EUROPEAN MICRO-CREDENTIALS

A Guideline for Vocational Education and Training Providers

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2023

MICRO QUEST:

Innovative Quality Evaluation Strategy for Micro-credentials in non-formal VET in Europe.

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ABBREVIATIONS

CEDEFOP	European Centre for the Development of Vocational Training
cVET	Continuous Vocational Education and Training
ECTS	European Credit Transfer System
ECVET	European Credit Transfer System for Vocational Education and Training
EFQM	European Foundation for Quality Management
EHEA	European Higher Education Area
EN	European Norm
EQAVET	European Quality Assurance in Vocational Education and Training
EQF	European Qualification Framework
HE	Higher Education
HPI	Human Performance Improvement
ICT	Information and Communication Technology
ISO	International Organisation for Standardisation
iVET	Initial Vocational Education and Training
LLL	Lifelong Learning
MC	Micro-Credential
MOOC	Massive Open Online Course
NFQ	National Framework of Qualifications
ÖNORM	Österreichische Norm (Austrian Norm)
PDCA	Plan-Do-Check-Act
PES	Public Employment Service
QF-EHEA	Qualifications Framework of the European Higher Education Area
QQI	Quality and Qualifications Ireland
SME	Small and Medium Sized Enterprise
TQM	Total Quality Management
VET	Vocational Education and Training

Find detailed information in the glossary located in the annex.

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INTRODUCTION

These guidelines have been developed as one of the central products of the **Micro Quest** project - **Innovative Quality Evaluation Strategy for Micro-credentials in non-formal VET in Europe** (2021-1-AT01-KA220-VET-000025399) - a project that has been co-financed by the Erasmus+ programme of the European Commission and developed in collaboration with organisations in five countries: Austria, Ireland, Germany, Slovenia and Spain.

The purpose of this guide is to provide VET providers with a practicable and easy to apply publication that shall introduce the topic of micro-credentials to VET providers in (non)-formal VET, elaborate on embedding micro-credentials into VET and HE, and provide quality measures and guidelines on its effective implementation into VET.

The first chapter of this guide provides a common definition of a micro-credential with all necessary requirements and parameters, following the guidelines determined by the European Union in its 2022 Council Recommendation of 16 June 2022 on a European Approach to micro-credentials for lifelong learning and employability. Within this chapter, an overview of mandatory and optional elements to a micro-credential are provided, along with principles for its design and issuance.

The second chapter defines interfaces and common boundaries that exist amongst micro-credentials and examines their connections and relationships with other elements that often coexist within VET systems, such as: the European Qualifications Framework, the Standards and Guidelines for Quality Assurance in the European Higher Education Area, and the European Quality Assurance in Vocational Education and Training. In addition, this chapter examines European Tools and influences, including the Europass, the European Credit Transfer and Accumulation System, and Diploma and Certificate Supplements.

The third chapter examines the benefits of micro-credentials in terms of supporting lifelong learning, and accessing and remaining competitive in the labour market. Additionally, this chapter proposes a 4-step guide to initiate micro-credentials in a VET organisation and provides an approach on how single micro-credentials can be extracted from (non)-formal VET programmes and courses.

The fourth chapter of this guide shows the permeability of micro-credentials between VET and Higher Education, providing examples of micro-credentials which are currently being offered in Germany, Canada, Ireland, and The Netherlands. This chapter concludes with a hypothetical case of micro-credentials within the VET sector.

The fifth and final chapter illustrates a series of international quality assurance standards, such as EQAVET, EQF, ECTS, the ISO 9001, TQM, and ISO 17024, which can be used to ensure the quality and comparability of micro-credentials in VET. Furthermore, it examines steps to ensure quality standards are in place and practical examples of its implementation within the VET sector.

All these topics are supported with examples and / or good practices in the field of training.

Find out more about our project at www.micro-quest.eu.

1. DEFINITION OF MICRO-CREDENTIALS

A micro-credential is a qualification that demonstrates learning outcomes achieved through a short, transparently assessed course or module.

According to the Recommendation of the Council of the European Union (06/16/2022), a micro-credential is defined 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 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.

A micro-credential's objectives:

a) enabling individuals to acquire, update and improve the knowledge, skills and competences they need to thrive in an evolving labour market and society, to benefit fully from a socially fair recovery and just transitions to the green and digital economy and to be better equipped to deal with current and future challenges;

b) supporting the preparedness of providers of micro-credentials to enhance the quality, transparency, accessibility and flexibility of the learning offering in order to empower individuals to forge personalised learning and career pathways;

c) fostering inclusiveness, access and equal opportunities and contributing to the achievement of resilience, social fairness and prosperity for all, in a context of demographic and societal changes and throughout all phases of economic cycles.

1.1 European Elements to Describe a Micro-Credential

The European Data Model is a common format for describing micro-credentials and will be available for use by micro-credential providers (VET centres, HE organizations, local - regional and national public authorities, training providers, employment and social inclusion services, …) if applicable, and could enhance interoperability and facilitate data sharing on micro-credentials.

The Recommendation of the COUNCIL OF THE EUROPEAN UNION (06/16/2022), provides a list of common European standard elements to describe micro-credentials recommended as a resource to support implementation. It identifies mandatory elements and optional elements.

Mandatory elements

- Identification of the learner (ID, name and surname, national insurance….)
- Title of the micro-credential
- Country(ies)/Region(s) of the issuer
- Awarding body(ies)
- Date of issuing
- Learning outcomes
- Notional workload needed to achieve the learning outcomes (in ECTS credits, where possible)
- Level (and cycle, if applicable) of the learning experience leading to the micro-credential (EQF, QF-EHEA), if applicable
- Type of assessment
- Form of participation in the learning activity

- Type of quality assurance used to underpin the micro-credential

Optional elements

- 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
- Integration/stackability options (stand-alone, independent micro-credential/integrated, stackable towards another credential)
- Further information

1.2 European Principles for The Design and Issuance of Micro-Credentials

These ten principles regulate the main characteristics of micro-credentials (included in the definition above) and offer guidance to training providers, and specifically to VET centres, on the conception and issuance of micro-credentials. and the issuance of micro-credentials and on micro-credential system.

The principles are universal and can be applied in any field or sector:
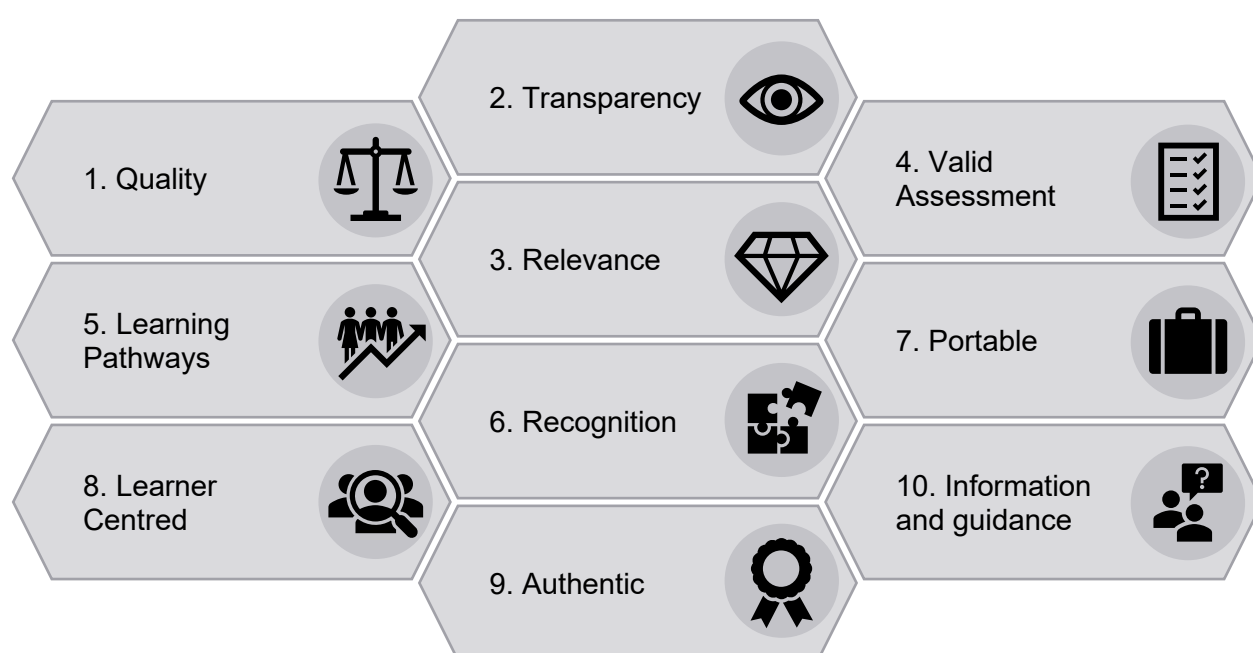
Figure 1: Micro-Credential Principles

1. Quality

Micro-credentials are subject to internal and external quality assurance by the system producing them (e.g., the education, training or labour market context in which the micro- credential is developed and delivered). Quality assurance processes must be fit-for- purpose, clearly documented and accessible and meet the needs and expectations of learners and stakeholders.

2. Transparency

Micro-credentials are measurable, comparable and understandable, with clear information on learning outcomes, workload, content, level, and the learning offer, as relevant.

3. Relevance

Micro-credentials should be designed and issued as distinct, targeted learning achievements and learning opportunities leading to them are to be updated as necessary, to meet identified learning needs.

4. Valid Assessment

Micro-credential learning outcomes are assessed against transparent criteria.

5. Learning Pathways

Micro-credentials are designed and issued to support flexible learning pathways, including the possibility to validate, recognise and 'stack' micro-credentials from across different systems.

6. Recognition

Micro-credentials are recognised, where possible, by the competent authorities, for academic, training or employment purposes, based on the information provided according to the European standard elements (seen previously) and these principles for the design and issuance of micro-credentials.

7. Portable

Micro-credentials are owned by the credential-holder (the learner) and may be stored and shared easily by the credential-holder, including through secure digital wallets (e.g., Europass), in line with the General Data Protection Regulation.

8. Lerner Centred

Micro-credentials are designed to meet the needs of the target group of learners.

9. Authentic

Micro-credentials should contain sufficient information to check the identity of the credential- holder (learner), the legal identity of the issuer, the date and place of issuance of the micro- credential.

10. Information and Guidance

Information and advice on micro-credentials should be incorporated in lifelong learning guidance services and should reach the broadest possible learner groups, in an inclusive way, supporting education, training and career choices.

2. EMBEDDING AND LOCATING MICRO-CREDENTIALS

Micro-credentials support the objectives of different European initiatives by offering flexible, inclusive, transparent and accessible learning opportunities in terms of skills, contributing to Europe's growth strategy, aimed at transforming its economy and society and putting it on a more sustainable path.

For this, the concept of micro-credential must be inescapably associated with quality, along with learning outcomes: quality aims to build trust in the micro-credential. Thus, without quality there is no micro-credential.

Briefly below, the references that guide how the quality assurance of micro-credentials should be carried out are indicated: (in the following chapter "Chapter 5" this topic is developed):

a) The European Qualifications Framework (EQF) for lifelong learning provides a common reference framework to help individuals and organisations to compare both different qualification systems and the corresponding levels of qualifications. EQF is also open to micro-credentials as long as they are first included in national qualifications frameworks. A micro-credential, as mentioned, is a qualification that demonstrates learning outcomes acquired through a short, transparently assessed course or module. Micro-credentials, in the interest of ensuring transparency, may be included in national qualifications frameworks or systems, where appropriate and in line with national priorities and decisions. National qualification frameworks or systems refer to the European Qualifications Framework.

b) The Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). The ESG acts as a reference for internal and external quality assurance systems in higher education. Information on micro-credential providers should be published, whenever possible and in the interest of providing transparent and clear information, in the relevant external quality assurance registries that are in line with the Quality Assurance Standards and Guidelines in the European Higher Education Area.

c) European Quality Assurance in Vocational Education and Training (EQAVET). EQAVET is a reference instrument designed to help EU countries to promote and guide the continuous improvement of their vocational training systems based on commonly agreed references. In addition to contributing to quality improvement in this area, its purpose is to build mutual trust between VET systems and to facilitate the acceptance and recognition of acquired skills and competences in different countries and educational settings.

2.1. European Tools in Which Micro-Credentials Are Reflected

In addition to the European quality assurance agencies, micro-credentials are reflected in the following European tools:

2.1.1. EUROPASS

The Common Framework for Better Services in Skills and Qualifications (Europass) is a free set of online tools for managing skills and planning learning and careers in Europe.

● With Europass you can create a free online profile that collects all the skills, qualifications and experiences of a person in one safe place.

● You can record all work experiences, education and training, language skills, digital skills, information about your projects, volunteer experiences and any other achievements.

● Diplomas, reference letters or other documents describing achievements can also be saved in your personal Europass library.

