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# **Guidelines for Open and Online Learning Assessment and Recognition with Reference to the National and European Qualification Framework**

## **Micro-Credentials as a Proposal for Tuning and Transparency**



Kaunas, 2021



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# Contents

EXECUTIVE SUMMARY	4
<b>1. THE SYSTEM OF EQF AND NQF FOR ASSESSMENT AND RECOGNITION</b>	<b>6</b>
<b>2. MICRO-CREDENTIALS FOR TRANSPARENCY AND MATCH BETWEEN OPEN ONLINE LEARNING ASSESSMENT AND RECOGNITION</b>	<b>8</b>
<b>3. INSTITUTIONAL GUIDELINES TO PREPARE FOR OPEN ONLINE LEARNING ASSESSMENT AND RECOGNITION WITH MICRO-CREDENTIALS</b>	<b>13</b>
3.1. Strategic decisions in identifying and selecting digital infrastructures for micro-credentialisation	13
3.2. Setting transparent internal procedures and staff development for institutional readiness	26
3.3. The model of digital credential metadata template	27
3.4. Preparation of a virtual learning environment for the link to the existing digital infrastructures	30
3.5. New requirements for learning opportunity descriptions	31
<b>4. DIGITAL BADGES AS A TYPE OF DIGITAL AND MICRO-CREDENTIAL</b>	<b>37</b>
<b>REFERENCES</b>	<b>42</b>

# EXECUTIVE SUMMARY

These Guidelines are one of the results of the four-year research project “Open Online Learning for Digital and Networked Society” (2017–2021). The project objective was to enable university teachers to design open and online learning through open and online learning curriculum and environment applying learning analytics as a metacognitive tool and creating open and online learning assessment and recognition practices, responding to the needs of digital and networked society. The research of the project resulted in 10 scientific publications and 2 studies prepared by Vytautas Magnus university Institute of Innovative Studies research team in collaboration with their international research partners from Germany, Spain and Portugal.

The final stage of the research attempted creating open and online learning assessment and recognition practices, responding to the learner needs in contemporary digital and networked society. The need for open learning recognition has been increasing during the recent decade while the developments of open learning related to the Covid-19 pandemic have dramatically increased the need for systematic and high-quality assessment and recognition of learning acquired online. The given time also relates to the increased need to offer micro-credentials to learners, as well as a rising need for universities to prepare for micro-credentialisation and issue new digital credentials to learners who are regular students, as well as adult learners joining for single courses.

The increased need of all labour-market participants for frequent and fast renewal of competences requires a well working and easy to use system of open learning assessment and recognition. For learners, it is critical that the micro-credentials are well linked to national and European qualification frameworks, as well as European digital credential infrastructures (e.g. Europass and similar). For employers, it is important to receive requested quality information that is encrypted in the metadata of the credential. While for universities, there is the need to properly prepare institutional digital infrastructure, organisational procedures, descriptions of open learning opportunities and virtual learning environments to share, import and export the meta-data easily and seamlessly through European Digital Hub service infrastructures, as well as ensure that academic and administrative staff has digital competencies to design, issue and recognise open learning through digital and micro-credentials.

The first chapter of the Guidelines provides a background view of the European Qualification Framework and National Qualification frameworks for the further system of gaining, stacking and modelling further qualifications through open online learning.

The second chapter suggests the review of current European policy papers and consultations on the establishment of micro-credentials in European higher education. The findings of the report of the micro-credentials higher education consultation group “European Approach to Micro-credentials” is briefly introduced, as well as important policy discussions taking

place. Responding to the Rome Bologna Communiqué 2020, where the ministers responsible for higher education agreed to support lifelong learning through issuing micro-credentials, a joint endeavour of DG Employment, Social Affairs and Inclusion and DG Research and Innovation resulted in one of the most important political documents highlighting the potential of micro-credentials towards economic, social and education innovations. The consultation group of experts from the Member States defined the approach to micro-credentials to facilitate their validation, recognition and portability, as well as to foster a larger uptake to support individual learning in any subject area and at any stage of life or career. The Consultation Group also suggested further urgent topics to be discussed, including the storage, data exchange, portability, and data standards of micro-credentials and proposed EU Standard of constitutive elements of micro-credentials.

The third chapter is devoted to the institutional readiness to issue and to recognise digital and micro-credentials. Universities need strategic decisions and procedures ready to be enacted for assessment of open learning and issuing micro-credentials. The administrative and academic staff needs to be aware and confident to follow these procedures while keeping the quality assurance procedures in place, as well. The process needs to include increasing teacher awareness in the processes of open learning assessment and the role of micro-credentials for the competitiveness of lifelong learners in general. When the strategic documents and procedures to assess open learning are in place and the staff are ready and well aware of the processes, the description of the courses and the virtual learning environment needs to be prepared to provide the necessary metadata for the assessment of open learning and issuing of micro-credentials. Different innovation-driven projects offer solutions: OEPass developed a pilot Learning Passport, based on European Diploma Supplement, MicroHE developed a portal Credentify for displaying, verifying and sharing micro-credential data. The Credentify platform uses Blockchain technology and is developed to comply with European Qualifications Framework. Institutions willing to join Credentify platform should make strategic discussions to apply micro-credential metadata standards. The ECCOE project building on outcomes of OEPass and MicroHE offers an all-encompassing set of quality descriptors for credentials and the descriptions of learning opportunities in higher education.

The third chapter also describes the requirements for university structures to interact with the Europass digital credentials infrastructure. In 2020, European Commission launched a new Europass platform with Digital Credential Infrastructure in place. Higher education institutions issuing micro-credentials linked to Europass digital credentials infrastructure may offer added value for the learners and can increase reliability and fraud-resistant information for the employers. However, before using Europass Digital Credentials, universities should fulfil the necessary preconditions that include obtaining a qualified electronic seal, installing additional software and preparing the necessary data templates. Moreover, the virtual learning environment needs to be prepared to export learning outcomes to a digital credential, maintaining and securing learner authentication. Open learning opportunity descriptions also need to be adjusted to transfer and match information for the credential meta-data. A case analysis of a digital badge metadata preparation is presented to offer a higher value of digital badges for the learners.

The Fourth chapter illustrates how digital badges as a type of micro-credentials in open online learning assessment may be used in higher education to create added value for the learners and employers. An adequately provided metadata allows using digital badges as a valuable tool for recognition in all learning settings, including formal, non-formal and informal.

# 1. The System of EQF and NQF for Assessment and Recognition

In 2008 the European Parliament and the Council endorsed the Recommendation on the Establishment of the European Qualifications Framework (EQF) for Lifelong Learning. The key goal of this recommendation was to establish a common reference tool that would facilitate the international recognition of all levels of qualifications and to act as a translation device to make qualifications understandable across different countries and systems in Europe. The main aim of the Framework was to allow working force mobility across countries or continuing education and training.

The EQF covers all types and all levels of qualifications and the use of learning outcomes makes it clear what a person knows, understands and is capable of doing. The level increases according to the level of proficiency, level 1 is the lowest and 8 the highest level.

After the 2017 revision EQF has kept the core objectives of creating transparency and mutual trust in the landscape of qualifications in Europe. The revision indicated that flexible learning pathways are important preconditions for facilitating lifelong learning while credit transfer and accumulation arrangements form this approach. Member States committed themselves to further develop the EQF and make it more effective in facilitating the understanding of national, international and third-country qualifications by employers, workers and learners.

In addition to the EU Member States another 11 countries work towards implementing the EQF, namely Iceland, Liechtenstein and Norway (European Economic Area countries), Albania, North Macedonia, Montenegro, Serbia and Turkey (candidate countries), Bosnia & Herzegovina, Kosovo (potential candidates) and Switzerland.

As mentioned above, the EQF consists of 8 levels with increasing complexity from level 1 to 8. Each country's national qualifications framework (NQF) levels are linked to EQF levels and this allows the EQF to "translate" how qualifications within the different education systems in the member states relate to each other. It applies to all types of qualifications from those achieved at school, to academic, professional or vocational qualifications awarded at the highest levels. This means that employers and education/training providers have additional information to assist them to understand qualifications from other countries.

Lithuania has started developing its National Qualifications Framework prior to the EQF initiative in 2005-2007, but finally approved it in 2010 in coordination to the EQF. In 2019, the Government renewed the Description, according to the Recommendation on the Establishment of the European Qualifications Framework for Lifelong Learning. However, these two documents do not have significant differences.

Based on the comparison of the Lithuanian and European qualifications frameworks Lithuanian qualification levels directly correspond to eight European qualification levels. Also, the Lithuanian qualification levels 6 to 8 corresponded to levels 1 to 3 in the Framework for Qualifications in the Area of European Higher Education.

Correlation between the frameworks is essential to open up possibilities for qualification acquisition and improvement as well as national and international mobility of studies and work. It also promotes lifelong learning and facilitates the recognition of qualifications, individual, non-formal and informal learning in all learning forms – face to face, open online or blended as well as in full programmes or for micro-credentials.

