Initial Lessons Learned. Available at: https://www.suny.edu/microcredentials/program-development/ (Accessed 18/07/2023)

Tinsley, B.; Cacicio, S.; Shah, Z.; Parker, D.; Younge, O.; Luke Luna, C.; 2022. 'Micro-credentials for Social Mobility in Rural Postsecondary Communities: A Landscape Report'. Digital Promise, March 2022. Available at: https://digitalpromise.dspacedirect.org/items/6f82f95d-21f3-40b6-8dae-332a131cba8c

Domain 7: Recognition

Introduction

The European commission states in 2022 Micro-credentials being "*the record of the learning outcomes that a learner has acquired following a small volume of learning. These learning outcomes have been assessed against transparent and clearly defined standards*".

Due to the different forms of Micro-credentials, recognition procedures can vary by country and institution making MC recognition challenging to summarize. There are ongoing efforts to streamline and harmonize recognition procedures across Europe.

Target audience:

Study Programme Managers, Pedagogical and edTech support, Senior Academic Leadership, Faculty Staff, LMS/VLE Support Unit, Teaching Support Unit, Admissions Office, International Office, Alumni Office, Graduation Office, Student Union, Industry Partners & Employers

What are the minimum standards to be fulfilled for the implementation of MCs?

Countries that have signed the Lisbon Recognition Convention (LRC) can follow the following minimum standards:

***Recognition of qualifications*:** Qualifications awarded by recognized institutions in other countries should be recognized as equivalent to similar qualifications in the receiving country.

***Transparency and information*:** Information about higher education qualifications and systems should be made available to facilitate recognition. This includes information on the level, content and learning outcomes of qualifications.

***Fairness and impartiality*:** Recognition procedures should be fair, transparent, and impartial, and should take into account the individual circumstances of the applicant.

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Access to information and appeal procedures: Applicants should have access to information about recognition procedures and the right to appeal recognition decisions.

***Quality assurance*:** Recognition procedures should be based on reliable and transparent quality assurance systems.

***Non-discrimination*:** Recognition should be based on the qualifications themselves, and not on the nationality, race, gender, or other personal characteristics of the applicant.

This chapter provides an overview of potential approaches for micro-credential recognition and includes aspects to consider during recognition processes. As indicated in the chapter, the current tools for recognition of academic qualifications may be perfectly feasible and it has been shown by some institutions that new mechanisms may not be needed and barriers to recognition at times are very low. For example in Finland, Tampere University allows micro-credentials to be included in students' study programs as elective studies. A typical 120 ECTS master's degree program can hold 25 ECTS as elective studies. In addition, certain previously completed micro-credentials can be accepted as recognition of prior learning (RPL). However, there is no silver bullet and the differences between nations, institutions and even faculties may be substantial.

1. Recognition of micro-credentials

Who are the target groups / learner groups who will benefit from MC recognition?

1. **Students (academic or educational recognition of micro-credentials)**

The formal acknowledgement of micro-credentials by a competent recognition entity for providing an applicant with **the right to apply for admission to an education or training programme, to transfer credit within it, or to exempt part or all of it**.

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2. **Life-Long-Learners LLL (Professional recognition of micro-credentials)**

The acknowledgement of micro-credentials by an employer for **providing an applicant with the possibility of employment or job progression"** (source "*Guide for Designing, Issuing and Recognising Micro-Credentials*", ETF, 2022)

Historically seen, the first good attempt in the direction of facilitating the transfer, recognition, and accumulation of assessed learning outcomes of individuals who are aiming to achieve a qualification was the European Credit System for Vocational Education and Training (ECVET, 2021). Between 2009 and 2020 it succeeded in making a significant contribution to the implementation of a learning outcomes approach, but it failed in the use of credit points to transfer assessed learning outcomes. ECVET managed to reinforce understanding of gained competences, sharing experiences about methods as well as managing competences. In some countries, ECVET contributed to reforms of national VET systems. Unfortunately, VET Council Recommendation 2020 formally repealed the ECVET. One of the reasons was that the concept of ECVET points was generally not applied and ECVET did not lead to the establishment of a European credit system in VET.