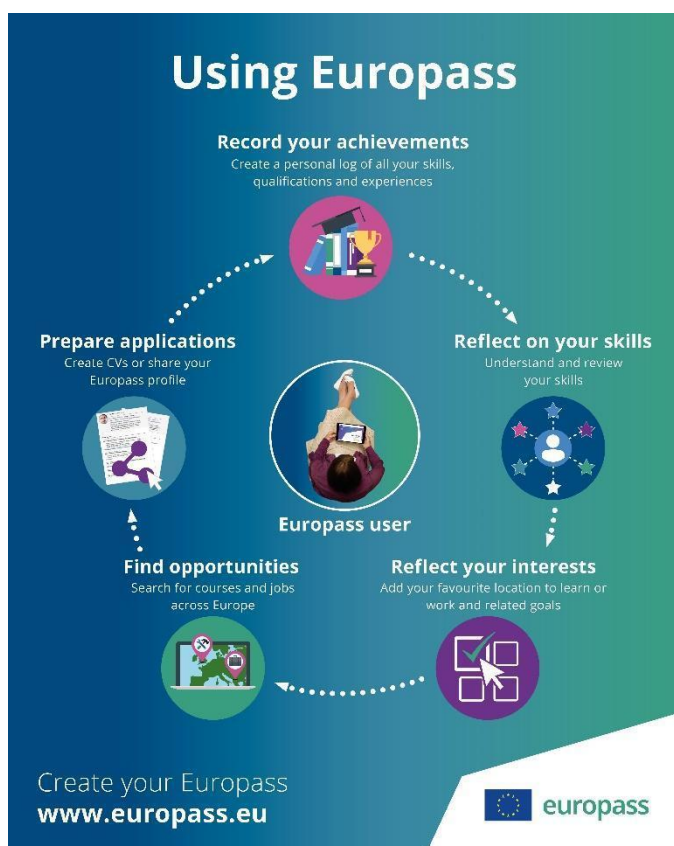● You can also create the profile in one or several European languages.

Figure 2: Europass Promotional Graphic

Europa offers credential authentication services, which allow the portability of micro-credentials. From Europe it is committed to making it easier for people to keep and show their micro-credentials through Europass and its digital credential infrastructure. Information on learning opportunities leading to micro-credentials should be accessible and easily exchangeable through relevant platforms, including Europass. Europe promotes making it easier for individuals to store and present their micro-credentials to employers through secure digital wallets (eg, Europass). Always in accordance with the General Data Protection Regulation.

The data retention infrastructure should be based on open standards and open data models, as this ensures interoperability and seamless data exchange and allows easy verification of data authenticity.

2.1.2. European Credit Transfer and Accumulation System (ECTS)

The European Credit Transfer and Accumulation System (ECTS) is a tool of the European Higher Education Area (EHEA) to make qualifications and courses more transparent. This guide helps students when moving between countries and also when it comes to getting their academic qualifications and periods of study recognized abroad.

ECTS makes it possible for the credits taken at a higher education institution to be valid for a degree studied at another similar centre. ECTS credits represent training based on well-defined learning outcomes and the workload they entail. Also, higher education institutions use the European Credit Transfer and Accumulation System (ECTS) and the Recommendation of European Qualifications Framework (EQF), whenever possible, to demonstrate the necessary theoretical workload. to achieve the learning outcomes of the micro-credential and in order to guarantee the principle of transparency.

2.2. Other Influences of Micro-Credentials

Finally, micro-credentials also have their reflection and influence on:

2.2.1. Validation of non-formal and informal learning

Validation of non-formal and informal learning implies that people can validate the knowledge, skills and competences acquired through non-formal and informal learning.

The European Commission distinguishes between formal learning (for example, institutional education and training programs), non-formal (for example, company training) and informal (for example, work and life experience), from a lifelong learning perspective.

According to the Council Recommendation (20 December 2012 on the validation of non-formal and informal learning), "validation is a process of confirmation by an authorised body that a person has acquired learning outcomes measured in relation to with a relevant standard and consists of the following four phases:

1.   Identification through dialogue of an individual's particular experiences,
2.   Documentation to make the individual's experiences visible,
3.   A formal evaluation of these experiences, and
4.   Certification of the assessment results, which may lead to a partial or full qualification" and "recognition of prior learning means the validation of learning outcomes, whether from formal education or from non-formal or informal learning, acquired before to request validation".

Here you can find an interesting case study about Recognition of Prior Learning (RPL) in practice, as an example. A group of farmers from Cork were assessed through RPL. The goal was to ensure the practical learnings that farmers have taken from Carbery's Greener Dairy programme were being academically recognised by University College Cork (UCC).

Governments must ensure that validation processes issue trustworthy certificates. Further development of the links between validation and micro-credentials is called for:

- National guidelines, agreed with the social partners, should detail the minimum standards for validation procedures.
- Validation standards should be designed to work across sectoral boundaries (encourage intersectoral cooperation).
- Cooperation between the education system and the labour market on validation procedures should be transparent. A legal framework should ensure the involvement of the social partners to monitor the quality standards of the procedures and of the training providers (VET centres or companies).

2.2.2. Diploma and certificate supplements

Micro-credentials open up education to a greater number of people due to their flexible nature and short duration. They are open to all types of students. They can be especially useful:

- for people looking to expand their current knowledge rather than earn a full degree
- want to bridge the gap between qualifications or their initial formal education and the new skills of the labour market
- want to improve or recycle their knowledge

These short courses can be delivered by higher and vocational education and training institutions, as well as by different types of private entities, as a quick response to the needs of the labour market in terms of specific skills.
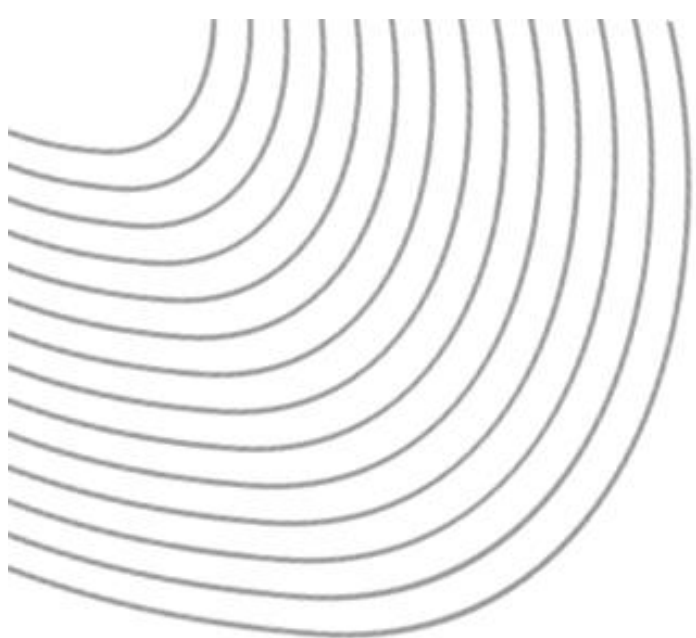
3. FROM VET PROGRAMMES TO MICRO-CREDENTIALS

Micro-credentials solve many issues where traditional education, including vocational education and training and universities cannot offer a solution, especially when you consider the constant changes in the needs and requirements of the labour market, the disconnection that the academic field has with the demands of companies, to the lack of time or resources for both the employer and the educators in terms of upskilling or reskilling new staff, applying for and implementing accredited training programmes, and a lack of human resource power to implement training programmes within organisations.

For these reasons, it is important that VET adapts quickly to remain relevant and offer solutions for a plethora of stakeholders, including students, current and future employees, the unemployed, and organisations. Not only should VET providers consider offering micro-credentials for the jobs of today, but they should also think about how to offer micro-credentials that will address the needs of the future labour market, through technological, engaging, and personalised methods that will attract new students in the future and keep current interested in pursuing lifelong education in the future.

3.1. How Can Continuing Vet Benefit from Micro-Credentials

Continuous vocational education and training (cVET), promotes the idea that adults will continue to learn throughout their lives. As a result of this programmes should be offered to encourage lifelong learning opportunities at all stages in our adult life. Examples of lifelong learning include; a receptionist who learns a second language to support their multicultural and multilingual clients; a business owner who attends a sales and marketing course to learn new ways to attract new clients; or, a company employee taking a website development course to add to their repertoire of skills. The

opportunities of lifelong learning are endless, and through participating in a micro-credential, adult learners participate in continuous professional development whilst simultaneously gaining accredited qualifications for their newly acquired skills.
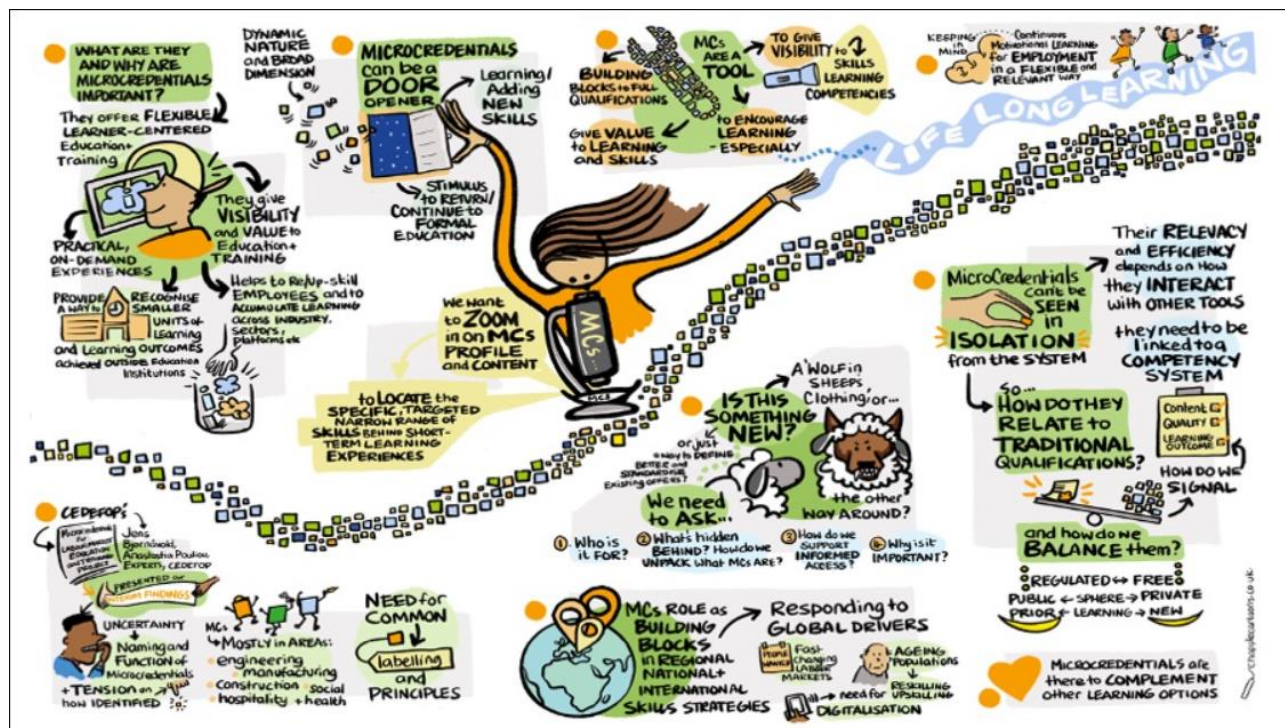
Figure 3: Micro-Credential Infographic (CEDEFOP 2022a)

Research undertaken by Ates & Alsal (2012) recognises that lifelong learning has become increasingly important in recent years, as it enhances social inclusion, promotes active citizenship and individual development, and also increases the competitiveness and employability of the labour market. As adults progress in life, a myriad of barriers often prevent them from partaking in education and training, such as time constraints in caring roles; additional pressures and requirements in work; or a lack of desire or motivation to take on a new educational path. Micro-credentials promote lifelong learning as they are short-term, goal-focused programmes, which promote the idea of teaching and learning around one very specific topic. They are also stackable, which will be discussed in chapter 4, illustrating that a series of minor awards (micro-credentials) can build towards a major award such as a diploma, degree, or masters. Some examples of micro-credential courses which promote lifelong learning in Trinity College Dublin in Ireland include a 5-week course on Equality Diversity and Inclusion; a 6-week course on Principles and Practices of Business and Human Rights; and a 12-week course on Entrepreneurship for the Nature-based Enterprise.

The COVID-19 pandemic highlighted the fragility of the labour market, with many jobs and industries being perceived as "non-essential", such as the airline / transport industry; arts industry; the

hospitality industry; and even the leisure industry. As a result, people across the globe were furloughed or lost their jobs, and many others remain fearful that their jobs are at high risk of this occurring. Micro-credentials also support individuals who wish to change career paths quickly or wish to ameliorate their progression paths within an organisation, as they address the skills gap that these individuals may have. Due to the short-term nature of these programmes, people do not have to "put their lives on hold" as they might if they were to undertake a Bachelor's or Master's degree. As a result of participating in a micro-credential, new opportunities and horizons are opened for learners in the relevant short to medium term, thus improving their employability and chances of being retained by an organisation.

cVET can benefit from micro-credentials as they invite learners from all backgrounds and traditions into the learning environment. Some individuals may never have participated in VET or FET, and as a result, are relying on the recognition or validation of prior learning to support their entry into the course. On the contrary, others may be highly knowledgeable and qualified in the broad topic area and wish to hone their skills into a specific field. As a result, micro-credentials help to expand and broaden the horizons of non-traditional learners and open up new pathways for highly experienced yet poorly qualified individuals.