The new Europass proposes a set of standard meta-data for documenting qualifications, to allow them to be recorded, stored and transferred in computer systems. However, without a meta-data standard to store the ECTS credits which constitute it, such a system would have very limited impact. New European developments like MicroHE, therefore, attempted to strengthen this initiative by proposing a meta-data standard – based on the Qualifications meta-data schema and ESCO data schema – for recording ECTS, based on the module supplement (proposed in other project activities), to allow for the deployment of a comprehensive solution.



## 2. Micro-credentials for Transparency and Match Between Open Online Learning Assessment and Recognition

A recently published EU Skills Agenda in Action 10 identifies micro-credentials as an EU tool supporting lifelong learning. The European Commission seeks to develop a European approach to micro-credentials and has appointed a Micro-credentials Consultation Group that produced a final report “A European Approach to Micro-credentials” in 2020.

Short-term open learning opportunities leading to micro-credentials may help to widen the scope of learning and skills development opportunities and form the lifelong learning dimension in higher education reaching more social groups of different age.

Micro-credentials are a novel but fast developing type of credential in Europe and other parts of the world as a response to the fast-changing skills needs of the labour market as well as a possibility to recognise non-formal as well as open learning of different age and social groups. Despite the ongoing discussions and emerging need for micro-credentialisation processes, there is still no single definition of ‘micro-credentials’, instead, different EU innovation projects and international organisations suggest how micro-credentials should be defined and understood (see table 1).

**Table 1.** *Definitions of micro-credentials (adapted and modified from Cirlan & Louk-kola, 2020).*

Organisation/ International project	Definition
OECD	Credentials that are not recognised as standalone formal educational qualifications.
UNESCO	A term that encompasses various forms of credential, including ‘nano-degrees’, ‘micro-masters credentials’, ‘certificates’, ‘badges’, ‘licences’ and ‘endorsements’. As their name implies, micro-credentials focus on modules of learning much smaller than those covered in conventional academic awards, which often allow learners to complete the requisite work over a shorter period.
MicroHE	Sub-unit of a credential or credentials that could accumulate into a larger credential or be part of a portfolio. Examples are: Verified Certificates, Digital Badges, MicroMasters, Nanodegrees. The project identifies the following 4 main key features of micro-credentials: modular, stackable, portable, digital, and universal.



The International Council for Open and Distance Education (ICDE)	A credential issued for a relatively small learning project that consists of several modules in a given subject.
Microbol	A small volume of learning certified by a credential.
A European Approach to Micro-credentials Consultation group	A micro-credential is a proof of the learning outcomes that a learner has acquired following a short learning experience. These learning outcomes have been assessed against transparent standards .

An innovation project Microbol (Cirlan & Loukkola, 2020) defines micro-credentials in the context of the European higher education area (EHEA) as credentials that may be offered or recognized by higher education institutions using recognition procedures in line with the Lisbon Recognition Convention or recognition of prior learning. They indicate that micro-credentials are designed to provide learners with specific knowledge, skills or competencies that respond to societal, personal, cultural or labour market needs. Besides, micro-credentials explicitly define learning outcomes at qualification framework of EHEA or NQF levels with indications of associated workload in ECTS credits, assessment methods and criteria, that allow quality assurance (Cirlan & Loukkola, 2020).

A European Approach to Micro-credentials Consultation group report (European Commission, 2020a) indicates that the proof of a micro-credential is (1) contained in a certified document that lists the name of the holder, the achieved learning outcomes, the assessment method, the awarding body and, where applicable, the qualifications framework level and the credits gained. Micro-credentials are (2) owned by the learner, can be shared, are portable and may be combined into larger credentials or qualifications. They are (3) underpinned by quality assurance following agreed standards.

As the EQF is a reference framework for qualifications based on level descriptors for learning outcomes applicable to all levels of qualifications, according to the Micro-credentials Consultation Group (European Commission, 2020a), EQF already provides a potential basis for the inclusion of micro-credentials if Member States wish to include these in their national qualification framework. Even though internationally inclusion of micro-credentials into the national qualification frameworks is in the early stages, there is a trend among the Member States to start opening national qualification frameworks (NQF) to other forms of provision than the full qualifications offered by formal education institutions, e.g. Austria, Denmark, France, Ireland, Netherlands, Poland, Finland, and Sweden. Next to this, it is recommended to link the European approach to micro-credentials with ECTS as much as possible. It is important that micro-credentials need to be comparable with the ECTS credit where 1 ECTS might be at the smallest, and "less than a full degree" at the biggest. A possibly typical micro-credential is suggested to be 1–6 ECTS. Though several group members were positive about allowing the stacking of micro-credentials and saw ECTS as a suitable tool for supporting this, the consultation group did not support the idea of the combination of several micro-credentials to automatically make up a full degree.

While micro-credentials are still widely discussed and observed analysing their development, issuing, storage, quality, and validity aspects, the question of recognition emerges as a very important one as well. Experts suggest that the recognition of micro-credentials could undergo the same procedures as recognition of prior learning or recognition of learning abroad, but the European approach to micro-credentials and its building blocks should support quick and more scalable recognition processes underpinned by digital solutions. Therefore, processes for the digitisation of student data and elements in the recognition process should be seen as part of a wider digital infrastructure. The Europass Digital Credentials Infrastructure (EDCI) as well as a number of ongoing projects in this domain allow standardised metadata and interoperability of the different tools.

Implementation of the infrastructure may help to ensure the successful development of the integration of micro-credentials in different types of institutions. This would provide support for all the stakeholders of this process, including learners, educational institution and employers. Next to this, it may help to facilitate the recognition of digital and micro-credentials, as digitally-signed micro-credentials would be directly related with the educational institution. Therefore, the Europass definition of a digitally-signed micro-credential emphasises the importance of a qualified body issuing the micro-credential. "Digitally-signed credentials are electronic documents which are awarded by qualified bodies to individuals to confirm and provide proof of their learning outcomes achieved in formal, informal, and non-formal settings. They may often be referred to as 'digital certificates' as well" (European Commission, 2020b, 20).

To demonstrate the holistic picture of micro-credentialisation, questions of storage, data exchange, portability and data standards are presented and discussed, and recommendations provided on each of the aspects mentioned above (European Commission, 2020a):

- Learners should own their own credential data, rather than the issuing institution. In line with the General Data Protection Regulation (GDPR), it is up to the learner to decide with whom they wish to share their data;
- The infrastructure for storing data should be based on open standards and data models to allow for interoperability and the seamless exchange of data;
- Metadata should be available in an open, portable format. European standards for sharing metadata should include only the basics, to allow for flexibility at national and institutional levels.
- The Europass Digital Credentials Infrastructure (EDCI) may provide a suitable infrastructure that can be applied to micro-credentials. The Europass Learning Model supports the awarding of a wide range of digitally-signed credentials, including – but not limited to – qualifications with NQF and/or EQF levels. The model itself is designed to support the issuing and stacking of micro-credentials, although the infrastructure needs further development before the technical tools and templates are ready to make this practicable.

To further the recommendations, A European Approach to Micro-credentials Consultation group (European Commission, 2020a) suggest the list of Building blocks that could provide more clarity and flexibility to the micro-credentials' development and implementation processes.

#### The Building blocks for micro-credentials:

- A common and transparent definition;
- A defined list of critical information elements to describe micro-credentials;
- Alignment to National Qualifications Frameworks (NQFs) and the European Qualifications Framework (EQF): defined levels, standards for describing learning outcomes;
- Quality assurance standards;
- Defined credits: European Credit Transfer and Accumulation System (ECTS), defined learning outcomes and notional workload;
- Recognition: for further studies and/or employment purposes;
- Portability: issuing, storage and sharing of micro-credentials;
- Platform solutions for the provision and promotion of courses leading to micro-credentials;
- Incentives to stimulate the uptake of micro-credentials (European Commission, 2020a, 11).

They indicated that whatever the issuing institution the transparency of learning outcomes is crucial for a good understanding of the micro-credential. The group also agreed to set up a European standard for content description including information about reference to a certain level of EQF. This information should offer verifiable, free and secure access to data, as well as being available over time, in order to support transparency and recognition.