Learning outcomes are significant in developing Micro-credentials as they represent one of the fundamentals for the recognition of a Micro-credential.

It is possible to distinguish two main target groups as beneficiaries of micro-credentials in the process of recognition.

The project MirocredX is primarily aiming at recognition of MCs for students' education and academic purposes for an individualised learning path.

What are the pillars on which a micro-credential recognition is based?

The Recognition of Higher Education qualifications in Europe is based on the following existing procedures and frameworks:

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Qualification Equivalence: This procedure involves comparing a foreign qualification to a national qualification of a similar level to determine if it is equivalent. If it is, the foreign qualification is recognized.

Qualification Assessment: This procedure involves a detailed assessment of a foreign qualification to determine its level, content, and learning outcomes. The assessment may include interviews, exams or other forms of evaluation.

Recognition of regulated professions: Some professions have their own recognition procedures which can fall to either the national or (federal) state governments, depending on who is responsible for authorising that profession. Within the EU (as well as EEA states and Switzerland) qualifications are automatically recognised for professional authorisation if the relevant professional rights are provided in the original country. Otherwise, a validation procedure is necessary.

European Qualifications Framework (EQF): The EQF provides a common reference framework for comparing qualifications across Europe. Qualifications can be assigned a level on the EQF, which can help with recognition and comparison.

According to ENIC-NARIC, Micro-credentials, which are aligned with the Bologna process can be recognized through the Lisbon Recognition Convention (LRC). Other types could be recognised through "*procedures for Recognition of Prior Learning (RPL) and an assessment of the relevant details of the course presented. In order for this to be possible, the micro-credential documentation should contain details of key aspects necessary for credential evaluation, such as – but not limited to – transparent information on quality assurance, assessment methods, entry requirements, and learning outcomes*" (ENIC-NARIC).

What are the existing recognition models for academic purposes ?

A recent report "Guide to design, issue and recognise Micro-credentials" (2022) issued by ETF and prepared by Knowledge Innovation Centre (KIC) lists multiple options for the recognition of micro-credentials. These are summarized in the Figure below.

There are many initiatives or projects in the EU dealing with recognition of micro-credentials. Although there isn't yet widespread knowledge of the mechanisms used, some of the promising approaches relate to the Recognition of Prior Learning (RPL) or established credit-exchange agreements among educational institutions. The first one, RPL, is seen

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as potentially impactful since higher education institutions generally include some freedom for the learners to apply electives in their studies and/or acknowledge prior studies that may not be ECTS-bearing.

Routes for Micro-credential recognition for academic purposes

In addition, and similar to the approaches identified in KIC's report, MicroCredX project did an inquiry within its partner universities on the recognition approaches that they use for micro-credentials. The most common possibilities were:

- **Automatic recognition (general)**

Partners/providers/universities agree on recognizing Micro-credentials from other partners/providers/universities as part of an agreement within a partnership – MCs from other organisations are recognized automatically by the home organization without any administrative procedures in a specific study program.

- **Elective Route (related to RPL)**

Within a study program a student is taking free electives from a partner's university. Curricula of study programs have a certain amount of ECTS granted for free electives.

In MicroCredX, these approaches are positively viewed as it could be openly used for any learning opportunities or Micro-credentials offered (e.g., by European Universities). It could also be used for enabling students to choose from a mutually agreed list among partners of MCs offered by other university´s study programs or the offered Micro-credentials within the partnership enabling individual learning pathways, where students can select Micro-credentials from a pool of modules in a certain ECTS amount to set their individual study focus.

Automatic recognition should lead into opening new learning pathways and enabling the so-called former "studium irregulare" as known, for example, in Austria. The students had the possibility to submit an application for individual studies to the rectorate of their university to deviate from the existing curriculum. However, it must be equivalent to a relevant degree.