3.2. How to Develop a European Approach to Include Micro-Credentials in CVET

1	2	3	4
IDENTIFY & DETECT THE NEED FOR MCS	COLLABORATION & COOPERATION WITH AGENTS	DESCRIPTION OF THE MC	INCLUSION OF THE MC IN OFFICIAL CHANNELS

In chapter 4, you can find more information and practical examples about

(3) and MC Design and MC Evaluation & Assessment
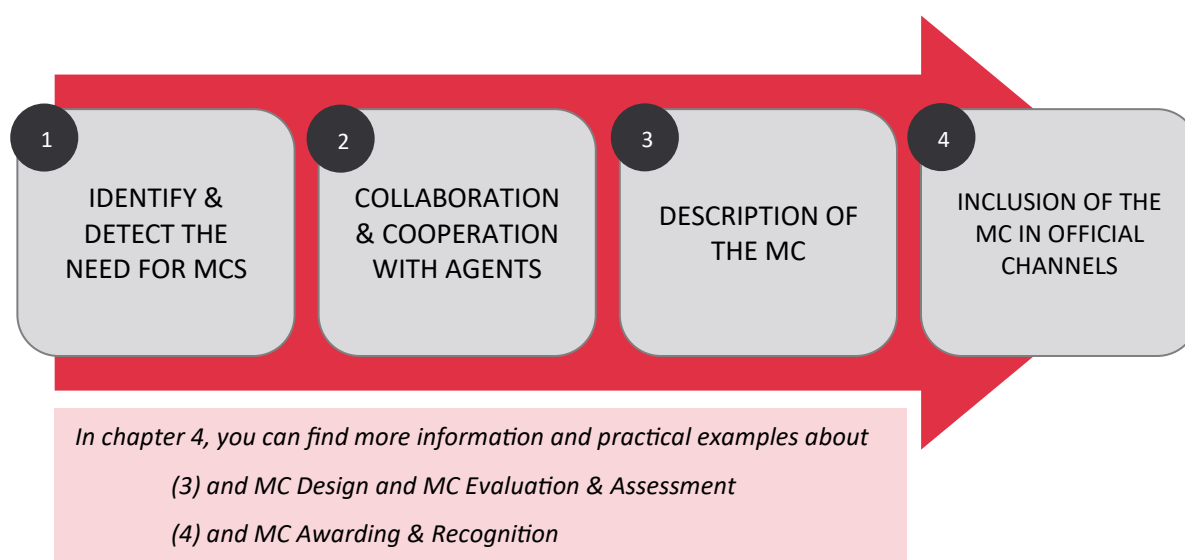
(4) and MC Awarding & Recognition

Figure 4: 4-step guide to initiate VET providers in micro-credentials

3.2.1. Identify/Detect the Need for Micro-Credential

The need to develop or update micro-credentials is evident to make a culture of lifelong learning effective and thus ensure that all people have the knowledge, skills and competencies they need to thrive in society, the labour market and their personal lives.

The first step for this is to identify and/or detect, through the analysis of labour market needs and demographic changes (through the use of "skills information" systems), the micro-credential demanded to meet new and emerging needs in society and the labour market and enable people to fill the skill gaps they need to succeed in a rapidly changing environment, without replacing traditional qualifications.

Micro-credentials could help certify the results of small personalised learning experiences. They make possible the selective and flexible acquisition of knowledge, skills and competences. The continuous upskilling and reskilling are essential for workers to respond to the needs of their current job or to transition to new jobs and expanding sectors, such as the green and digital sectors, in particular in the context of demographic ageing.

Lifelong learning opportunities should be part of the long-term strategy of VET organisations to improve their responsiveness to the fast-changing needs of employers and learners. The micro-credentials can complement existing qualifications, providing added value while not undermining the core principle of full degree programmes in initial/continuous education and training. Micro-credentials could be designed and issued by a variety of VET providers in different learning settings (formal, non-formal and informal learning settings).

This would enable a more diverse body of learners (including graduates of these training organisations and other adult learners) to upskill and reskill.

3.2.2. Collaboration / Cooperation with Agents

The cooperation, governance and partnership among agents is important for identifying needs for micro- credentials, co-developing micro-credentials, and updating micro-credentials, as well as for assessing the impact on upskilling and reskilling, lifelong learning and career development.

It is recommended that the providers of micro-credentials, including vocational education and training (VET) institutions, cooperate and integrate the latest research findings in the design and update of learning opportunities.

a) The relevance, development and updating of micro-credentials depends on the cooperation and collaboration between regional and national authorities, education and training organisations:

- education and training institutions;

- the social partners;

- employers and industry;

- research and innovation organisations;

- civil society organisations;

- employment and social inclusion services;

- local, regional and national authorities;

- business and companies;

- community centres;

- professional associations;

- private training providers;

- various funding sources

b) It is necessary to promote the development of micro-credentials designed and agreed by the representatives of employers and workers through social and intersectoral dialogue (this social dialogue should involve organisations that represent workers and employers from both the private and public sectors, small and medium-sized enterprises -SMEs, and professional and managerial staff), where appropriate. Collaboration between education and training organisations and employers, social partners, other providers, users of micro-credentials is encouraged to increase the relevance of the micro-credentials for the labour market.

3.2.3. Description of Micro-Credentials

Information and elements to describe the European Micro-Credentials are already provided in chapter 1.1 (page 4).

Mandatory Elements of a Micro-Credential

Identification of the learner

Title of the micro-credential

Country(ies)/Region(s) of the issuer

Awarding body(ies)

Date of issuing

Learning outcomes

Notional workload needed to achieve the learning outcomes

Level (and cycle, if applicable) (EQF, QF-EHEA), if applicable

Type of assessment

Form of participation in the learning activity

Type of quality assurance used to underpin the micro-credential

Figure 5: Mandatory Elements of Micro-Credentials

3.2.4. Inclusion of the Micro-Credentials in official channels

EDUCATION AND TRAINING SYSTEMS AND SKILLS POLICIES

NATIONAL QUALIFICATIONS FRAMEWORKS AND SYSTEMS

OFFICIAL CHANNELS TO INCLUDE

EMPLOYMENT POLICIES AND ACTIVE LABOUR MARKET POLICIES

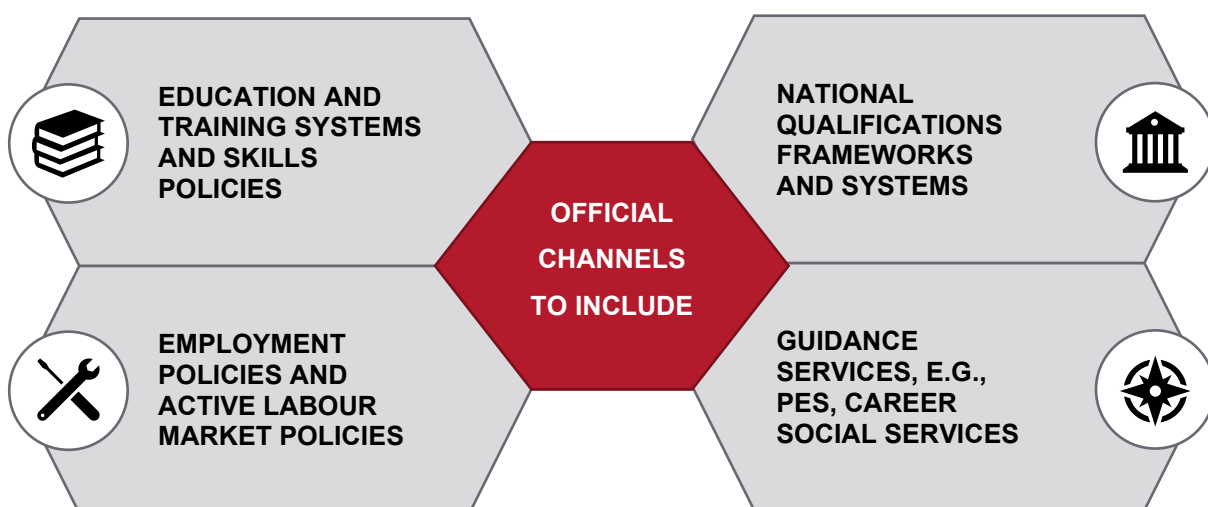GUIDANCE SERVICES, E.G., PES, CAREER SOCIAL SERVICES

Figure 6: Official Channels to Include Micro-Credentials

Integration of micro-credentials into **education and training systems and skills policies**, through:

1. The publication in the education and training catalogues of the offers that give rise to micro-credentials, including, when appropriate, its micro-credential recognition policy.

2. The use of micro-credentials to improve access to education and training for all learners, including disadvantaged and vulnerable groups: people with disabilities, the elderly, low-skilled people, minorities, people with a migrant background, refugees and people with fewer opportunities due to their disadvantaged geographical or socio-economic situation.

3. The use of micro-credentials to support flexible learning pathways and the transition from post-compulsory secondary education or VET to higher education, CVET and adult education.

4. The use of micro-credentials that can be integrated into degree programs or complement them, when appropriate.

5. The use of micro-credentials as an additional means of improving basic and advanced digital skills and competences of a wider range of learners, in line with the Digital Education Action Plan and the European Pillar of Social Rights Action Plan.

6. The use of micro-credentials to support the development of the learning offer for ecological transition and sustainable development in the framework of the national implementation of the Council Recommendation on learning for environmental sustainability.

7. Promoting the use of micro-credentials by education and training institutions and other providers, in cooperation with their knowledge and innovation ecosystem, to drive relevance and increase the potential positive impact of micro-credentials on the economy of their cities. and regions.

8. Promoting the understanding and use of micro-credentials through continuous professional development of teachers and trainers and career advisors, academics, researchers and other related professionals.

9. Promoting the use of micro-credentials for the rapid transfer of the latest research results to learning opportunities, reinforcing synergies between the European Education Area and the European Research Area.

10. Exploration of the use of micro-credentials in the European Education Area in order to combat gender stereotypes and other discriminatory stereotypes related to study options and in educational practices and materials.

Integration of micro-credentials in employment policies and active labour market policies (employment services, training support and employment incentives), with the aim of:

1. Address skills mismatches and bottlenecks in certain economic sectors and regions.

2. Improve and retrain workers for the skills and jobs demanded by the labour market, particularly in the context of the digital and ecological transitions.

3. Include training that generates micro-credentials in recognized training opportunities that can be linked to individual learning accounts, where they exist, and other training support systems.

4. Update and improve the skills of the self-employed and non-conventional workers, including people who work through platforms and SMEs.

5. Support and motivate disadvantaged and vulnerable groups (such as minimum income earners, people with disabilities, the long-term unemployed and the low-skilled) to re-enter the labour market or continue working.

6. Apply the enhanced youth guarantee in order to support young people, in particular in preparatory training and in good-quality continuing education or training offers.

7. Support the professional development of workers and meet mandatory retraining and retraining requirements in certain jobs and types of work (eg, in the case of licences, training requirements and permits).

Integration of micro-credentials in **national qualification frameworks and systems**

The European Qualifications Framework for lifelong learning is open to micro-credentials as long as they are first included in the national qualification frameworks. The EQF provides a common framework of reference to help individuals and organizations to compare both different qualification systems and the corresponding levels of qualifications. As a European framework of reference, the European Qualifications Framework (EQF) is open to all types and levels of qualifications and represents the common standard reference for transparency, portability and comparability.

	Integration of micro-credentials in **guidance systems**

Incorporate information and advice on the identification and selection of micro-credentials into lifelong learning guidance services: guidance services in career guidance centres in higher education and VET institutions, public employment services (PES), private employment services, social services and other guidance services (employment, career, education and training, counselling).

Incorporating guidance on micro-credentials into these services should respond to the needs of all learners, including the disadvantaged and vulnerable groups (such as people with disabilities, the elderly, low-qualified/skilled people, minorities, people with a migrant background, refugees and people with fewer opportunities because of their geographical location and/or their socio-economically disadvantaged situation).