#### Proposed EU Standard of constitutive elements of micro-credentials:

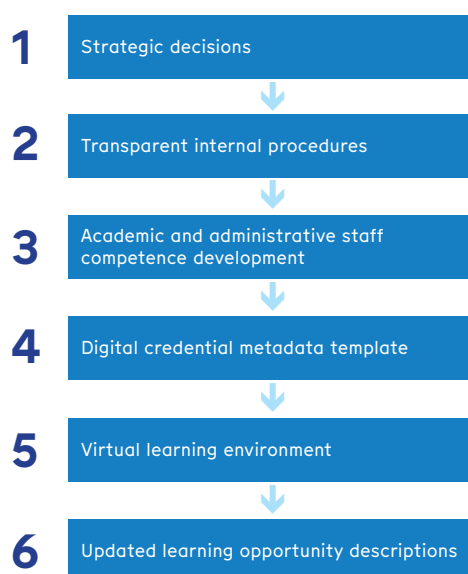
- Identification of the learner
- Title of the micro-credential
- Country/region of the issuer
- Awarding body
- Date of issuing
- Notional workload needed to achieve the learning outcomes (in ECTS, wherever possible)
  - Level (and cycle, if applicable) of the learning experience leading to the micro-credential (EQF and/or national qualifications framework);
  - Overarching Framework of Qualifications of the European Education Area)
  - Learning outcomes
  - Form of participation in the learning activity (online, onsite or blended, volunteering, work experience)

- Prerequisites needed to enrol in the learning activity
- Type of assessment (testing, application of a skill, portfolio, recognition of prior learning, etc.)
- Supervision and identity verification during assessment (unsupervised with no identity verification, supervised with no identity verification, supervised online or onsite with identity verification)
- Quality assurance of the credential and, where relevant, of the learning content
- Grade achieved
- Integration/stackability options (standalone, independent micro-credential / integrated, stackable towards another credential)
- Further information.

A European Approach to Micro-credentials Consultation group report (European Commission, 2020a) expects that national qualification networks may proceed exploring the feasibility or integrating micro-credentials in NQFs in regular consultations with the European Qualification Framework Advisory Group, the Advisory Committee for Vocational Education and Training (VET), the Bologna Follow-Up Group (BFUG) and among the education and training community and labour market actors, including social partners, youth organisations and civil society.

### 3. Institutional Guidelines to Prepare for Open Online Learning Assessment and Recognition with Micro-Credentials

Institutional preparedness to offer digital and micro-credentials for open online learning assessment and recognition will be introduced step-by-step through the following sub-chapters (Figure 1):



**Figure 1.** *Interface between institutional preparedness process and this Guide chapter sequence.*

#### 3.1. Strategic Decisions in Identifying and Selecting Digital Infrastructures for Micro-Credentialisation

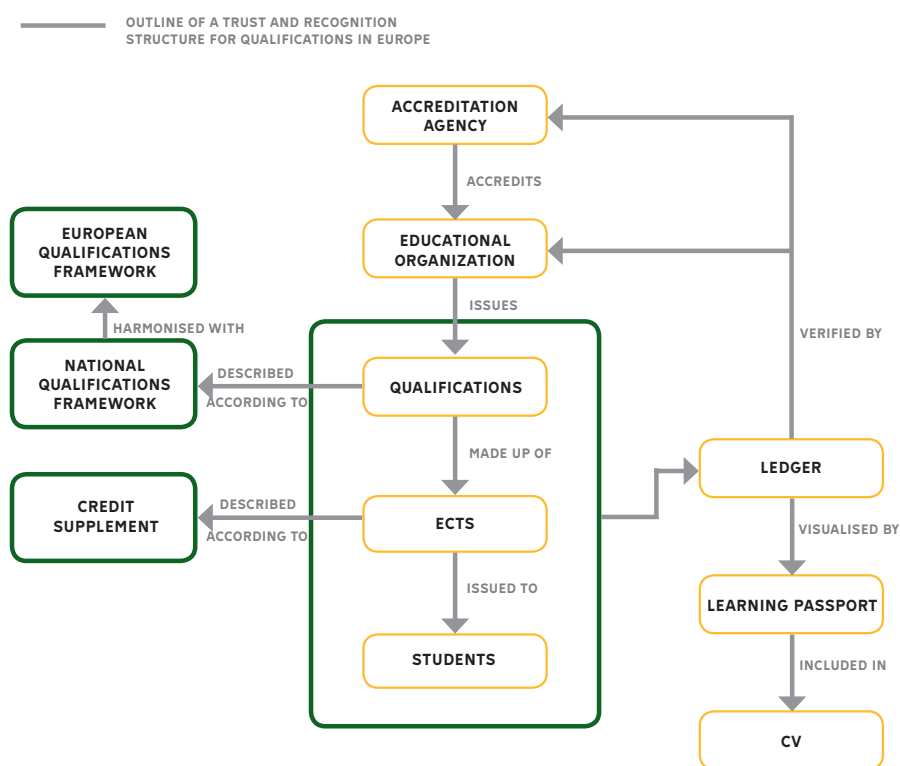
##### 3.1.1. European Pilot Digital Infrastructures for Digital and Micro-Credentials

Institutions should prepare to interact with European infrastructures on micro-credentials, digital certificates and recognition processes. There is a number of infrastructures which are evolving quickly and offer credentials recognition scenarios for institutions and citizens. Most of these infrastructures are elaborated in various projects funded by the European Commission. Different projects have different approaches how to identify micro-credentials, how to describe them (Table 1), how to check, validate and recognise acquired skills of learner.

The OEPass project worked on similar solutions regarding credentials and recognition in workplace and academia. During this project team described a quality system for analysing the quality of credentials, classified different kinds of open credentials according to a typology developed in the project as well as developed a pilot Learning Passport<sup>1</sup> which was based on European Diploma Supplement<sup>2</sup> a document accompanying a higher education diploma providing a standardised description of the nature, level, content and status of the studies completed by its holder. By the end of the project additional to Learning Passport project team developed and published a detailed report which included:

- A standard set of meta-data descriptors for recognising open learning in line with the Learning Passport;
- An implementation guide for using blockchain (or other centralised digital certificate schemes) to record this meta-data;
- An ontology connecting qualification frameworks, diploma supplements, ECTS modules, systems for accreditation and open learning accreditation systems;
- A technological roadmap which would allow fully-open credentials.

The scheme below (Figure 2) outlines how the approach of OEPass fits into the existing higher education landscape. The two components in the right column, “Ledger” and “Learning Passport”, are new.

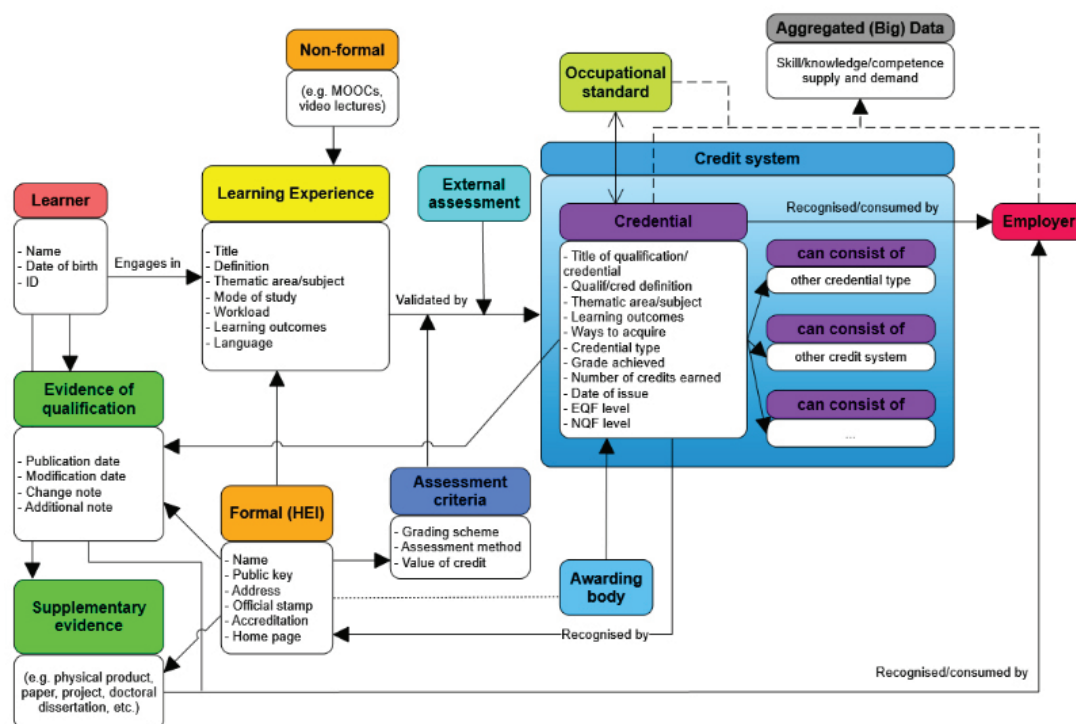


**Figure 2.** Trust and recognition structure for qualifications (Grech & Camilleri, 2017 from Ehrenreich et al., 2020)

<sup>1</sup> <https://oepass.eu/outputs/learningpassport/>

<sup>2</sup> [https://ec.europa.eu/education/diploma-supplement\\_en](https://ec.europa.eu/education/diploma-supplement_en)

The visualised meta-data standard developed by the OEPass and MicroHE projects indicates elements which are needed to integrate such a standard in organisations (Figure 3). It is necessary to have all the elements in institution information systems to apply this meta-data standard and be compatible with the European Digital Credential Infrastructure described below in this document.