- **Recognition of Prior Learning** (RPL) – recognition of any formal, informal or non-formal acquired knowledge, competences or skills in the past. Many partners of MicroCredX acknowledge that RPL and prior recognition approaches for qualifications do not have to be reinvented for micro-credentials. However, RPL policies and processes for micro-credentials must be in line with existing national and institution-specific policies.

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- **Recognition (academic issuer)** of any Micro-credential from universities (enabling individual learning pathways, where students can select Micro-credentials with a certain ECTS amount to set their individual study focus (e.g. 30% of specialisation). This can be made possible through an agreement leading to an elective learning pathway by extending a list of modules students may select from during their studies with selected Micro-credentials offered by other organisations. Quality assurance due to accreditation procedures at universities is assured.

The introduction of micro-credentials in the European educational landscape will need a certain sensitivity to build up trust in the system of MCs. Therefore, two schemes of recognition as suggested in the following subsections may be a first step to build up mutual trust in the system.

How can recognition be facilitated?

Inter-provider agreements for credit exchange are a common feature of mobility programmes. As an example, in VET a Memorandum of Understanding (MoU) is traditionally introduced and often signed to regulate mobility. It confirms that VET partners accept each other's status as competent institutions; accept each other's quality assurance, assessment, validation and recognition criteria and procedures as satisfactory for the purposes of credit transfer; agree on the conditions for the operation of the partnership, such as objectives, duration and arrangements for review of the MoU; agree on the compatibility of qualifications concerned for the purposes of credit transfer, using the reference levels established by a regional qualification framework such as the EQF; and identify other actors and competent institutions that may be involved in the process concerned and their functions (EU,2009/C 155/01). In Higher Education 'Inter-institutional Agreements' serve a similar purpose. Providing that Micro-credentials are credit-bearing (and share a credit system with the programme a student follows), then they can be recognised as contributing to a programme a student is following or in which they want to enrol.

As examples for bilateral recognition of learning outcomes may be mentioned Higher Education agreement (e.g. for erasmus students exchange).

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What are the perspectives of the different stakeholders in the process of recognition?

Taking into account the views of different stakeholders, recognition of credit exchange occurs:

From an organisational perspective:

- Two or more educational organisations organise and recognize the study periods followed by their students in an exchange program or in a networked/joint program.
- Institutional policies and strategies entail such collaborations and mobility.
- Collaboration and mobility agreements create the organisational framework.
- The organisations involved enhance their profile and strengthen their curricula;

From a student perspective:

- Students follow a learning activity, a course or part of a curriculum in another university in the framework of a bilateral or a network/consortium agreement between universities.
- Students benefit from a rich international academic experience

From a teaching staff perspective:

- Staff is organising a learning activity or a course in the framework of a bilateral or a network/consortium agreement between educational organisations. By doing so, new educational and mobility formats are created, based on international course and curriculum design.
- Teaching combines collaboration in education, research and innovation (Henderikx and Ubachs, 2019).

Under such an agreement, a group of education and training providers can agree to allow their students to study credits from other providers party to the agreement, as part of their study programme. The essential nature of such agreements is that they are automatic in nature – i.e., students who are studying a programme at a home organisation, may acquire any micro-credential that meets the requirements of the agreement, without the need for further administrative procedures.

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Which key elements of the agreement should be considered?

Such agreements may be designed with varying scopes and level of ambition:

Many micro-credential programmes aim to encourage students to widen their perspectives and acquire additional self-identified skills they feel are valuable for their personal development. In this case micro-credential providers can set up an agreement leading to an open learning pathway that specifies a certain number of credits which may be acquired in any subject, from any source or provider that meets certain quality criteria. This form of agreement is analogous to systems which give students credit for conducting voluntary work or gaining experience in their community.

Educational organisations, especially small ones, may want to give students access to a more comprehensive programme than what is feasible with their own staff and resources. This can be made possible through an agreement leading to an elective learning pathway by extending a list of modules a student may select from during their studies with select micro-credentials offered by other organisations.

Should the aim be to offer the student an international multi-institutional education, then an agreement leading to a rigid learning pathway would result in a programme designed to include compulsory credits from two or more education and training organisations. Joint degrees are an extreme form of such arrangements.