The Higher Education Quality Council of Ontario published a report "Understanding Micro-credentials" in 2021, where a typology for micro-credentials is presented (see figure below). This structured view can be a useful tool for preparing and creating micro-credentials.
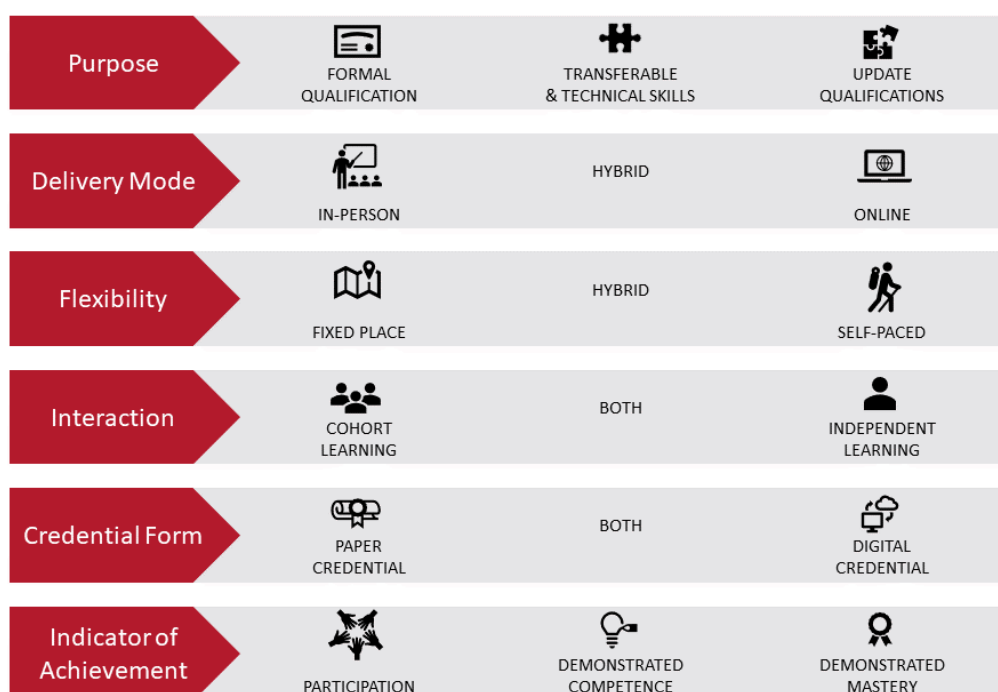
Purpose	FORMAL QUALIFICATION	TRANSFERABLE & TECHNICAL SKILLS	UPDATE QUALIFICATIONS
Delivery Mode	IN-PERSON	HYBRID	ONLINE
Flexibility	FIXED PLACE	HYBRID	SELF-PACED
Interaction	COHORT LEARNING	BOTH	INDEPENDENT LEARNING
Credential Form	PAPER CREDENTIAL	BOTH	DIGITAL CREDENTIAL
Indicator of Achievement	PARTICIPATION	DEMONSTRATED COMPETENCE	DEMONSTRATED MASTERY

Figure 7: Types of Micro-Credentials. Adapted from: Structure and forms of micro-credentials offered in Canada (from Pichette, J., Brumwell, S., Rizk, J., Han, S.(2021) Making Sense of Micro-credentials. Toronto: Higher Education Quality Council of Ontario.

4. MICRO-CREDENTIALS IN BETWEEN VET AND HIGHER EDUCATION

4.1. State of the Art in Higher Education

In higher education, micro-credentials are already well established, especially in Northern America and Australia and now starting to spread in Europe as well.

They are defined as "...certified documents that provide recognised proofs of the achievement of learning outcomes from shorter, less duration, educational or training activities. They focus on the validation of competency-based skills, outcomes and/or knowledge using transparent standards and reliable assessments, which can enhance graduates' employability prospects. A micro-credential can be accepted for credit by an institution or organization or be an attestation for employers. A micro-credential attests to specific knowledge or skills competencies with defined learning outcomes and may or may not be stacked towards larger units of accreditation." This fits very well with the definition of the EU which you can find in chapter 1 of this guideline.

Micro-credentials in higher education exist mostly outside the formal qualifications network of traditional universities, but these institutions provide formal guidance for the learners. Sometimes, the micro-credentials are stackable or combinable towards higher qualifications to the point of formal certificate and/or degree credit programs. There are different approaches in how to take control over micro-credentials, if it is managed by the institution, by a national framework or personally by the learner. In Europe, with Europass, the latter approach has been chosen.

In the following, we will present a few examples of micro-credentials in higher education programs, and focus on how skills and competencies are evaluated, awarded, and recognised by these institutions.

4.1.1 Micro-credentials at HPI University Potsdam, Germany

The micro-credential has been developed as part of the EU Corship Project and has been offered from the HPI at University Potsdam. The micro-credential consists of the Co-Innovation Journey MOOC as a required introductory step that should be completed by participants in self-paced mode before starting the Co-Innovation MasterClass with a "confirmation of participation". The MOOC introduces the topic and provides learners with the necessary knowledge to dive deeper into the topic, apply that knowledge and, within the Co-innovation MasterClass, design a solution set in a context of startup-corporate collaboration.

Deduction/Evaluation of competences

At the end of the course, there is a final event for all the participants, coaches, experts and external guests. External guests (professors, students, startups, corporates, city officials) are invited to participate and provide feedback to learners. Teams present the final outcomes of their work to a jury of judges in the form of a 3-minute pitch. The assessment will be done from multiple perspectives (learners, peers in the same team and other teams, coaches, experts and clients) and consider the whole process of the MasterClass instead of focusing merely on the outcome of the project. The types of assessment may be classified as follows:

1. Process assessment within Team
2. Outcome assessment by the Jury (Clients and Experts)
3. Outcome assessment by other Teams

Awarding

It is necessary to be an enrolled student at Potsdam University or one of the other institutions, who organised the micro-credential, to receive a formal certificate after the successful completion of the course. Participants also had to pay to get the certificate, like it is common in many MOOCs.

Recognition

Participants receive digital proof of their achievements. Since it is no formal degree, it is up to any university, employer or other organisation, if and how the certificate will be recognised.

4.1.2 Micro-credentials at Ontario Tech University, Canada

The TD Ready Commitment delivers, together with Ontario Tech University, 1,000 free micro-credentials, across 24 topics of interest. TD is a Canadian Retail bank and therefore a private provider of micro-credentials. The audience are people, who are mid-career, under-employed, or who are currently or likely to face changes in the workplace. Most of these micro-credentials are offered in one of the following formats:

1. stand alone, where the learner may opt in to taking the program,
2. integrated within the classroom, where a faculty member identifies a point where a skill is being developed and displayed and could be assessed as a result of the work they are doing,
3. integrated into co-curricular activities.

Deduction/Evaluation of competences

The micro-credentials are based around acquired competency, essentially the system is pass or fail. The transferable skills (soft skills) offer learners two separate pathways:

1. allows the learner to demonstrate examples from their lives where they have displayed a specific skill, while
2. engage the learner in reflexive activities about the material they have learned and demonstrate the skill through their responses.

In both cases, the learner is assessed against the same rubric which highlights the skills of that competency. The skills are assessed by a trained assessor with a background in education. Those that are deficient in the skills receive some feedback from the coach and an opportunity to reattempt the skill.

There also is a variety of other micro-credentials that are focused around entrepreneurship which are assessed through a pitch or the evaluation of an mvp (minimum viable product) or Excel, where learners are given a variety of criteria, they must complete to receive the micro credential.

Awarding

A badge is awarded after successful completion to people who have had their skills assessed. It is the digital representation of an earned micro-credential and contains verifiable data of how the student earned the credential, proof of ownership and a description of the achieved skills. The badge is a portable communication tool that can be added to social media profiles, shared with colleagues, employers, professors, and others.

Recognition

Micro-credentials are awarded as "co-curricular activities", where students can demonstrate their involvement in campus life by means of an "involvement record", that tracks students' participation in various events and provides an official university document.

4.1.3 Micro-credentials in Ireland

There are seven universities in Ireland that offer a variety of over 1,000 programs that can be classified as micro-credentials. Quality and Qualifications Ireland (QQI), the state agency responsible for promoting the quality, integrity and reputation of Ireland's further and higher education system, provides information and analysis about these programs.

Deduction/Evaluation of competences

There are different offers for micro-credentials (called MicroCreds at University of Galway). Interested persons must apply at the university and study online in a course with continuous assessment in different forms, like role plays, oral presentations, written assignments, or aural assessments, depending on the subject of the course. Some courses define entry requirements and most of them have a fee.

Awarding

The report shows that micro-credentials worth 5 to 30 ECTS have been awarded in Ireland until May, 2021.

Recognition

The Irish National Framework of Qualifications (NFQ) recognises micro-credentials, which gives some assurance to funders, learners, and employers that programmes are well designed and delivered and assessed to high standards.

Having a micro-credential will mean that a person has studied for a university level course and completed it to this standard. Each MicroCred will provide skills and knowledge which will be directly related to the work environment and should assist in career development. In some instances MicroCreds may be of benefit for Recognition of Prior Learning, when taking other related higher awards at the university.

4.1.4 Micro-credentials Pilot in the Netherlands

In the Netherlands, 32 higher education institutions have been taking part in the Dutch national micro-credentials pilot. The aim is for educational institutions to offer the first micro-credentials. During the pilot, it will be explored whether and in what way micro-credentials can be permanently added to the system.

Deduction/Evaluation of competences

The quality of the education certified by micro-credentials is guaranteed on the basis of the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG). The

tests support the learning process of the participant and the assessment is valid, reliable, transparent for participants and sufficiently independent.

Awarding

The micro-credential stands for education worthy of accreditation and adds a quality mark: the (paying) participant/employer can be sure that the course has been set up in such a way that learning outcomes will be achieved. The achievement of these learning outcomes is traceable and verifiable. It will be issued using edubadges, the digital certificates platform for the Dutch education community.

It is planned to have a national registration of who has obtained which micro-credential.

Recognition

In Dutch higher education, a high-quality system of quality assurance exists. The quality of the education certified by micro-credentials is guaranteed on the basis of the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).

1. The Executive Board is familiar with and consciously chooses to offer micro-credentials on the basis of the institution's LLL (Lifelong Learning) vision.
2. The institution has set up an internal quality assurance process for the design, accreditation and quality assurance of micro-credentials.
3. The institution has designated a body or bodies that can guarantee the final level of micro-credential-certified education.
4. A form of educational evaluation, participation and possibility of submitting complaints has been organised for participants in micro-credential-certified education

4.1.5 Examples for micro-credentials in higher education – Overview

The following table summarizes the examples described above for a quick overview.

	DEDUCTION	AWARDING	RECOGNITION
Germany	process assessment within team, outcome assessment by a jury, outcome assessment by other teams	formal certificate	digital certificate issued by university
Canada	assessment of demonstrated example where specific skills have been used, reflexive activities about the material that has been learned	badge	co-curricular activity, digital certificate issued by university
Ireland	continuous assessment in different forms: role play, presentation, written assignments, aural assessments	formal certificates with ECTS, QQI minor awards	recognized by the Irish National Framework of Qualifications, can be recognized as part of Prior Learning
Netherlands	tests and assessments on the basis of the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG)	edubadges, national registration of who has obtained which micro-credential	quality of education certified by micro-credentials guaranteed on the basis of ESG

Table 1: Examples of micro-credentials in higher education.

4.2. Comparison To VET

In the European context, micro-credentials are gaining popularity as a means of updating the skills of workers and fostering continuous learning. In this part of the chapter, we will take what we learned from MCs in HE and compare it to the VET world. What can be transferred, in what regard is it similar, what is different?

Currently, there is no common European approach to micro-credentials and the modularisation of VET programmes. It is still a sandbox to explore and develop national strategies that will have a common ground and understanding to ensure the transferability and comparability between EU member states, and probably broader. However, VET is adopting the lessons learned from the HE in this regard.

Traditional VET programmes that lead to formal qualifications have become increasingly modular, which could be viewed as coming one step closer to micro-credentials, therefore becoming more agile and responding to the needs of the labour market. One can stack different competencies through micro-credentials, which could lead to a formal VET certificate in some countries. The main concern is whether the deconstruction of the partial qualifications is the right decision or micro-credentials should be independently designed, and supplement qualification systems.

According to the CEDEFOP 2022 study:

> *"[…] many labour market actors, such as the ICT sector, consider micro-credentials crucial to their national education and training landscape. Initially delivered by colleges and universities (NQF level 6), micro-credentials have also spread into VET; digital badges and other micro-credentials, for example, enjoy growing popularity in the food sector. Awarded for short courses that meet controlled criteria, they offer employees tangible and practical awards that can be verified online with a higher value than attendance certificates."*
>
> (CEDEFOP 2022b)

Furthermore, there is the issue of the numerous credentials, provided by the private VET, which are outside of NFQs, with different standards, assessment, and recognition by relevant ecosystem parties.

Examples of introducing MCs in VET in some European countries (CEDEFOP, 2021)

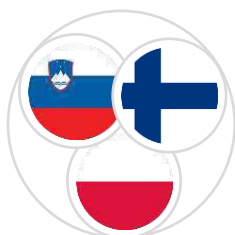|	**GENERAL**	**AWARDING**	**RECOGNITION**
Croatia	The Adult Education Act, adopted in December 2021, introduced 'micro-qualifications' into formal adult education.	Short training programmes, including professional development training and other VET courses will be awarded with **learning outcome units.**	Included in Croatia's national qualification framework (NQF) so that they can lead to **partial or full qualifications.**
Netherlands, Norway	The Commission's consultation, in 2021, has inspired discussions on how to embed MCs into formal VET systems.	Since 2017, it has been possible in the Netherlands to issue online MCs called **edubadges**. The platform contains different badge classes covering all education levels and many labour market sectors.	Organisations can issue, create and edit micro-credentials, and learners can store and share them with employers or education providers. External parties can verify and authenticate badges.
Spain	Numerous MCs are considered as a part of formal VET.	Stacked MCs could lead to formal VET certificates.	Part of formal VET.
Latvia	MCs are allowed by the law to be accumulated towards a **full qualification** or to be used as **stand-alone** qualifications.		Qualifications: full or stand-alone.