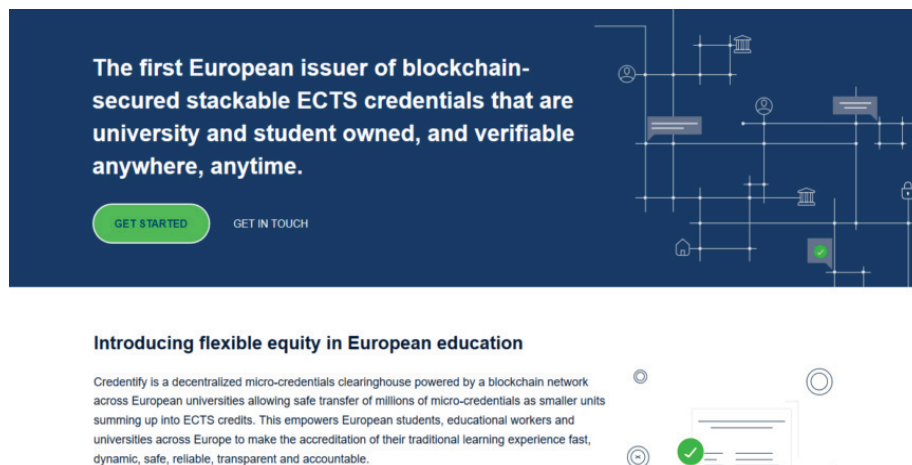
**Figure 3.** OEPass & MicroHE Meta-Data Standard (Ehrenreich et al., 2020).

The ECCOE<sup>3</sup> project works on digitalisation and validation of credentials by creating a system allowing the issue of validation and secure credentials that will take place between the education provider and the learner, as well as letting learners freely utilise their credentials by referencing their credentials in their online job application, CV, e-Portfolios.

MicroHE<sup>4</sup> is another successful project which analysed and modelled micro-credentials in Europe, built a scenario, created a recognition framework for micro-credentials and developed a piloting portal Credentify (Figure 3) for displaying, verifying and sharing micro-credential data.

<sup>3</sup> <https://eccoe.eu/outputs/io5/>

<sup>4</sup> <https://microcredentials.eu>



**Figure 4.** *Credentify piloting portal.*

Credentify BETA version was developed and released on September, 2019. This was one of the first platforms developed based on blockchain technology allowing universities and students to issue and receive micro-credentials that could be stacked into European Credit Transfer and Accumulation System (ECTS). For blockchain solution Credentify uses the Oxcert<sup>5</sup> open source protocol with non-fungible tokens that are excellent for credentials validation and recognition. A variety of certificates, diplomas, micro-credentials and digital badges hold specific information about students' achievements and this information cannot be compromised, changed or destroyed. Blockchain technology prevents data mismanagement, content forgery and authenticity abuse, allows students to build a personalised digital résumé which would be fully trusted, improves the credential issuing process for education institutions and adds an extra layer of trust and document protection.

#### Credentify platform:

- Provides comprehensive information on the qualification and credential – transparency;
- Allows the adequate identification of institutions involved;
- Verifies that the student presenting the credential was actually awarded it by the institution that they claim awarded it;
- Contains a repository of all credentials earned by their owner for purposes of accumulation and portability

The Credentify platform was developed to comply with the European Qualifications Framework (EQF) set of standard metadata for documenting qualifications and metadata standard – based on the Qualifications metadata schema and ESCO data schema – for recording ECTS. The MicroHE proposed metadata standard is available to download on a Github and it is made of 3 types of data:

<sup>5</sup> <https://Oxcert.org/>



- Descriptive metadata – describes an information resource for identification and retrieval through elements;
- Structural metadata – documents relationships within and among objects through elements such as links to other components;
- Administrative metadata – helps to manage information resources through elements such as version number, archiving date, and other technical information for purposes of file management, rights management and preservation.

Implementing the Credentify platform should be available for all European institutions as the MicroHE project team plans to allow to download platform software code for everyone, allowing any public institution in Europe to use it in part or in full to aid their own recognition initiatives.

Institutions willing to implement the Credentify platform in their infrastructure should follow the metadata standard created by the MicroHE project. Metadata stores information regarding awarding body, educational credential, credential type, the holder of the educational credential and their accomplishment. This information needs to be available in an institution database or internal system and need to be transferred to the Credentify platform.

### **3.1.2. Europass digital infrastructures enabling the potential of lifelong learning**

Another infrastructure with which institutions could implement compatibility is the Europass platform. In 2018 the European Commission launched the Digital Education Action Plan that provides new impetus for unbundling learning and digitising credentials. It also proposes the integration of digitally signed qualifications in Europass.

In 2020 July European Commission launched a new Europass platform with Digital Credential Infrastructure in place. The Europass platform is currently in a pilot phase but it already has tools for institutions to issue credentials, certificates at different levels, in digital format with automatic verification of authenticity. In the near future institutions implementing Europass infrastructure in their organisations would be able to issue qualifications and certificates in an efficient and secure, trustworthy and fraud-resistant digital infrastructure. This will allow validation of digital credentials for education or training providers and employers to ensure the validity of learner credentials.

A European Approach to Micro-credentials Consultation Group report (2020a) indicates further development of EUROPASS, in particular the Europass Digital Credentials Infrastructure, for the issuing, sharing and storage of micro-credentials, also fostering the availability of metadata in open formats and the interoperability between various infrastructures, including between the European Student Card initiative and Europass.

Europass Digital Credentials Infrastructure is a technical infrastructure that institutions can use to issue digital credentials across the European Union. This technical infrastructure could be used by the Member States and various stakeholders when issuing Europass Digi-

tal Credentials to learners. For example, IT systems of awarding bodies could implement this infrastructure to create diplomas and certificates for students. The Europass Digital Credentials Infrastructure provides a secure, trustworthy and fraud-resistant system that ensures data privacy and data protection.

Europass Digital Credentials describe different learning achievements:

- Activities (e.g. classes attended);
- Assessments (e.g. projects);
- Achievements (e.g. skills developed);
- Professional entitlements (e.g. registration as a medical doctor); and
- Qualifications.

Even though Europass Digital Credentials infrastructure is still in its development phase credential issuers may already try this tool. Institutions can issue degrees, diplomas, certificates of participation or other credentials to their learners using the Europass infrastructure. Any school, college, university or training provider in Europe may use this tool to issue credentials for free and secure them with their e-seal. Credentials can be e-mailed to learners or directly deposited to their Europass profiles. There is a 3-step approach for issuers:

1. Prepare data to obtain a qualified electronic seal for issuing digital credentials;
2. Use the online credential builder or existing XLS template to describe digital credentials and add necessary information;
3. Upload prepared credential information to the system.

Before using Europass Digital Credentials institution should fulfil important preconditions. First, an institution needs to obtain a qualified electronic seal. A qualified electronic seal is an electronic seal compliant with EU Regulation No 910/2014 (eIDAS Regulation) for electronic transactions within the internal European market. It enables verification of the issuer of a document over long periods of time. An institution can obtain a qualified electronic seal by ordering it from one of the trusted providers which can be found here: <https://webgate.ec.europa.eu/tl-browser/#/> For example, Lithuanian institutions need to contact one of the following trusted providers in order to obtain qualified electronic seal (Figure 5).

## Trusted List Browser

Tool to browse the national eIDAS Trusted Lists and the EU List of eIDAS Trusted Lists (LOTL).

Menu ▾

European Commission > CEF Digital > eSignature > Trusted List Browser > Lithuania



## Trusted List Lithuania

### Trust service providers

Currently active trust service providers

<p><b>Identity Documents Personalisation Centre under the Ministry of the Interior</b></p> <p>QCert for ESig</p>	<p><b>State Enterprise Centre of Registers</b></p> <p>QCert for ESig   QCert for ESeal</p> <p>QTimestamp</p>
<p><b>UAB BalTstamp</b></p> <p>QTimestamp</p>	<p><b>UAB Dokobit</b></p> <p>QVal for QESig   QVal for QESeal</p>

**Figure 5.** Trusted providers for issuing qualified electronic seal in Lithuania (<https://webgate.ec.europa.eu/tl-browser/#/tl/LT>).

After successfully obtaining a qualified electronic seal, an institution will have to install additional software to its computers called NexU which can be downloaded from Github: <https://github.com/nowina-solutions/nexu/releases/download/nexu-1.22/nexu-bundle-1.22.zip>

NexU is an open-source remote signature tool with a purpose to communicate with smart-cards. It relies on Nowina's XSS-Sig Module to support interoperability of electronic signature in Europe. After downloading and installing NexU on computer it is recommended to test if e-Seal is working. This can be done at <https://europa.eu/europass/digital-credentials/issuer/#/home> clicking on "Test your e-Seal" (Figure 6).

### Prepare

1

To issue credentials, you need to obtain a qualified electronic seal. Our test tool will ensure everything is set up properly. Then, follow our tutorial to understand how to prepare your data.



Test your  
e-Seal



How to  
prepare your  
data

**Figure 6.** Test e-Seal. <https://europa.eu/europass/digital-credentials/issuer/#/home>.

The next step would be building a Europass Digital Certificate. There are three options to prepare Europass Digital Credential data:

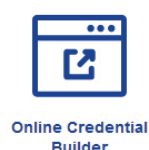
- the platform is integrated with EU Login, so you can register an EDCI account and start creating and storing credential templates that are only visible to you entirely via the browser in the Online Credential Builder;
- prepare larger datasets in Excel (for Windows) using template;
- export a package from your student information system as XML.