In all these cases, an inter-institutional agreement similar to those described above can be used to regulate micro-credential credit transfer - the key elements of the agreement being the:

1. Parties involved in the agreement;
2. Modules/courses which shall be available for exchange;
3. Programmes (at the home institutions) where these modules/courses may be included;

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4. Conditions for the automatic recognition of these modules/courses (e.g. the student achieving a passing grade)

Ad hoc recognition

Another potential path for recognition of micro-credentials is using trilateral contracts between a student's home institution, an institution they choose to visit (either via a virtual or a physical mobility) and the student (Sidaoui and Villecroze, 2020). Different to the automatic recognition path described above, in this case, each recognition is a bespoke agreement which sets out an individual study plan that summarises the mobility (or successive mobility periods) within the curriculum or course.

source SHARE

source: SHARE 2018

The recognition process for credit exchange via learning agreements amongst South-East Asian Universities participating in the SHARE programme (see picture, SHARE 2018).

Typically, an inter-institutional agreement will establish a trust relationship between the institutions participating, but critically, unlike in the examples above, will not provide for automatic recognition of study periods. Instead, these are regulated on an ad-hoc basis by the learning agreement, key elements of which include details on the:

1. Parties involved in the agreement, including the student;
2. Modules/courses which are to be exchanged in the specific mobility;
3. Specific dates for the mobility period;
4. The specific programme (at the home institutions) where these modules/courses may be included;

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5. Conditions for the automatic recognition of the modules/courses (e.g. the student achieving a passing grade) (SHARE, 2018)

While this route to recognition requires significantly more administration than the automatic recognition route in general, it may be easier to implement for institutions, since it uses existing structures and procedures that are already established for mobility periods.

2. Recognition Procedure and Elements to Describe Micro-credentials

How to describe a micro-credential meaningfully?

The wide variety of Micro-credentials offered make the recognition process challenging in daily practice. Micro-credentials of different providers could be recognised through procedures for Recognition of Prior Learning (RPL) and an assessment of the relevant details of the course presented. In order for this to be possible, the Micro-credential documentation should contain details of key aspects necessary for credential evaluation. See also Domain 2 of the implementation framework which gives detailed information on unifying design principles within the network exchange partners and informs you about minimum standards and critical information requirements.

According to the Annex II of Council Recommendations (Definition and Union Standard Elements to describe a micro-credential, 2022) mandatory elements are:

- Identification of the learner (name, surname, date of birth, ID)

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- Title of the Micro-credential
- Country/Region of the issuer
- Awarding body (company/institution name, address, …, incl. status of the provider e.g., public institution, private provider, …)
- Date of issuing
- Learning outcomes
- Notional workload needed to achieve the learning outcomes (in ECTS credits, wherever possible for academic learners and in certified hours [h] of attendance for LLL)
- Level (and cycle, if applicable) of the learning experience leading to the Micro-credential (EQF, QF-EHEA), if applicable (information on the QF level: NQF level (when possible), QF-EHEA and EQF level (if self-certified/ referenced), ISCED level & subject area code, (if needed)
- Type of assessment (oral, written on site, online, application of a skill, portfolio, recognition of prior learning, etc.)
- Form of participation in the learning activity
- Type of quality assurance used to underpin the Micro-credential

Further optional elements where relevant (but not exclusively) are:

- Target group (academic purpose or/and LLL)
- Prerequisites needed to enrol in the learning activity
- Supervision and identity verification during assessment
- (Unsupervised with no identity verification, supervised with no identity verification, supervised online, or onsite with identity verification)
- Grade achieved

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- Integration/stackability options (standalone, independent Micro-credential/integrated, stackable towards another credential)
- Further information

Ongoing suggestions of the MicrocredX team to be included:

- Development of a European Grading Standard (e.g. in [%] reached of 100 [%]) or if applicable the ECTS standards scheme
- Accreditation status of the provider (institutional accreditation, curriculum acc., course acc., no accreditation)
- Course description
- Language of instruction