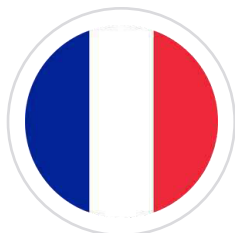| GENERAL	
Denmark	Labour market training courses (LMTC) offer various upskilling and reskilling courses. **LMTC** are well-developed and recognised and could potentially form the **basis for initiatives using MC.**
Estonia	The Ministry of Education has launched a **regulatory process amending its Adult Education Act** to establish the content, provision, quality, and duration of learning that leads to the award of MCs.
Finland, Slovenia, Poland	Set up consultation groups on MCs.
France	Since the 2018 law on the freedom to choose one's professional future, the training market has been largely liberalised, with a sharp increase in numbers of VET qualifications, including MCs issued by private bodies. No official definition,
Germany	The Jobstarter programmes, implemented by the Federal Ministry for Education and Research, have helped initiate **short VET programmes,** first designed for low-qualified young people. In recent years, the market for modular training, partial qualifications and qualification supplements has grown rapidly.

GENERAL	
Ireland	Included short courses and certificates in its NQF since its establishment in 2003. The Irish Qualifications Authority (2021) introduced a **working definition** stating that 'a MC is a qualification that attests to a small-volume, highly specific learning achievement'.
Sweden	The National Research Institute, the National Agency for Higher VET and the Digital Services Agency of the public employment service, JobTech Development, have taken forward **discussions** on the description, quality assurance, recognition, 'stacking' and portability of MCs with a range of stakeholders.

Table 2: Examples of introducing MCs in VET in some European countries (CEDEFOP, 2021)

In the following paragraphs, we will present ideas on how the process of evaluation, awarding and recognition of MCs could work in VET, compared to how it works in HE.

4.2.1. Deduction/Evaluation of competences

The evaluation of micro-credentials is a crucial step in ensuring their quality and value. This can include assessments of both the quality of the learning materials and the skills and knowledge of the learners themselves. Evaluation methods may include self-assessment, peer review, or external validation by industry experts. This process involves the assessment of the learner's skills and knowledge in a particular field, and typically includes both formative and summative evaluations.

Formative evaluation focuses on the process of learning and aims to provide feedback to the learner on their performance, while summative evaluation focuses on the outcome of learning and is used to make a final assessment of the learner's achievements. Both types of evaluation are important in ensuring that micro-credentials are relevant and meaningful, and that they reflect the latest developments in the relevant field.

VET could adopt the process of evaluation of MCs in HE. Additionally, it could include the assessment centre method of evaluating the competencies that are not strictly based on knowledge, but rather on demonstration of using gained competencies in a specific situation or solving specific problems.

🔍 **Deduction/Evaluation**	
Higher Education	**Vocational Education and Training**
● process assessment within team ● outcome assessment by a jury. ● outcome assessment by other teams' assessment of demonstrated example where specific skills have been used ● reflexive activities about the material that has been learned ● continuous assessment in different forms: - role play, presentation - written assignments - aural assessments ● tests and assessments based on the Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG)	● to take into consideration: which part of the competence is being evaluate - knowledge, skill or the whole competence ● potential in comprising the team/jury of VET teachers and experts from the companies specialised in the field of the assessment

Table 3: Deduction/Evaluation practices from HE and possible transfer to VET

4.2.2. Awarding

The awarding of micro-credentials is the process of granting recognition to individuals who have successfully completed the required training and evaluations. This recognition can take the form of a certificate, digital badge, or other form of credential that can be displayed on the learner's professional profile or resume.

The awarding of micro-credentials is typically done by educational institutions, training providers, or professional organisations. To ensure that micro-credentials are credible and trustworthy, the awarding process must be transparent, consistent, and based on clear and fair criteria.

There are no established practices of the MCs awarding process in VET. However, compared to HE, it could be proposed that the awarding is similar as in HE. According to the CEDEFOP study, "the revision of Dutch VET policy (2017-21) prioritised making educational programmes for adults more flexible to encourage lifelong learning. Since 2017, it has been possible in the Netherlands to issue online micro-credentials called edubadges. Organisations can issue, create, and edit micro-credentials, and learners can store and share them with employers or education providers. External parties can verify and authenticate badges."

Therefore, digital badges and edubadges as well as certificates are a possible mechanism to award the successfully obtained competencies gained by MCs in VET, and possibly could lead to partial or full qualifications, depending on the country and its legislation.

Awarding	
Higher Education	**Vocational Education and Training**
● badge, edubadges ● formal certificate, formal certificates with ECTS, QQI minor awards	● digital badges, badges, edubadges ● formal certificate, formal certificates with ECTS ● Europass ● Could lead to formal recognition

Table 4: Awarding practices from HE and possible transfer to VET

4.2.3. Recognition

The recognition of micro-credentials is the process of acknowledging their value and validity in the wider context of education and the labour market. This includes the recognition of micro-credentials by employers, professional organisations, and other stakeholders.

To ensure that micro-credentials are recognized and valued, it is important that they are based on rigorous evaluation processes and are awarded by reputable organisations. Furthermore, efforts must be made to promote the recognition of micro-credentials by employers and other stakeholders, through initiatives such as public awareness campaigns, employer networks, and recognition agreements between organisations.

In conclusion, micro-credentials are a valuable tool for promoting continuous learning and professional development in the European context. However, to ensure that they are effective and relevant, it is crucial that they are evaluated, awarded, and recognized in a rigorous and consistent manner. By doing so, micro-credentials can help to create a more dynamic, innovative, and competitive workforce, and contribute to the achievement of the European Union's goals for a highly skilled workforce.

As of now, there are no set procedures for the recognition of micro-credentials in VET. However, because VET is more closely linked to the economy and businesses, it plays a bigger part in addressing the skills gap in the labour market and is more responsive to employers' demands. It's possible that the economy or businesses that verify the credibility of the MCs supplied in VET will be the source of recognition in the field.

Recognition	
Higher Education	**Vocational Education and Training**
● digital certificate issued by university, ● co-curricular activity, ● recognized by the National Framework of Qualifications, ● can be recognized as part of Prior Learning; ● quality of education certified by MCs guaranteed based on ESG	● digital certificate issued by the National Agency or VET provider ● recognized by the National Framework of Qualifications ● recognized by the companies

Table 5: Recognition practices form the HE and possible transfer to the VET

4.2.4. Hypothetical Case of the MCs in VET

We shall create a hypothetical method for evaluating, recognizing, and awarding the MCs in VET since there are no existing practices in place. As a result, we are encouraging the reader to go along with us on this fictitious journey as we conceive the procedure for creating and putting into practice a micro-credential in VET.

Designing the Micro-credential:

1. Define the learning outcomes: The first step in designing a micro-credential is to determine what skills and knowledge the student will be able to demonstrate after completing the program. This includes identifying the competencies that the student will need to acquire and the assessments that will be used to evaluate their progress.

2. Determine the appropriate level of rigour: The next step is to determine the level of rigour that will be required for the micro-credential. This will depend on the student's prior experience and the type of job they hope to secure.

3. Develop the curriculum: Once the learning outcomes and level of rigour have been determined, the curriculum can be developed. This should include a combination of online courses, hands-on training, and other learning experiences that will help the student acquire the necessary skills and knowledge.

Evaluation and Assessment:

1. Evaluate the curriculum: Before the micro-credential is offered, the curriculum must be evaluated to ensure that it will achieve the desired learning outcomes. This may involve pilot testing the program with a small group of students or conducting a thorough review by subject matter experts.

2. Assess the students: The students enrolled in the micro-credential program will be assessed using a combination of assessments, such as online exams, hands-on projects, and other assessments that will demonstrate their mastery of the skills and knowledge they have acquired.

Awarding and Recognition:

1. Award the micro-credential: Once the students have successfully completed the program, they will be awarded a micro-credential. This may be in the form of a digital/physical certificate (digital badge, edubadge, and so forth) or a certificate.

2. Recognize the micro-credential: Employers and other organisations that are looking for individuals with specific skills and knowledge should recognize the micro-credential as valid evidence of these skills and knowledge. This may involve including the micro-credential in job postings or accepting it as equivalent to a traditional degree.

The process of designing and implementing a micro-credential in VET can be a complex and challenging task. However, by following a systematic and rigorous approach, organisations can ensure that their micro-credentials are effective and recognized by employers.

In conclusion, there are no official examples of practices of the micro-credentials in VET, as the MCs are not yet established as in HE. However, some good practices in HE could be transferred to VET,

such as the awarding system. Recognition of micro-credentials could be granted by the National Agency for Accreditation or other relevant institutions. True recognition of micro-credentials, in our opinion, will always lay in the hands of the market and needs of the market, as it will be crucial to adapt to the current state of the market and how to fill the gap that would be detected. We would emphasise that to stay relevant is to keep micro-credentials in VET and in HE connected to the forecasted needs for competencies on the labour market and monitoring trends to ensure real-time gap filling.

5. QUALITY ASSURANCE FOR MICRO-CREDENTIALS

5.1. Mutual Trust as Key Pillar of Awarding and Recognising Micro-Credentials in VET

Within national VET systems and even more between VET systems of different (European) countries there are a number of distinct elements which determine the "value" of a certificate for a completed training programme. Valuable certificates and awards depend on the quality of the training programme offered (within a VET institution), on the general need of the developed competences on the labor market and especially on the trust in the VET organisation issuing the award or certificate. Only if there is some kind of basic trust from the organisation recognising a certificate (may it be another VET training centre, higher education institution or companies / organisations on the labor market), award or micro-credential in the organisation issuing this award for a completed training programme, the value of this certificate can be created.

Building mutual trust between "sender and receiver" of micro-credentials is the most crucial element for making the system work and support development, labour market integration and societal contribution of people. Trust in educational settings is considered to be one of the most important preconditions for valuable certificates, awards or micro-credentials and e.g. Stensaker and Maassen (2015) identify six levels of trust in educational settings:

1.   Legal regulation
2.   Certification
3.   Reputation
4.   Community norms
5.   Structures and procedures

(Bjorn Stensaker, Peter Maassen: "A conceptualisation of trust building mechanisms for international quality assurance of higher education" in Journal of Higher Education Policy and Management, February 2015).

While legal regulations and community norms are elements of a wider discussion beyond every single education provider and issuing organisation of micro-credentials, the topics of certification, reputation as well as structures and procedures remain for consideration on the level of each organisation and provider. These three topics do all relate to procedures of quality assurance within VET institutions and especially on the level of awards and certificates issued.

Quality assurance is seen as a key factor for transparency and in the end for mutual trust between VET institutions, learners and finally also employers. This has also been confirmed by the European Commission: "Quality assurance in particular has a key role to play in improving transparency, thus helping to build mutual trust." When narrowing the quality assurance discussion towards the topic of micro-credentials in VET, CEDEFOP published the results of a survey performed during 2021 related to the perception of micro-credentials in Europe and also the results from the survey show that quality assurance of micro-credentials is seen as one of the most important aspects and respondents mentioned that, unfortunately, quality assurance processes differ and not all micro-credentials are quality assured based on the nationally established quality standards.

This short analysis shows clearly that establishing transparent mechanisms for quality assurance for micro-credentials must be seen as a top priority in the process of establishment of this new and innovative form of certification and awards. It is, however, not enough to apply national or regional quality standards to micro-credentials, in the sense of a wider application and usability of credentials, European or international standards need to be identified and applied to allow for mutual trust and accreditation.

Within this chapter, we will have a look at existing and available European quality standards in education as well as international models for quality assurance with relevance for micro-credentials.

5.2. Approaches and Models for Quality Assurance in Education

The European Commission as well as all member states have been working on the development and elaboration of different approaches and models for quality assurance in education over the last 15-20 years. When wanting to apply a common and broad standard for quality assurance in an educational setting such as a VET training centre, you would have a number of different choices between already well elaborated and established models which can be divided into

a. European Quality Assurance Models for Educational settings: These approaches have been elaborated mainly within the European Union and under coordination and support of

the European Commission over the last years. For vocational education and training especially EQAVET (European Quality Assurance Model for Vocational Education and Training), EQF (European Qualification Framework) as well as ECVET (European Credit Transfer System for Vocational Education and Training) are relevant from our point of view.

b. International Quality Assurance Models: These approaches and models have been developed on an international level as general quality assurance and standard approach which does of course also have considerable relevance for vocational education and training. Within this broad collection of approaches and standards, especially ISO 9001 (International Standard Organisation) with its similar appearances in DIN and EN norms for quality of organisations, TQM (Total Quality Management) and ISO17024 (International Standard Organisation norm for Conformity Assessment Certification of Persons) would have relevance for vocational education and training institutions.

In the following paragraphs, we discuss these different quality management approaches, analyse their pros and cons as well as make deductions for the challenge of quality assurance of micro-credentials in VET.