If institutions want to prepare a larger dataset it is more convenient to use a prepared MSeExcel template which can be downloaded here: <https://europa.eu/europass/digital-credentials/issuer/#/home> by clicking "Download your XLS template" (Figure 7).

## Build

2

The Online Credential Builder allows you to enter your data entirely via the browser. You may also prepare larger datasets in Excel (for Windows) using the supplied template. Alternatively, you can export a package from your student information system as XML.



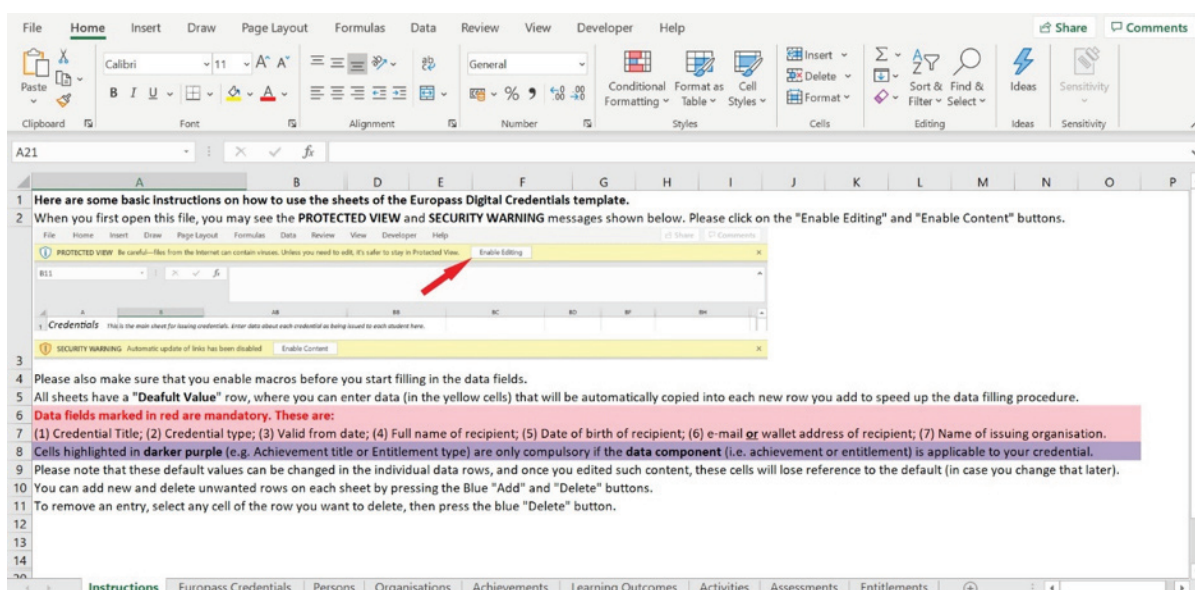
Online Credential  
Builder



Download your  
XLS template

**Figure 7.** Download prepared Excel template.

Before starting to add information to the Excel template it is necessary to enable macros and editing functionality, only then it will be possible to add information to the template (Figure 8).



**Figure 8.** Enable macros and editing.

The EDCI Excel template has 8 main sheets and holds important information which needs to be filled in:

- Europass Credential is the main sheet for issuing credentials. Data about each credential as being issued to each student is filled in this sheet. Title, description, valid from, expiry date, owner (student), issuer and other important information is filled in this sheet. This sheet also makes automatic references to the credential issuer from the Organisations tab and your credential holders, whose details are specified on the Persons sheet.
- Persons' sheet is used to list the persons who will receive credentials.
- Organisations' sheet is used to fill information about the issuing organisation such as legal name, official identification number, address, VAT information and other details.
- Achievements' sheet is used to describe learning achievements in detail. As there might be very different achievements most of the fields in this sheet is optional and can be added accordingly. If smaller achievements can be stacked into a larger one, it is possible to add them by selecting the sub-achievements of a more complex one.
- Learning outcomes are used to describe all the knowledge, skills and competencies that your learners have achieved by successfully completing a learning opportunity. It is recommended to add short and informative titles and descriptions of learning outcomes.
- Activities is used to add activities referenced in the credential. As in achievements and learning outcomes sheets, activities also need to have a title and description. Additional fields such as workload in hours – actual number of hours the learner has spent engaged in the activity, directed by, sub-activities and other fields can be filled in.
- Assessments is used to add assessments referenced in the credential. Each assessment has title, description, assessed organisation, assessment method, date, grading information.
- Entitlements is used to list any entitlements referenced in the credential. This sheet has similar fields: title, description, date of issue and expiry date, entitle specification fields.

When the Excel sheet has all the necessary information filled in it can be uploaded to the platform and checked for errors, if any (Figure 9).

### Upload

3

If you have your credential data prepared, upload the file and move on to the next step of reviewing and digitally sealing your credentials.



**Upload XLS  
spreadsheet**

Maximum file size: 5  
MB  
Accepted file formats:  
XLS, XLSX, XLSM



**Upload XML**

Maximum file size: 5  
MB  
Accepted file format:  
XML

**Figure 9.** Upload filled Excel document. <https://europa.eu/europass/digital-credentials/issuer/#/home>.

If the Excel file was uploaded successfully and all errors were fixed you will be able to preview credentials in the Europass Digital Credentials platform (Figure 10).


## View Credential

 Credential Details

 Export

 Upload another credential

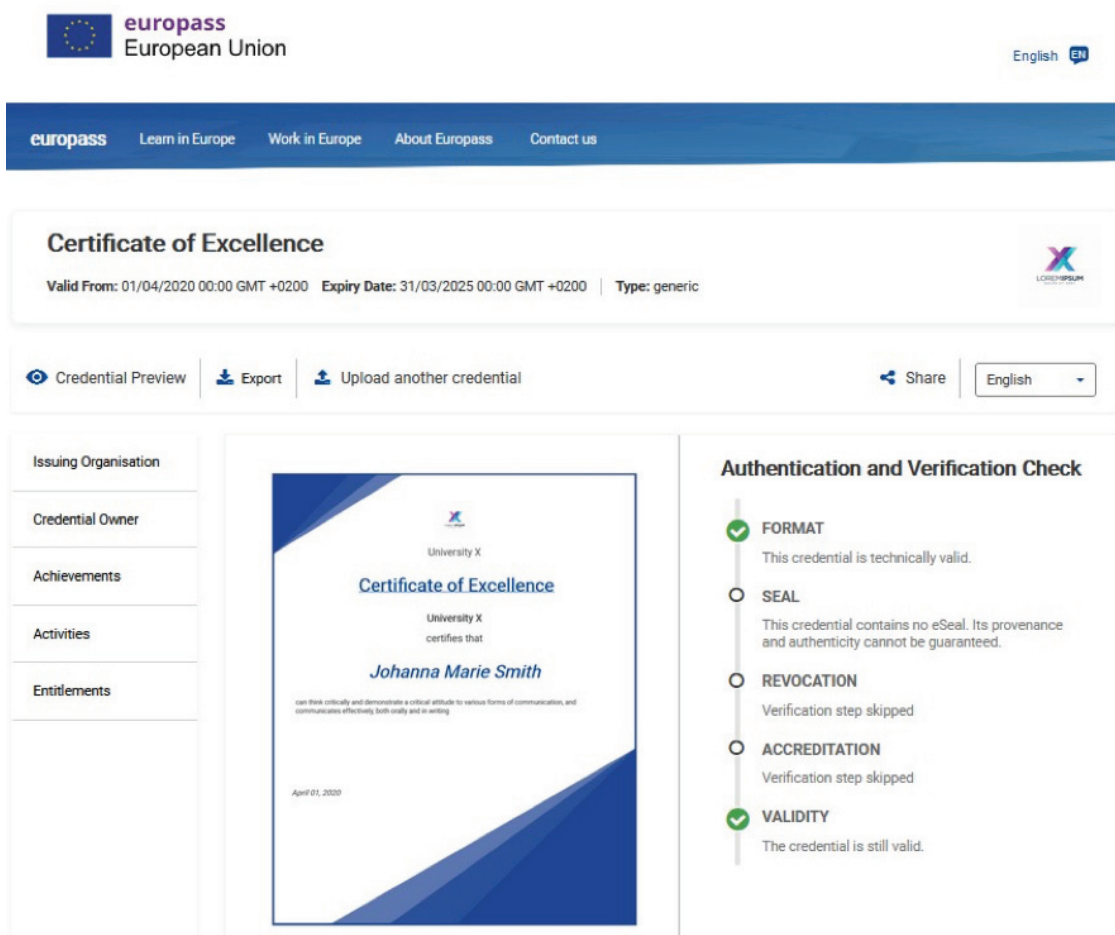
 Share

English 



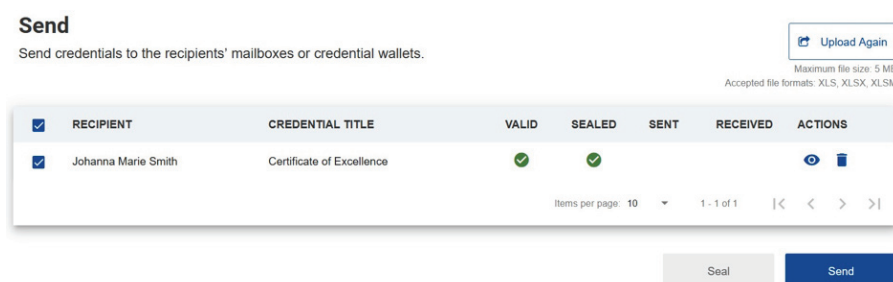
**Figure 10.** Credential preview <https://europa.eu/europass/sites/default/files/2020-08/Picture44.png>.