- Achieved competences / qualification
- Form of modality of the learning activity (online, onsite, blended, work experience, voluntary, independent learning, …)
- Description of prerequisites:
    - Admission requirements
    - Prior knowledge
    - Prior (work) experience
- Monitoring and re-evaluation (evaluation, validation, re-accreditation, ...)
- Costs (students / LLL)

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- Micro-credentials should be issued in digital form

3. What are the Barriers for Recognition?

Besides ongoing efforts and processes there are still considerable barriers recognized by the MicrocredX partner institutions. There are similar barriers like differences in national and institutional cultures, as well as rigid procedures and systems-related barriers. What is needed are open-minded individual advocates which champion for more agile and flexible recognition procedures and services, an implementation manual and MC strategy defined and accepted by different stakeholders. Moreover, the MC strategy has to be communicated to and aligned with all stakeholder groups across organisations, including those in such essential areas as academic services and student support, or planning and quality departments.

At the moment, partner institutions follow the Recommendations of the EU council. It may be concluded that the most common barrier is either the lack of awareness on MCs and whether they actually need any specific approaches for recognition or the lack of regulations on institutional, legal and/or on a national or international level. A common recognition would assure efficacy and validity of MCs and make the educational pathways open and more flexible (as intended by the EU and its recommendations). Funding of MCs is an open question which has not been tackled till now and has to be considered within the educational structure on all levels, especially as government ministries distribute funding schemes to public higher education institutions linked to explicit micro-credentialing action plans, such as the case in Ireland, Spain and elsewhere.

However, it is important to note that many institutions in Europe acknowledge that via elective routes and RPL, here barriers for recognition of micro-credentials are not substantial as the mechanisms are already flexible enough for allowing learners to include micro-credentials in their study programs and degrees.

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The EU is leading the way to overcome the barriers. Through RPL (Recognition of Prior Learning) and free electives the way to MCs recognition is already open, but still needs some administrative hurdles to overcome and human intervention, meaning that we are far from automatised recognition. First solution to make recognition easier are digital credentials that are verifiable (e.g., EDC/Europass) and can make it easier for learners to prove their prior learning with rich metadata. Digital credentials allow learners to prove and/or show the achievements / micro-credentials they have gained and simplify the recognition process of an institution.

There are many incentives along the way (but also many hurdles (Legislation and Internal organisation, Lack of standardisation, Recognition, Privacy & Security etc.). Not to mention there are also requirements from the Quality Assurance Agencies (accreditation of programs and/or institutions). Already there are many initiatives on the way: Certidigital EDCI (European Digital Credentials Initiative), EBSI (European Blockchain Services Infrastructure), DCC (Digital Credentials Consortium), DC4EU (Digital Credentials for Europe Consortium) IMS (Instructional Management System Consortium) and other "commercial" Initiatives.

For overcoming such barriers, MicrocredX partners suggest the following procedures to facilitate multilateral recognition of micro-credentials:

- Common quality standards,
- Clear communication strategies to foster organisational change
- Common understanding of standardised parameters for enabling an automated recognition (see domain 2)
- Suitable platforms for online and hybrid teaching and learning models
- Adequate academic services management system
- Upskilling of professors/staff in new teaching methods e.g. MCs
- MC platform and adequate technological infrastructure (see domain 4) (for sharing, digital certificate infrastructure)

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- Quality standards in terms of content and format.
- Reference points for assessing the quality of a micro-credential
- Definition of qualifications based on micro-credentials

Good examples/practices of projects which already proposed recognition within their partnerships:

1. The e-VALUATE project provided a framework for recognising non-traditional learning, including Massive Open Online Courses (MOOCs) and Small Private Online Courses (SPOCs). The STACQ project followed on from e-VALUATE; this newer project has developed an online evaluation tool for Micro-credentials. It uses the criteria and the framework for recognising Micro-credentials and offers recommendations if some criteria for recognition are not met.

2. The MICROBOL project developed a "Common Framework for Micro-credentials in the EHEA" with a section dedicated to recognition, together with qualifications framework and quality assurance.