5.3. European Quality Assurance Models in Education (EQAVET, EQF, ECVET)

5.3.1. EQAVET – European Quality Assurance model for Vocational Education and Training

With EQAVET which in fact is a network of expertise and organisation around the quality assurance of vocational education and training, the European Commission has established a broad and comprehensive support scheme for VET providers who are willing to improve and assure the quality of their offer. The EQAVET approach is basically built on the common PDCA (Plan-Do-Check-Act) circle of continuous improvement and the network members have elaborated and deducted a selection of descriptors which allow VET providers the analysis of the quality of their VET offer. The PDCA circle has been amended into a planning, implementation, evaluation and review scheme and EQAVET provides a list of indicators for VET providers which may be considered when assessing the own offer.

If you as a VET provider would like to step a little deeper into the analysis of improvement potentials and quality assurance, EQAVET provides a second and even more complex approach of analysis

and assessment indicators which is divided into so called 6 building blocks which should be analysed and focused. These focus points for quality in VET (organisations) would be:

1. Management Culture
2. Approaches reflect the providers circumstances
3. A culture of self-assessment
4. Support staff training
5. Use data and feedback to improve VET
6. Involvement of stakeholders

For all six building blocks, which in our point of view do very well reflect the different levels of focus and action in a quality assurance and improvement process, EQAVET provides detailed descriptions, key questions for assessment, lessons learnt as well as a call to action for the user. More detailed information about the six building blocks and their application for quality assurance in VET could be found under https://eqavet.eoppep.gr/en/documents?download=1:eqavet-building-blocks

5.3.2. EQF – European Qualification Framework

The European Qualification Framework in fact is a very clever reference table for qualification levels within all the European Countries. It is an eight-level reference system which translates between the qualification levels of all European countries (and beyond). It was originally established in 2008 and later revised in the year 2017. The eight levels of qualification are defined by a description of adequate knowledge, skills and responsibility/ autonomy which all correspond to the independence of work and activities the owner of a qualification (certificate) on a certain level has (see image).
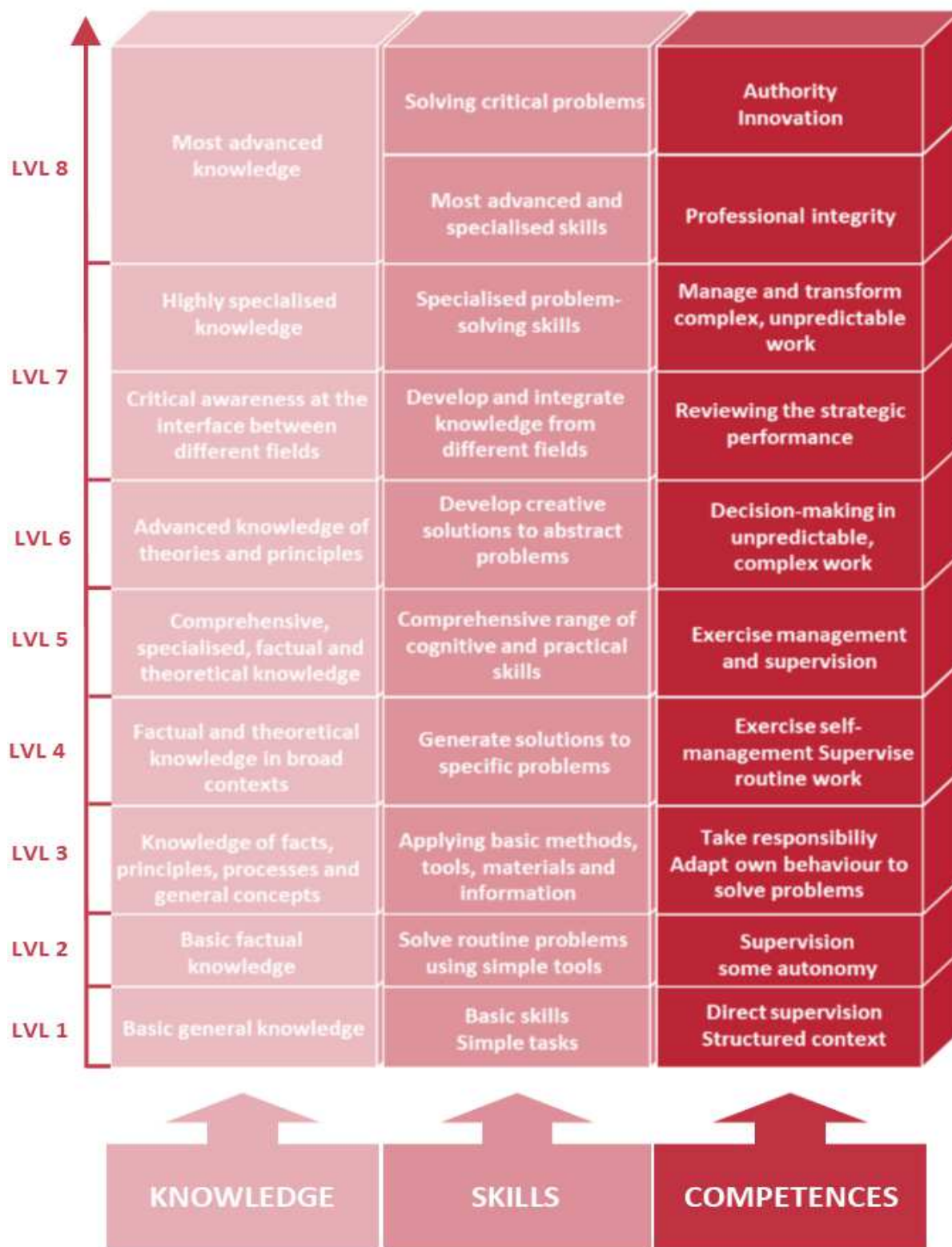
EQF LEVELS & INDICATORS

	KNOWLEDGE	SKILLS	COMPETENCES
LVL 8	Most advanced knowledge	Solving critical problems	Authority Innovation
		Most advanced and specialised skills	Professional integrity
LVL 7	Highly specialised knowledge	Specialised problem-solving skills	Manage and transform complex, unpredictable work
	Critical awareness at the interface between different fields	Develop and integrate knowledge from different fields	Reviewing the strategic performance
LVL 6	Advanced knowledge of theories and principles	Develop creative solutions to abstract problems	Decision-making in unpredictable, complex work
LVL 5	Comprehensive, specialised, factual and theoretical knowledge	Comprehensive range of cognitive and practical skills	Exercise management and supervision
LVL 4	Factual and theoretical knowledge in broad contexts	Generate solutions to specific problems	Exercise self-management Supervise routine work
LVL 3	Knowledge of facts, principles, processes and general concepts	Applying basic methods, tools, materials and information	Take responsibiliy Adapt own behaviour to solve problems
LVL 2	Basic factual knowledge	Solve routine problems using simple tools	Supervision some autonomy
LVL 1	Basic general knowledge	Basic skills Simple tasks	Direct supervision Structured context

Figure 8: EQF Levels and Indicators from WBL Accelerator Magazine

So, for an owner of a qualification on level 1 the responsibility/autonomy description reads like this:

"Work or study under direct supervision in a structured context", the same criterion for a qualification on level 4 reads like: "Exercise self-management within the guidelines of work or study contexts that are usually predictable, but are subject to change; supervise the routine work of others, taking some responsibility for the evaluation and improvement of work or study activities."

For a qualification on level 8 which in fact corresponds to a PhD study completed reads like:

"Demonstrate substantial authority, innovation, autonomy, scholarly and professional integrity and sustained commitment to the development of new ideas or processes at the forefront of work or study contexts including research."

Based on these descriptors, all European countries (and another 11 countries beyond the European Union) may reference their national qualification frameworks and achieve a translation of levels between an e.g. 5 level national qualification framework in one European country and an 8 level national qualification framework in another. For you as a VET provider the most important quality relevant feature of the whole European Qualification Framework would be to align the descriptions of your qualifications offered to the EQF descriptors as good as possible to make an easy and transparent comparison possible and allow the learner to make full use of the qualification obtained in other European countries. This appears to be especially relevant when offering micro-credentials which, per definition, would be shorter than a full study programme and so appear between level 4 and 5 (or even 6) in the European Qualification Framework. The clearer your description of knowledge, skills and responsibility/autonomy, which a learner may expect from such a micro-credential, is, the more "value" this offer will have and also the higher its quality and trust will be. More information about the descriptors for the eight EQF levels in all European languages may be found under: https://europa.eu/europass/en/description-eight-eqf-levels.

5.3.3. ECTS – European Credit Transfer Systems

With the introduction of credit transfer systems also to the vocational education and training sector, the European Commission wanted to transfer the successful approach of credit transfer from the higher education level (ECTS – European Credit Transfer System in Higher Education) also to the level of vocational education and training. The approach of ECVET is basically similar to ECTS in the sense that single qualifications offered in VET are described in detail on the level of knowledge, skills and competences (descriptors are partially suggested by ECVET documents, also Bloom's Taxonomy of descriptors is used to describe qualifications in detail (see: https://bloomstaxonomy.net/)). Together with an estimation of the total learning effort (workload) for

obtaining a single qualification in hours (including direct training, self-study, preparation and homework etc.) a numerical credit is then awarded to a single qualification. The basic rule for the number of credits is that a full study year in VET may lead to a maximum of 60 ECVET credits (similar to ECTS). This leads to a deduction that a one week of VET study equals to about 1,5 - 2 credits for a qualification. With this system the European Commission wanted to increase the transparency of qualifications in the member states and also increase mobility of people with qualifications from one European country to another. Even an accumulation of credits with programmes from different VET providers, even from different European countries should become possible with the introduction of ECVET into the VET systems in Europe. Unfortunately, after some years of introduction, discussion and partial implementation of ECVET in the European countries, it turned out that the full application of principles from higher education (ECTS) in the very broad, differentiated and dynamic field of vocational education and training is not fully possible and so the broad introduction of ECVET has finally not been followed any further. However, for you as a VET training provider and organisation with special interest in offering micro-credentials, the approaches of describing a qualification in detail on the level of knowledge, skills and competences (with dedicated and well-chosen descriptors) from ECVET could be really helpful in quality assurance. Similar to the EQF descriptors for the level of qualification, the ECVET approaches and descriptors for the content of the qualification = micro-credential offered would be an important element for increasing transparency and with this also quality of your offer. Further information about descriptors of qualifications = micro-credentials as well as general information about ECVET may be found on the website of the European Centre for the Development of Vocational Education and Training (CEDEFOP) under: https://www.cedefop.europa.eu/en/projects/european-credit-system-vocational-education-and-training-ecvet

5.4. International Quality Assurance Models

5.4.1. ISO 9001

ISO 9001 is the by far most important and popular model for quality assurance in businesses and organisations in the whole world. It is an international norm for quality assurance and has also been translated into a European norm (EN ISO 9001) or even into national norms e.g. Germany (DIN EN ISO 9001) or Austria (ÖNORM EN ISO 9001). In fact, the ISO9001 norm defines the factors, criteria and levels for setting up a quality management system in the own organisation. The quality management approach ISO 9001 introduces builds on 7 quality management principles:

	Customer Focus		Improvement
	Leadership		Evidence-based Decision Making
	Engagement of People		Relationship Management
	Process Approach		

Figure 9: ISO 9001 Quality Management Principles.

ISO 9001 suggests a number of elements and factors for all the 7 quality management principles which should be followed. The fact that ISO 9001 is a very flexible approach which also allows smaller organisations to consider only parts of the elements makes it also very interesting for smaller VET organisations. For you as a VET organisation it would be an approach to introduce quality management for the whole organisation which, in a second step, does also have impact on the quality of your offer and services but it is much more than that. Introducing and following ISO 9001 means that your organisation commits to quality management on organisational level and puts the customer focus first. Another important fact with ISO 9001 is that the whole approach is process oriented, this means that it focuses clearly on the processes in your organisation which should experience quality management, it is not the product and offer in first place but the processes that lead to these results and products. For many organisations this means a different perspective and a new way of thinking quality assurance. In addition to this, we need to mention that the whole approach of ISO 9001 is a broad and general quality management model for your whole organisation which in some cases might become a little too big and broad. For this reason, we clearly recommend

to inform yourself about ISO 9001 in detail (e.g., under https://www.iso.org/publication/PUB100373.html) before starting to introduce the approach to your organisation.

5.4.2. TQM – Total Quality Management

The approach of TQM – Total Quality Management is an extension or enlargement (even in the sense of an alternative) of the approach followed in ISO 9001 which also puts the customer focus as the main element and aim of quality management and assurance. However, compared to the ISO 9001 approach the TQM model goes even deeper into the analysis and improvement of processes. The TQM approach therefore suggests overall 8 quality levels which should be focused:

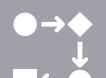|			
	Customer Focus		Strategic and Systematic Approach
	Total Employee Involvement		Continual Improvement
	Process Centred		Fact-Based Decision Making
	Integrated System of Micro Processes		Communications

Figure 10: ISO 9001 Quality Levels.