Next step is to add e-Seal to the credential to guarantee its authenticity. As described above, the organisation needs to have a qualified e-Seal and NexU software installed to seal the document (Figure 11).



**Figure 11.** Credentials need to be e-Sealed to guarantee authenticity. <https://europa.eu/europass/sites/default/files/2020-08/Picture46.png>.

After successfully sealing the credential you will be able to see the list of credentials which has been sealed (Figure 12). When a credential has been sealed it can be sent to the owner. If the owner had a new Europass platform account and such data was entered on the Excel sheet it will be automatically sent to owner Europass Library, Certificates and diplomas section.



**Figure 12.** Credential has been sealed and can be sent to owner. <https://europa.eu/europass/sites/default/files/2020-08/Picture48.png>.



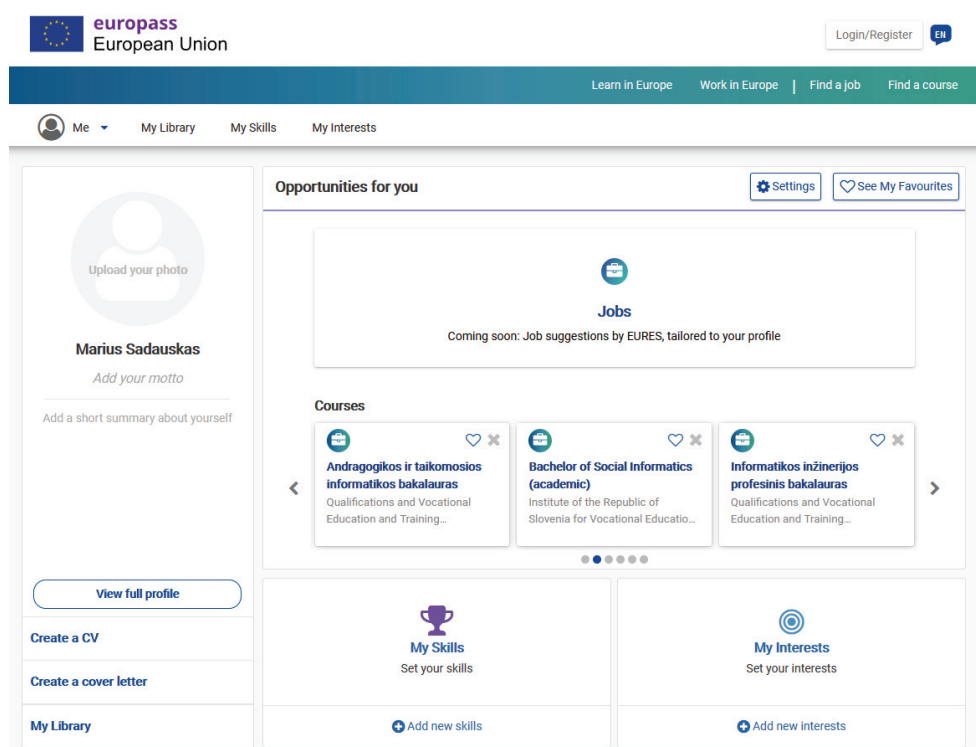
Detailed guide how institutions need to prepare their data for Europass Digital Credentials can be accessed here: <https://europa.eu/europass/en/preparing-credentials-europass-digital-credentials>.

Detailed video instructions how to build and issue Europass Digital Credentials can be accessed here: <https://audiovisual.ec.europa.eu/en/video/I-199527>

Europass CVs is part of Europass platform where citizens may create their own Europass profile and as many CV as needed. With the launch of new Europass platform in July 2020 now everyone can create a new Europass profile which also includes tools such as:

- Diploma supplement – helpful information on higher education diploma (e.g. grades, achievements, institution) to help communicate learner skills to employers.
- Europass Certificate Supplement – helpful information on vocational qualifications (e.g. grades, achievements, institution) to help communicate learner skills to employers.
- Europass Mobility – helps to describe international experiences and skills developed while studying, working or volunteering abroad.

When registering for a Europass profile and filling in personal information, achievements, skills, jobs, education and degree, the platform automatically suggests, adapts and offers courses in which a person might be interested according to his/her information provided in profile (Figure 13). In the near future even job suggestions will be offered according to profile information.



**Figure 13.** Europass profile on <https://europa.eu/europass> platform.



Using the Europass platform students can easily find information on courses offered by different European countries. Currently Belgium, Estonia, Germany, Greece, Hungary, Iceland, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Serbia, Slovenia provide information about their courses to Europass. Students may search for a course filtering by European Qualification Level, location, thematic area or by searching for a course title (Figure 14).

The search interface includes the following elements:

- Search by keyword:** A text input field with the placeholder "Search by keyword".
- Location:** A dropdown menu currently showing "Lithuania".
- Level in EQF:** A dropdown menu with the placeholder "Select from list".
- Thematic area:** A dropdown menu with the placeholder "Select from list".
- Find:** A green button to execute the search.
- Search Results:** A section header below the filters.
- Showing 146 results:** A summary of the search results.
- Sort by:** A dropdown menu currently set to "Relevance".

**Figure 14.** Course search criteria in the Europass platform.

On the course page (Figure 15) students can read detailed course descriptions, awarded qualification in EFQ level (from 1 to 8), awarding institution and data source of organisation which provided information about the course.

The course description page is structured as follows:

- Course information:**
  - Qualification Awarded:** EQF Level 6.
  - Awarding Activities:** Vytauto Didžiojo universitetas. Location: LT LTU LT. Homepage: <http://www.vdu.lt>. Alternative names: VDU. Type: national-authority.
  - Data source:** Name: Qualifications and Vocational Education and Training Development Centre.
- Course description:**

Technologijos bakalauro kvalifikacija reikalinga norint dirbt technologo darbą. Baigę Neurotechnologijų bakalauro programą absolventai galės tiesiogiai orientuotis į plačią darbo rinką apimančią tiek neurotechnologijas, informacines technologijas, biotechnologijas bei socialinių krypčių įmonėse (neuromarketingas, neuroekonomika, kt). Šie absolventai galės dirbti įvairiose įmonėse ir organizacijose, kuriančiose produktus bei paslaugas informacijos, elektronikos, biotechnologijos, medicinos, ir kitose neurotechnologijų taikymo srityse. Programos absolventai taip pat galės dirbti programinės įrangos kūrimo, neuromokslų, neuroinformatikos laboratorijose, pramogų bei reabilitacinių įrankių kūrimo įmonėse. Be to, šie specialistai galės dirbti kuriant biogriztamojo ryšio, neurofiziologinių signalų registracijos, virtualios ir papildytos realybės ir kt. technologijas, kurios naudoja žmogus-kompiuteris sąsajos principus.

**Figure 15.** Course description page on the Europass platform.

While Europass is evolving and further development will be oriented for creating open metadata formats for sharing and storing of micro-credentials and interoperability between various infrastructures institutions should be following this path, preparing institutional roadmaps for digital credentials' storage and recognition and integrate already-existing Europass Digital Credentials Infrastructure in organisations' IT systems.