4. Joint Exchange Network Use Case: The MicrocredX Agreement

One of the potential ways for the recognition of Micro-credentials between multiple educational organisations, as evidenced in joint exchange networks and programmes, are agreements among institutions. Within the MicrocredX network, a signed agreement is currently considered that targets toward automatic recognition as the credits taken at a partner institution are based on the elective courses and are also part of the programme at their home universities. Institutions are currently evaluating whether a signed agreement is necessary or whether the autonomy of faculties and study programmes combined with existing tools for recognition solve the same goal of automatic recognition. Our initial work indicates that study programmes have autonomy to decide for their studies and institutional agreements may not be as effective as on a study programme or faculty-level.

The "UNESCO Global Convention on the Recognition of Qualifications concerning Higher Education (2023)" is an important step towards enabling student mobility, international cooperation between universities and quality

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assurance and should be mentioned as the newest approach how such an agreement of recognition may look like though this convention may not be fully applicable to all processes in HE.

At the time of publication, the “UNESCO Global Convention on the Recognition of Qualifications concerning Higher Education (2023)” has only registered 21 states as parties, with only 15 having ratified the convention. By applying the principles of the convention, a country gives students an automatic right to have their micro-credentials (qualifications and study periods) recognised for purposes of access to Higher Education and employment. It also provides a set of guidelines towards internationally standardised processes and procedures to make this a reality. Signature of the convention implies that a state is committed towards fairer and more efficient recognition procedures to access Higher Education including via support for flexible learning pathways.

Conclusion

This chapter of domain 7 shall give an overview about the pathways of recognition based on existing international conventions and recommendations. As there are no harmonised European standards the countries have to adapt their individual standards and agreements to their given legal framework.

A recognition agreement may have the form of a letter of understanding as minimum to a multilateral learning agreement (e.g., Erasmus+ mobility learning agreement).

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References

"Council Recommendation of 16 June 2022 on a European Approach to Micro-Credentials for Lifelong Learning and Employability." Official Journal of the European Union, vol. 2022/C, 16 June 2022, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32022H0627(02)&from=EN.

RECOMMENDATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 18th June 2009 on the establishment of a European Quality Assurance Reference Framework for Vocational Education and Training (Text with EEA relevance) (2009/C 155/01)

https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32009H0708(01)

"COUNCIL RECOMMENDATION of 24 November 2020 on vocational education and training (VET) for sustainable competitiveness, social fairness and resilience" (2020/C 417/01) celex_32020h120201_en_txt.pdf (europa.eu)

ENIC-NARIC: https://www.enic-naric.net/page-micro-credentials#:~:text=The%20definition%20proposed%20by%20the,transparent%20and%20clearly%20defined%20standards%E2%80%9D accessed: May 2023

Sidaoui, Sara, and Agathe Villecroze. Learning Agreement - Exchange Students. Deliverable: Guide, framework, Erasmus+ MOVIDIS, 31 Aug. 2020, https://www.movidis.eu/_files/ugd/c5068b_4c465c89170d4c358a667292751af50d.pdf. Accessed: July 2023

ECCOE. The Model Credit Recognition Agreement Tool User Guide. 2019, https://eccoe.eu/wp-content/uploads/sites/28/2022/09/MCRA-User-Guide.pdf.

ETF. Guide for Designing, Issuing and Recognising Micro-Credentials 2022, https://www.etf.europa.eu/sites/default/files/2023-05/Micro-Credential%20Guidelines%20Final%20Delivery.pdf accessed: June 2023

European Commission, Directorate-General for Employment, Social Affairs and Inclusion, The European credit system for vocational education and training – , Publications Office, 2021, https://data.europa.eu/doi/10.2767/298513

SHARE. Towards a common Credit Transfer System for Intra-ASEAN and ASEAN-EU Mobility. 2018, https://admin.share-asean.eu/sites/default/files/SHARE_HandBook_October%202018%20%2825102018%29.pdf accessed: july 2023

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https://www.unesco.org/en/legal-affairs/global-convention-recognition-qualifications-concerning-higher-education as at 27 January 2023

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