It was Mr. W. Edwards Deming back in the late 1940s and 1950s who developed the approach of a total quality management focus involving all employees of a company and a total customer focus further. Its first significant results and success stories were reported from companies in Japan in the 1950s. Mr. Demings main belief was, that ordinary workers have a considerable role to play in the quality of a company, its processes and outputs and their involvement is considered crucial for success. Based on the main levels of total quality management Deming has deducted 14 management principles which help to achieve total quality in an organisation (see e.g. www.asq.org):

1. Create constancy of purpose for improving products and services
2. Adopt the new philosophy
3. Cease dependence on inspection to achieve quality
4. End the practice of awarding business on price alone; instead, minimize total cost by working with a single supplier
5. Improve constantly and forever every process for planning, production and service

6.   Institute training on the job

7.   Adopt and institute leadership

8.   Drive out fear

9.   Break down barriers between staff areas

10.   Eliminate slogans, exhortations and targets for the workforce

11.   Eliminate numerical quotas for the workforce and numerical goals for management

12.   Remove barriers that rob people of pride of workmanship, and eliminate the annual rating or merit system

13.   Institute a vigorous program of education and self-improvement for everyone

14.   Put everybody in the company to work accomplishing the transformation

When analysing the pros and cons of the total quality management focus for the purpose of quality assurance in the process of micro-credentials we have to see very clearly that the whole planning and application of total quality management is a complex, complicated, long and costly process for an organisation and if the main purpose of the TQM introduction in a vocational education and training organisation is only the quality assurance of their issued micro-credentials this would certainly be an overkill. However, if a training organisation decides to introduce a general organisational model for quality management and assurance far beyond the issuing of single certificates, then TQM could become an interesting and useful alternative with its dedicated levels and a clear orientation towards micro processes in companies and organisations as well as the direct and broad involvement of all employees. For further information about total quality management, its concrete application possibilities as well as further material and access to certification bodies you might want to contact EFQM which is the general body for total quality management in Europe under www.efqm.org

5.5. The Solution for Quality Assurance of Micro Credentials: ISO 17024 Conformity Assessment – General Requirements For Bodies Operating Certification Of Persons

Besides the above-mentioned international quality assurance and management approaches which both (ISO 9001 and TQM) do have a very broad focus and at the same time impact on education and training organisation, there is a third and very suitable approach for quality assurance which is directly focusing on the process of certification of persons.

Under the certification of persons, the ISO 17024 norm understands the process that a person shows in an appropriate way, that he/she meets the requirements of a dedicated certification scheme. The requirements, single steps and criteria for the process of assessment if a person meets these requirements are elaborated in detail in the ISO 17024 norm paper that is an internationally agreed standard which is a perfect reference and quality frame for an awarded micro-credential. From our point of view and also considering the high flexibility needed with the awarding of micro-credentials (e.g., permeability towards the higher education systems, comparability and transferability between countries of the European Union and even beyond) an international standard detailing the necessary requirements and conditions for the certification of a single person (= awarding a micro credential for a single person) is the ideal solution.

In the following paragraphs, the term certification is used similar to a micro-credential!

The most important pre-condition for the application of ISO 17024 for the quality assurance of micro-credential is that we need to distinguish between an organisation which offers the qualification and training (even online, self-study, distance learning, practical placements etc.) and a second organisation which offers the certification. The division between these two kinds of organisations is in fact the main quality principle behind ISO17024. And while other quality management approaches are mainly focusing on quality management within the organisation which offers the qualification and training (e.g., ISO 9001), the ISO 17024 norm is exclusively focusing on the organisation which is offering the certification. The norm document stipulates in detail all the requirements, which need to be considered for an awarding body and in this sense the quality management focuses exclusively on the way how a certificate is finally issued. Organisations who obey these standards and quality principles are allowed to be accredited on national level as certification organisations according to ISO17024. This also means that in each of the European countries (and beyond) there is a certain number of certification bodies acting under the ISO17024 scheme.

For you as a vocational education and training institution it would be crucial to identify one organisation in your country / region which is accredited according to ISO17024 and is allowed to

issue ISO 17024 based certificates. If you have identified such an organisation, you can be sure that this certifying organisation is considering and obeying the following quality standards:

1.	Legal Matters
	The organisation is a legal entity or governmental body.

2.	Responsibility for Decision on Certification
	Only this organisation is responsible for all decisions on certification including granting, maintaining, recertifying, expanding and reducing the scope of the certification as well as suspending or withdrawing the certification.

3.	Management of Impartiality
	The certification body needs to take all necessary steps and requirements to ensure full impartiality in its certification services. This relates to impartial acting towards applicants, candidates and certified persons. The certification may not be restricted on the grounds of undue financial or other limiting conditions. The certification body needs to identify threats to its impartiality on an ongoing basis and shall analyse, document and eliminate or minimize the potential conflict of interests arising from its certification activities. The certification body shall document and be able to demonstrate how it eliminates, minimizes or manages such threats.

4.	Finance and Liability
	The certification body shall have the financial resources necessary for the operation of the certification process.

5.	Management and organisation structure
	The certification body needs to document its organisational structure, describing duties and responsibilities as well as authorities of management, certification personnel and any committee.

6.	Structure of the Certification Body in Relation to Training
	The completion of a training programme may be a specific requirement of a certification scheme but the approval of such a training by the certification body shall not comprise impartiality. Offering training and certification for persons within

the same legal entity constitutes a threat to impartiality. If this is done within the same legal entity, the certification body shall:

- o Identify and document the associated threats to its impartiality and document how the risks are minimized or eliminated.

- o Demonstrate that all processes performed by the certification body are independent or training to ensure that confidentiality, information security and impartiality are not compromised.

- o Not give the impression that the use of both services would provide any advantage to the applicant for certification.

- o Not require the candidates to complete a certification body's own education and training as an exclusive prerequisite when alternative education and training with an equivalent outcome exists.

- o Ensure that personnel do not serve as an examiner of a specific candidate they have trained for a period of two years from the date of the conclusion of the training activities.

7.	**General Personnel Requirements**

The certifying body needs to have sufficient personnel available with the necessary competences to perform the certification scheme, it needs to define the competence requirements for personnel involved, shall provide its personnel with documented instructions describing their duties and responsibilities. The certification body needs to keep up to date personnel records and the personnel itself shall keep confidential all information obtained or created during the performance of the certification activities, the certification body shall require the personnel to sign a document by which they commit themselves to comply with the internal rules of the certification body. If the certification body certifies an own employee it needs to adopt procedures to maintain impartiality.

8.	**Personnel Involved in the Certification Activities**

All persons involved in certification activities need to declare any potential conflict of interest in any candidate. Examiners need to: understand the relevant certification scheme, be able to apply the examination procedures and documents, have competence in the field to be examined, be fluent both in writing

and orally in the language of examination and have identified any known conflicts of interest. If there is a conflict of interest described, the certification body needs to undertake measures that ensure the confidentiality and impartiality of the examination is not compromised.

9.	Records and information requirements

The certification body needs to have records on all single certification processes with very detailed information about the person, certification scheme, results of examination etc. This must be ensured under full consideration of confidentiality.

10.	Certification schemes

Each certification scheme offered shall include the following elements:

- o Scope of certification,
- o Job and task description,
- o Required competence,
- o Abilities (when applicable) – can include physical abilities such as vision, hearing and mobility,
- o Prerequisites (when applicable),
- o Code of conduct (when applicable) – describes the ethical or personal behaviour required by the scheme.

Moreover, a certification scheme shall include the following certification process requirements:

- o Criteria for initial certification and recertification,
- o Assessment methods for initial certification and recertification,
- o Surveillance methods and criteria (if applicable),
- o Criteria for suspending and withdrawing certification,
- o Criteria for changing the scope or level of certification (if applicable).

For the development of a new certification scheme (= micro-credential!) the following elements need to be included or considered:

- o The involvement of appropriate experts.
- o The use of an appropriate structure that fairly represents the interest of all parties significantly concerned without any interest predominating.
- o The identification and alignment of prerequisites, if applicable, with the competence requirements.

    o The identification and alignment of the assessment mechanisms with the competence requirements.

    o A job or practice analysis that is conducted and updated to identify the tasks for successful performance, the required competence for each task, prerequisites (if applicable), confirm the assessment mechanisms and examination content, the recertification requirements and interval.

11.	Certification Process Requirements

If a candidate wishes to be examined and certified against the existing certification scheme (= awarding of a micro-credential) the process follows a four-step procedure:

  a) Application process
  b) Assessment process
  c) Examination process
  d) Decision on certification

Besides this, there are clear rules available for the suspension, withdrawal or reduction of the scope of a certification as well as requirements for the recertification process. The ISO 17024 norm foresees also requirements for appeals against decisions on certification as well as a general complaint possibility towards the certifying body.

12.	Management System Requirements

The certifying body has to follow a number of clear instructions on management system level which include documentation requirements as well as the requirement for continuous management reviews in the form of internal audits every 12 months which need to be fully documented. These internal audits shall focus on the following elements:

   o Results of internal and external audits

   o Feedback from applicants, candidates, certified persons

   o Safeguarding impartiality

   o Status of preventive and corrective actions

   o Follow-up actions from previous management reviews

   o Fulfilment of objectives

   o Changes that could affect the management system

   o Appeals and complaints

For each of the levels within a certifying body, the norm document ISO17024 provides even a lot more details, criteria and consideration points which should make sure that the 6 main principles for certification bodies for persons and their certification activities are fulfilled:

	General requirements (flexibility of the certification process, providing value through public confidence and trust)		Confidentiality and Openness
	Impartiality		Responsiveness to Complaints and Appeals
	Competence		Responsibility (of the Certification Body)

Figure 11: ISO 17024 Principles.

5.6. APPLYING ISO17024 FOR THE QUALITY ASSURANCE OF MICRO-CREDENTIALS

From our point of view, the use of ISO17024 for the quality assurance of awarded micro-credential has a huge potential and makes perfect sense for vocational education and training organisation. The configuration and thinking behind the setup of a certification scheme corresponds very well with the thinking behind and the structure of micro-credentials. Even when comparing the necessary description content of a certification scheme under ISO17024 and a micro-credential in front of the suggested description content of European micro-credentials there are significant similarities visible:

Micro-credential	Certification Scheme
● Identification of the learner	● Scope of certification
● Title of the micro-credential	● Job and task description
● Country/Region of the issuer	● Required competence
● Awarding body	● Abilities (when applicable) – can include physical abilities such as vision, hearing and mobility
● Date of issuing	
● Learning outcomes	● Prerequisites (when applicable)
● Notional workload needed to achieve the learning outcomes (in ECTS credits, wherever possible)	● Code of conduct (when applicable) – describes the ethical or personal behaviour required by the scheme
● Level (and cycle, if applicable) of the learning experience leading to the micro-	

credential (EQF, QF-EHEA), if applicable ● Type of assessment ● Form of participation in the learning activity ● Type of quality assurance used to underpin the micro-credential ● 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 ● Integration/stackability options (standalone, independent micro-credential / integrated, stackable towards another credential) 1	● Criteria for initial certification and recertification ● Assessment methods for initial certification and recertification ● Surveillance methods and criteria (if applicable) ● Criteria for suspending and withdrawing certification ● Criteria for changing the scope or level of certification (if applicable) (ISO/IEC 17024:2012)

Table 6: Similarities between Micro-Credentials and ISO17024 Certification.

When wanting to use ISO 17024 for the quality assurance of micro-credentials awarded, the following steps need to be followed:

1.	Certifying Body
🏛	Identification of a certifying body: If your micro-credential should be certified under the requirements and conditions of ISO17024 as a quality assurance method, the first precondition is that you get in contact with a ISO17024 certifying body. In every European country and also beyond, there are several providers working as certifying bodies. It would be important to identify a reliable and

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[1] Further information (European Approach to Micro-Credentials (2021)

interested organisation (probably in your region to ease communication and cooperation).

2.	Certification Scheme

Define a certification scheme: the precondition for a certification on the basis of ISO17024 is the definition of and agreement on a certification scheme. The certification scheme under the ISO17024 wording generally equals to a micro-credential in the sense of the European Union and European Commission understanding. The definition of a certification scheme requires a number of steps and consideration of different information sources, external expertise, labour market requirements, stakeholder needs etc. and would of course also require some time until it is finalised. The necessary description criteria for micro-credentials as well as a ISO17024 certification (see above) need to be fully considered.

3.	Training Programme

Offer and implement the training programme required for the preparation of candidates for the assessment against the defined certification scheme as well as support learners = candidates during their learning and assessment application process.

4.	Assessment

Implementation of the assessment procedure in a defined four step process (application, assessment, examination, decision) including the consideration of appeals and general complaints against decisions.

5.	Certificate Issuing

Issuing of certificates = micro-credential by the certifying body on the basis of ISO17024 quality requirements including information about the duration of the certificate validity and necessary recertification.

6.	Continuous Evaluation

Continuous evaluation of process quality and deduction of improvement potentials for the certification scheme, assessment process as well as the training programme offered for the micro-credential.

6. CONCLUSION AND OUTLOOK

In this guideline, the Micro Quest project has presented fundamental definitions alongside practical examples of how micro-credentials can be used and how their quality can be assured.

As discussed in this guideline, a crucial element of the awarding and recognition of micro-credentials is the applied quality assurance process that guarantees a solid trust basis for all involved parties within a country and across borders. Only if learner, awarding organisations and recognising bodies can rely on the content and quality of competence which the micro-credential certifies, the added value is given.