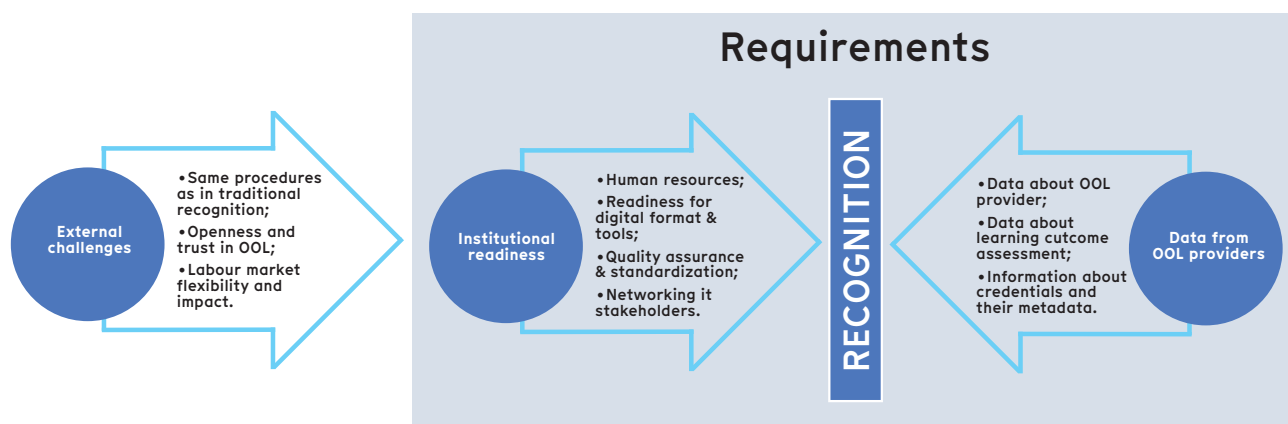
### **3.2 Setting transparent internal procedures and staff development for institutional readiness**

Our research findings highlight several prospective requirements for universities to recognise open online learning (OOL) (Figure 16). First, external challenging factors in the process of OOL recognition closely relate to political decisions, such as standards and guidelines that lead recognition procedures within Europe, that those should be the same, when it comes to OOL. The different attitudes and trust in open learning, labour market flexibility needs to be emphasised both by society and universities. The internal requirements for universities mostly deal with 1) internal readiness of university; and 2) learner-provided evidence on open online learning.

Requirements for university readiness to recognise OOL lead to changes in institutional values and culture. The university needs strategic decisions and setting internal transparent procedures, in order that the staff and learners are confident on how and when, and through which type of learning OOL could be recognised. This also means that professionals in recognition, human resource managers, as well as academic staff should be instructed on procedures of recognition and possible activities around it.

Moreover, academic and non-academic staff should not only be informed about strategic decisions and processes required to prepare for micro-credentialisation, but also targeted programmes for continuous professional development should be prepared and staff competences need to be developed and constantly updated. Even though digital competences of staff are already under discussion, there are no yet clear concepts and guidelines for training programmes established at the moment for micro-credentialisation.

In such a way clearly defined quality assurance procedures and standards could increase trust among all stakeholders. The role of stakeholders, when OOL recognition is in focus, is of high importance, as strong networks with a variety of stakeholders contribute to easier solutions when it comes to questions of openness, transparency, trust, and digital credentialisation. University openness also means a change in teacher's attitude towards openness, sharing and use of online learning content created by others, and the new modes of teaching and learning.



**Figure 16.** Requirements for universities to recognise open online learning (Tereseviciene et al., 2020).

The process of recognition inside the university, as based on evidence provided by OOL providers, offers a variety of quality assurance scenarios already available from the good practices of most advanced universities in this area. Prior to recognition, requirements for the process of open and online learning assessment, to ensure validity and recognition, include learner identification, learner authentication, process description, and the assessment process requirements. The collected evidence on how learning and assessment was done and what results were reached in many situations allows us to get more objective data. Information, data and qualitative evidence are the main requirements for OOL providers to ensure a successful process of OOL recognition in the university.

### 3.3 The Model of Digital Credential Metadata Template

According to MicroHE definition “credential is a documented statement that acknowledges a person’s learning outcomes or achievements”. In other words, the term “credential” is used to refer to any type of formal certification usually awarded to acknowledge a completion of an academic degree or professional/vocational training (LaMagna, 2017). Examples of credentials include the following: diplomas, certificates, degrees, etc.

Higher educational institutions face challenges in attempting to recognise students’ achievements, skills, competences, and knowledge. Thus, there is growing interest in making credentials more valuable and informative. Recently, there has been an attempt to improve the design of the credentials so they become more informative and comprehensive. For instance, the ECCOE (European Credit Clearinghouse for Opening up Education) project aims at simplifying certification within the higher education sector, as well as raising approval rates and appreciation of technology-enabled credentials with different stakeholders, such as students, higher education institutions, and employers. Based on the outcomes of OEPass and MicroHE projects and a draft data model, created by the EU Commission, the ECCOE project has offered an all-encompassing set of quality descriptors for credentials (e.g. type

of studies, assessment methods, verification systems, grading mechanisms, etc.), which are frequently used by member countries.

As mentioned above, conventional credentials such as diplomas, transcripts, and other certificates are considered to be not informative enough, as they lack some relevant information regarding courses, study type, assessment methods and techniques, grading and evaluation system, knowledge, qualifications, skills and competences acquired. Thus, there is a need for more sophisticated and informative credentialisation. ECCOE offers meta-data descriptions, where everything regarding student learning and his/her achievements, skills and competences is described in a detailed manner.

The template of digital credentials, as suggested by the ECCOE project work group, includes the following parts: general information about the learner and the course, then information regarding the education field, language, and quality levels (i.e. EQF and/or NQF), information on assessment and assignments, and, finally, the information about the grading scheme and the issuer. Below excerpts from the template can be found.

The template starts with the learner's identification information and all the details regarding the course (Figure 17). This is considered to be quite standard, yet informative, as it provides all the details necessary to identify the receiver and the course s/he has taken.

The image shows a template for an 'Academic certificate'. The title 'Academic certificate' is at the top. Below it, the text 'This document is to certify that' is followed by a box for 'Firstname Lastname' and a box for '(Person identifier 48110100011 )'. Below this, the text 'Has completed an' is followed by a box for 'a blended' (highlighted in blue), a box for 'non-formal', a box for 'part-time' (highlighted in blue), and a box for 'education course of' followed by a box for '3 ECTS' (highlighted in blue). Below this, the text '( 1 month , 80 academic hours), ECTS evaluation - B' is shown. At the bottom, there is a box for 'Course name'.

**Figure 17.** *Information about the learner and the course.*

Also, the credential template includes information on the educational field (Figure 18). Additionally, it is suggested to indicate the course language in the credential. This is relevant as it can additionally indicate a learner's skills and abilities, e.g. proficiency in a foreign language. Besides, the template invites one to include the following the information on National Quality Standard (NQF) and European Qualifications Framework (EQF). This is considered to be a rather significant innovation, which gives an opportunity to learn more about the quality standards applied and better evaluate the learner's level of expertise on the subject.

Education field:	0011 Basic programmes and qualifications				
study language:	English	,	NQF	level	4

**Figure 18.** Information about the education field, study language, and level.

Also, the ECCOE project group suggests including information on assessment into credentials (Figure 19). Information regarding assessment is relevant as it lets the user form a broader understanding about what type, techniques, and methods have been applied. Such information is not often included in any other type of credentials.

Type of assessment:	formative and summative	online assessment without ID verification of a learner with secure login into LMS	
Assessed by	independent assessor (third party)	, Format of assessment	automatic grading

**Figure 19.** Information about assessment.

Finally, it is offered to include information about assignments. The relation of every single assignment to assessment is demonstrated as a percentage (Figure 20). Thus, an in-depth understanding can be formed regarding the assessment procedures (how it has been carried out) and assignments (type, frequency, and value to assessment).

Assignments	Weight	Total Weight
Written exam without accessing course material (testing knowledge and its application to theoretical scenarios)	2-3%	60%
4 self-assessment tests	5%	20%
Final exam	20%	20%
Contact hours	8	

**Figure 20.** Information about assignments.

In short, it can be stated that the new credential template by ECCOE project group can be considered as innovative as it includes multiple elements that are usually excluded or not mentioned in any credentials or transcripts.

### 3.4 Preparation of a Virtual Learning Environment for the Link to the Existing Digital Infrastructures

European higher education institutions have already for a long time organised distance or blended learning and have their digital learning environments in operation. Some institutions rely on commercial decisions, however, others have their own digital learning environments, in their own servers, and use them for fully online or blended studies (when activities and educational resources in a digital learning environment are used for online and face to face learning).

The most popular institutional, non-commercial digital learning environment which is used by European universities is Moodle. It is an open-source platform which requires the institutional staff for administration. However, the requirement to have it administered by institutional staff provides opportunities for its adaptation to institutional needs, and thus opens possibilities for flexible use of micro-credentials.

EHEA institutions organise different types of educational initiatives and issue different types of credentials (see Camilieri and Rampelt, 2018, for classification types of credentials). This chapter aims to illustrate the institutional practices of issuing a digital certificate (a micro-credential) for non-formal course participants using a digital learning platform.

The selected micro-credential is a digital certificate, which is issued by a higher education institution using the data gathered and generated by digital learning environment Moodle. Cirlan and Loukkola (2020) in the MICROBOL project report emphasize that micro-credentials that are issued by EHEA institutions usually *“have explicitly defined learning outcomes at a QF-EHEA/NQF level, an indication of associated workload in ECTS credits, assessment methods and criteria, and are subject to quality assurance in line with the ESG.”* (MICROBOL, 2020, 7; where ESG – the Standards and Guidelines for Quality Assurance in the EHEA). The European Commission report on the European Approach to Micro-credentials (2020a) describes the micro-credential mentioning the following characteristics: *“The proof is contained in a certified document that lists the name of the holder, the achieved learning outcomes, the assessment method, the awarding body and, where applicable, the qualifications framework level and the credits gained”* (p. 10). The same report also suggests an EU Standard of constitutive elements the European micro-credential should contain, and some more crucial than others. Thus, the main characteristics stressed by the EC experts are to be assessed and included in the digital certificate.