The approach towards European Micro-Credentials is currently at an early stage and there are still various aspects that need to be figured out on national as well as on transnational level. Nonetheless, there is no doubt that the demand of individualised, small and stackable qualifications will only rise in the foreseeable future. This applies not only to the trend of life long learning of individuals, but especially in the area of training staff and personnel in continued vocational education paths.

VET providers and higher education institutions alike have the chance to put themselves ahead of the competition and become regional, national and even international role models to their peers. Now is the time to become an early adopter of the new qualification format and lead by example to set the pace. It will be a collective learning process and the exchange among early adopters will enhance the mutual trust and recognition as well as communication among VET and higher education providers across Europe.

GLOSSARY

CEDEFOP European Centre for the Development of Vocational Training	CEDEFOP stands for "European Centre for the Development of Vocational Training." It is an agency of the European Union (EU) whose main task is to support the development of vocational education and training (VET) policies and systems in the EU member states.
	CEDEFOP provides research, analysis, and advice to support the development and implementation of effective VET policies and practices across Europe. It also facilitates the exchange of information and best practices between EU member states and provides technical assistance to support the implementation of VET reforms.
cVET Continuous Vocational Education and Training	Continuous Vocational Education and Training (cVET) is a system of education and training that provides ongoing learning opportunities for individuals to acquire new knowledge, skills, and competencies throughout their working lives. It is designed to support individuals in adapting to changing work requirements and to help them stay competitive in the job market.
	cVET can take many forms, including short courses, workshops, on-the-job training, online learning, and mentoring programs. It can be provided by employers, educational institutions, and other training providers.
DIN Deutsche Industrie Norm (German Industrial Norm)	DIN is a set of technical standards and norms used in Germany and internationally. These standards are developed by the German Institute for Standardization (Deutsches Institut für Normung) and cover a wide range of topics, including engineering, manufacturing, and technology.
	The DIN standards are widely recognized for their high quality and rigor and are used by businesses and organizations around the world to ensure consistency and safety in their products and processes. Some of the key areas covered by the DIN standards include:

ECTS European Credit Transfer System for Higher Education	The European Credit Transfer System (ECTS) is a standardized credit system used by many universities and higher education institutions throughout Europe to facilitate the recognition and transfer of credits earned by students in different institutions and countries. The system is designed to make it easier for students to transfer credits earned at one institution to another, or to combine credits earned in different countries towards a degree program. Under the ECTS system, each course or module is assigned a certain number of credits based on the workload required for that course, as well as the learning outcomes and competencies that are expected to be achieved. In general, one ECTS credit is equivalent to 25-30 hours of student workload, including lectures, seminars, independent study, and assessments.
ECVET European Credit Transfer System for Vocational Education and Training	ECVET is a framework developed by the European Union to promote the recognition and transfer of learning outcomes achieved in vocational education and training (VET) across different countries and systems. The ECVET framework is based on the principles of transparency, transferability, and recognition of learning outcomes. It provides a common language and system for describing and documenting the skills and knowledge acquired through VET, and enables learners to accumulate credits and qualifications that are recognized throughout Europe.
EFQM European Foundation for Quality Management	The European Foundation for Quality Management (EFQM) is a not-for-profit membership organization based in Brussels, Belgium. It was established in 1988 with the aim of promoting and supporting quality management practices in European organizations. The EFQM has developed a model for organizational excellence, known as the EFQM Excellence Model, which is used by organizations to assess and improve their performance.
EHEA	EHEA stands for the European Higher Education Area. It is a network of 48 countries in Europe that have agreed to work together to create a common framework for higher education. The goal of the EHEA is

to promote mobility, quality, and competitiveness in higher education across Europe.

The EHEA was established in 1999 with the Bologna Declaration, which committed European countries to working together to create a European Higher Education Area by 2010.

EN European Norm	EN is a set of technical standards developed by the European Committee for Standardization (CEN). These standards cover a wide range of topics, including materials and products, construction, engineering, and information technology. They are intended to promote consistency and safety in products and processes across the European Union (EU) and other countries that adopt them. The EN standards play an important role in promoting the harmonization of technical standards across Europe and beyond.
EQAVET European Quality Assurance in Vocational Education and Training	EQAVET stands for the European Quality Assurance in Vocational Education and Training. It is a European-wide framework that aims to improve the quality of vocational education and training (VET) systems in Europe. EQAVET was established by the European Union in 2009 and is based on the principles of continuous improvement, stakeholder involvement, and transparency. EQAVET is designed to support member states in developing and implementing quality assurance systems for VET, and to encourage the sharing of best practices across Europe. The framework is intended to be adaptable to different national contexts, while still maintaining a common set of quality criteria and indicators.
EQF European Qualification Framework	The European Qualification Framework (EQF) is common reference framework developed by the European Commission to facilitate the comparison and recognition of qualifications across different countries and education systems in Europe. The EQF is based on learning outcomes, which are the knowledge, skills, and competences that individuals acquire because of their learning experiences. The EQF has eight levels that describe the knowledge, skills, and competences that an individual should possess to achieve a particular qualification. The levels are based on the complexity and demands of

the learning outcomes, and are applicable to all types of qualifications, including those awarded in vocational education and training (VET), higher education, and lifelong learning.

ESG	ESG stands for "Environmental, Social, and Governance" and is a set of criteria used to evaluate the sustainability and ethical impact of investments or business practices.
	Environmental criteria refer to a company's impact on the natural environment, including factors such as carbon emissions, water usage, waste management, and resource efficiency.
	Social criteria refer to a company's impact on its employees, customers, and communities, including factors such as labor standards, human rights, product safety, and community engagement.
	Governance criteria refer to a company's internal management and decision-making processes, including factors such as board diversity, executive compensation, transparency, and ethical behavior.
HE Higher Education	Higher Education (HE) refers to tertiary education that is typically provided by universities, colleges, and other institutions of higher learning. HE programs are designed to provide students with advanced knowledge and skills in a particular field of study, and to prepare them for professional careers or further academic study.
HPI	Human Performance Improvement: HPI refers to a systematic approach for improving the performance of individuals, teams, and organizations by identifying performance gaps, analyzing root causes, and developing targeted interventions to address them. HPI is used in a variety of settings, including workplace training and development, education, healthcare, and the military.
ICT	ICT stands for "Information and Communication Technology". It refers to the use of various digital technologies, including computers, software, networks, and telecommunications, to process, store, transmit, and manage information.
	ICT encompasses a wide range of applications and tools, including hardware devices such as computers, laptops, smartphones, and

tablets, software applications such as word processors, spreadsheets, and databases, and networking technologies such as the internet, intranets, and extranets.

ISO17024 International Organisation for Standardisation Norm Conformity assessment — General requirements for bodies operating certification of persons	ISO 17024 is an international standard developed by the International Organization for Standardization (ISO) that sets out general requirements for bodies that operate certification programs for individuals. The standard is designed to provide a framework for the development and operation of credible, reliable, and transparent certification programs that meet the needs of stakeholders, including employers, regulators, and the public.
ISO9001 International Organisation for Standardisation Norm Quality Management System Requirements	ISO 9001 is an international standard developed by the International Organization for Standardization (ISO) that sets out the requirements for a quality management system (QMS). A QMS is a set of policies, processes, and procedures that an organization uses to ensure that its products or services consistently meet customer requirements and comply with relevant regulations.
iVET Initial Vocational Education and Training	Initial Vocational Education and Training (iVET) refers to the education and training that individuals receive at the beginning of their working lives, typically after completing their compulsory education. It is designed to equip individuals with the knowledge, skills, and competencies they need to enter the workforce and begin their careers. iVET can take many forms, including apprenticeships, vocational courses at secondary schools, vocational colleges, and vocational training centers. It is typically focused on specific occupations or industries and is designed to provide practical, hands-on training that is relevant to the needs of employers.

LLL	LLL stands for "lifelong learning." It refers to the ongoing process of learning and personal development that occurs throughout an individual's life, from childhood through adulthood. Lifelong learning encompasses both formal and informal learning, and can take place in a variety of settings, including schools, universities, workplaces, and communities.
LMTC	Labour market training courses
MC	Micro-credential
MOOC	MOOC stands for Massive Open Online Course. It is an online course aimed at unlimited participation and open access via the internet. MOOCs are designed to offer interactive online learning experiences to large numbers of participants from all over the world. They are typically free or low-cost and can be accessed by anyone with an internet connection.
	MOOCs are structured like traditional courses, with lectures, assignments, and assessments, but are delivered through online platforms. They use a range of multimedia resources such as videos, readings, quizzes, and forums to facilitate learning.
MVP	MVP stands for "Minimum Viable Product". It is a term used in product development, particularly in the context of startups and entrepreneurial ventures.
	A Minimum Viable Product (MVP) is the most basic version of a product or service that can be released to the market, with just enough features to satisfy early customers and gather feedback for future development. The goal of an MVP is to test the viability of a product idea in the market with minimal investment in development time and resources.
NFQ National Framework of Qualifications	The National Framework of Qualifications (NFQ) is a framework for organizing all qualifications in Ireland, from the early childhood education and care to doctoral degrees, into a single, coherent system. The NFQ provides a way to compare and understand

qualifications, regardless of where or how they were obtained, and to support lifelong learning.

The NFQ is based on ten levels that correspond to different levels of knowledge, skill, and competence. Each level describes what a learner knows, understands, and is able to do as a result of their learning.

ÖNORM Österreichische Norm (Austrian Norm)	ÖNORM is a set of technical standards and norms used in Austria. These standards are developed by the Austrian Standards Institute (Österreichisches Normungsinstitut) and cover a wide range of topics, including engineering, construction, and technology.
	The ÖNORM standards are widely recognized for their high quality and rigor, and are used by businesses and organizations throughout Austria to ensure consistency and safety in their products and processes.
	The ÖNORM standards are designed to be voluntary, but many businesses and organizations in Austria adopt them as a means of ensuring compliance with regulatory requirements and promoting quality and safety.
PDCA	PDCA, or Plan-Do-Check-Act, is a management methodology that is widely used in industry to improve processes and achieve continuous improvement. It is also known as the Deming cycle, named after the American statistician and management consultant W. Edwards Deming, who popularized the approach.
PES	PES stands for Public Employment Service. It refers to government organizations and agencies that are responsible for providing employment services to job seekers and employers. PES organizations typically offer a range of services, including job matching, job counseling and guidance, training and education programs, and unemployment benefits.
QF-EHEA	QF-EHEA stands for the "Qualifications Framework of the European Higher Education Area". It is a framework that provides a common

understanding of qualifications within the European Higher Education Area (EHEA).

The QF-EHEA is based on learning outcomes and levels of qualifications, and it aims to make it easier for learners, employers, and educational institutions to understand and compare qualifications across different countries and education systems within the EHEA. It also provides a basis for the recognition of qualifications across the EHEA.

The framework has three cycles: the first cycle represents the undergraduate level, the second cycle represents the graduate level, and the third cycle represents doctoral level qualifications. Each cycle has a set of level descriptors that describe the knowledge, skills, and competences that a learner is expected to acquire upon completion of a qualification within that cycle.

The QF-EHEA is part of the Bologna Process, which is a series of agreements and reforms aimed at creating a harmonized system of higher education across Europe. The QF-EHEA helps to ensure that qualifications obtained within the EHEA are comparable, compatible, and recognized across different countries and institutions.

QQI	QQI stands for Quality and Qualifications Ireland, which is the national body responsible for the quality assurance of further and higher education and training in Ireland. QQI is a state agency established in 2012 and is responsible for maintaining the National Framework of Qualifications (NFQ).
	The main functions of QQI include the development, review, and award of qualifications in Ireland. It also has responsibility for ensuring the quality and standards of educational programmes and providers through a process of external review and evaluation.
SME Small and Medium Sized Enterprise	SME stands for Small and Medium Sized Enterprise. It is a term used to describe businesses that fall below a certain size threshold in terms of employees and revenue. The specific definition of an SME varies by country, but it generally includes businesses that have fewer than 250 employees and annual revenues of less than a certain amount.

TQM Total Quality Management	Total Quality Management (TQM) is a management approach that focuses on improving the quality of products and services through the continuous improvement of processes and the involvement of all employees. TQM is based on the belief that quality should be the primary focus of all organizational activities, and that every employee has a role to play in achieving this goal. Overall, TQM is a comprehensive approach to quality management that emphasizes the involvement of all employees, continuous improvement, and a focus on the needs and expectations of customers. It is widely used in manufacturing, service, and other industries to improve quality and performance.
VET Vocational Education and Training	Vocational Education and Training (VET) is a type of education that focuses on developing practical skills and knowledge for specific occupations or industries. VET programs provide learners with the knowledge, skills, and competencies necessary to perform specific tasks or roles in the workforce. VET programs can be offered at various levels, from entry-level qualifications to advanced diplomas, and can be delivered through a range of pathways, including apprenticeships, traineeships, and formal courses. VET programs are often designed in consultation with industry to ensure that they meet the needs of employers and the labor market.

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