#### Generating Learning Outcomes to Digital Credentials

The digital certificate (referred in this example) is a micro-credential that collects meta-data from a digital learning environment and transfers the data to a digital certificate; the more of the elements are generated by the platform and automatically is transferred to the certificate, the more the metadata digital certificate has. For the digital learning platform to generate metadata it needs to collect it during the learning process. Thus, the teacher (or institution providing the digital learning experience, such as a course(s) or module) not only needs to design and prepare educational activities, but also need to use the digital learning

environment functionality properly for learning process organisation. So, what needs to be prepared and used?

First, learner authentication and administration. In order for the learner to be provided with the digital learning opportunity it needs to be enrolled in the platform. Usually, universities have different procedures for this enrolment and learner authentication; the stress here is that the learner's name and other identifying information which is to be visible on the digital certificate has to be indicated in the learner profile in the Moodle learning environment.

Second, when the selected learning activity (for example a course or module) is designed and prepared in the digital learning environment it needs to be associated with the learning outcomes. The learning activity outcomes need to be added to the course, linked with the learning activities, and later, when the teacher assesses the learner activities, learning outcomes linked to the activity also need to be evaluated and marked if they have been reached.

Third, there are certain digital learning environment plugins (such as Simple certificate, Custom certificate or similar) that need to be installed in the Moodle and based on their possible templates the digital certificate is formed and may be issued. It is possible to add different data that goes along with the digital certificate, such as issuing body and its details, the learner details, title of the course, module or courses, learning outcomes, learning volume and date range, assessment methods and grades, teacher(s) name(s) and other necessary information.

When the learning process is over and the learning activity – a course or several courses or modules – is finished, either the teacher or the Moodle platform itself allows the learner to generate the certificate if the learning activity conditions are fulfilled.

### 3.5 New Requirements for Learning Opportunity Descriptions

In this chapter, we will present how teachers at universities or other higher education institutions should prepare an open online course description in order to transform teaching and learning to reflect the needs of society. Open learning requires us to rethink curriculum, course design, teaching and learning approaches and how to support learners.

Initial activities on clear needs and the expectations of a particular target group are necessary to ensure the activities are relevant, their results sustainable and those involved see their expectations fulfilled. Therefore, an open online course should meet national competence standards that have been endorsed by a national authority. In the absence of national standards, course outcomes should be based on the authority's definition of competence and endorsed by industry training boards or by relevant industry parties. Where non-formal learning is guided by a formal curriculum, it should meet formal education standards e.g. learning outcomes defined by educational institutions.

Structural elements of open online course descriptions include: general information, learning outcomes, pedagogical approach, assessment strategy and certification. The structural elements are explained below and presented in the table 2. The description gives learners a clear indication of what is expected of them in terms of performance, conditions and standard.

## General Information

General information gives a brief overview about the open online course and includes a title of the online course, the education field to which a course belongs as i.e. science, art, humanities, education, technology, etc., education institution/department/faculty; introduction and information about the teacher/trainer: his/her name, title, field of expertise and affiliation; areas of interests, courses taught, membership of other organisations, link to his/her blog or website; the scope of the learning programme by academic hours and ECTS which includes hours for group learning and independent learning. In the scope of general information the aim of the digital course which is based on need analyses and/or competences (e.g. defined in formal learning program) needs to be included.

To make a course description more attractive, some key question(s) addressed in the course could be identified, relating the questions and topics to the latest news and viral social media discussions. Furthermore, it is necessary to indicate the main target group, course language, course level (if applicable), providing course delivery specifications and letting a learner know about the planned type of learning - mentored or self-learning and finally course duration in weeks (see lines 1–14, Table 2).

## The Learning Outcomes

The main feature of the open online course (as in the formal learning programme case) is learning outcomes which state specifically what a student should be able to do. Learning outcomes are brief, clear, specific statements of what learners will be able to perform at the conclusion of learning activities. Learning outcomes allow visibility and portability of such outcomes in the lifelong learning system, in the labour market or in the community and validation/recognition in formal system. Learning outcomes (knowledge, skills, attitudes) provide the basis for clear, implicit or explicit course content, training activities, which needs to be addressed and developed (see 15–16 lines, Table 2). In the case that non-formal learning is guided by a formal curriculum, learning outcomes should be chosen from formal curriculum having in mind target group needs analyses and expected scope of non-formal learning programme.

## Pedagogical Approach and Interactivity

The pedagogical approach includes a description of main learning activities, learning methods, and the level and form of interactivity used in the course (see lines 16–17, Table 2). A pedagogical approach is the overarching consideration in ensuring that digital technologies are used purposefully to support learning. When using digital tools, there can be three pedagogical approaches (Kirkwood, 2014): “acquisition-oriented”, “participation-oriented”, and “contribution-oriented”. These three pedagogical approaches can be useful in thinking about how technologies can be employed to achieve expected learning outcomes.



An acquisition-oriented approach means that the majority of the learning activities are designed with the aim of transmitting knowledge so that students “acquire” the knowledge. Knowledge is provided through books, lectures, written or video material. The teacher can use technology to help students in the learning process by using a virtual learning environment to store all needed information.

A participation-oriented approach means that a student becomes a member of a community of practice, learning from the community. The teacher role is to develop activities in such a way that the students can participate in them. Technologies can be used to create activities for students to take part in, to encourage learning by doing process. Learning activities may include small group discussions, project work, debates, role playing, simulations, games and so forth are designed to ensure that the learner grasps the knowledge easily, retains the knowledge successfully, and is capable of transferring the knowledge through application in a real-world situation.

Contribution-oriented approach – stresses that learners are not only learning by participating in activities, but they are active contributors to knowledge as well. Learners can play an important role as co-creators or co-authors of learning activities. Therefore, openly accessible technologies such as open educational resources, wikis (e.g. the use of Wikipedia) and blogs can back up this scenario and students as contributors to the knowledge base can be involved.

For open learning, the quality of the learning material and the virtual learning environment are even more important than for other type of studies. A motivating learning environment with diverse and interactive tasks, videos, quizzes etc. can improve learning success considerably.

According to learning activities, learning methods, and the level and form of interactivity used in the course, distribution of learning hours becomes important as learning hours covers a) contact hours with the teacher; b) group work with peers; c) individual work. All of them could be “face to face” or online depending on teacher/institution decisions – blended learning or online self-learning.

The virtual learning environment contributes towards interactivity between all participants and enables teachers and students to activate synchronous and asynchronous communication via forums, messages and chats. Teachers can also set up group areas, discussion forums, wikis, and other tools to allow students to communicate about general topics with little to no facilitation by the teacher. For example, the teacher can use a discussion forum as a way for students to introduce themselves, to provide technical support to each other, or to continue an interesting discussion out of the classroom. Virtual learning environments usually provide a calendar to which teachers can add events, mark quiz dates or remind assignment dates. Students can schedule learning groups, mark special events such as field trips.

**Table 2.** *Open Learning Opportunity Description.*

No. of line	Title of the open learning opportunity	Example of information included
1.	Education field in which course belong	i.e. science, art, humanities, education, technology...
2.	Education institution/ department, faculty	Name of Education institution/ department, faculty
3.	Author/ Teacher/ Trainer	The name, title, field of expertise and affiliation of author
4.	Information about the teacher/ trainer	Introduce yourselves briefly (your areas of interests, courses taught, membership in other organisations, link to your blog or website) – 100 words maximum
5.	Photo (attached by separate file)	Your picture that best reflects your current state. Picture size 300x400 pixels.
6.	The scope of the learning programme by academic hours and ECTS	Duration of learning and scope e.g. 1 ECTS or 26,67 academic hours, which includes 10 ac. hours group learning and rest 16,67 is independent learning
7.	The aim of the learning programme	Based on need analyses and competences (e.g. defined in formal learning program). This is the business card of your course! Present the key question(s) that are addressed in the course, relate the questions and topics with the latest news, society discussions, media and other.
8.	Target group	Identify main target group
9.	Course language	Language of tuition
10.	Course level	Beginner, intermediate, advanced, if applicable
11.	Formal entry requirements	Describe entry requirements, if applicable
12.	Course delivery	Mentored and/ or self-learning
13.	Course duration	In weeks
14.	Competences/ learning outcomes	Choose appropriate learning outcomes (e.g. from formal curriculum in relation with competences), having in mind target group need analyses and expected, scope of non-formal learning program.
15.	Main topics (content)	Shortly present topics
16.	Pedagogical approach and interactivity	Describe main learning activities, learning methods, and the level and form of interactivity used in the course.

No. of line	Title of the open learning opportunity	Example of information included																	
17.	Distribution of learning hours	<table><tr><td>Learning hours</td><td>Face to face</td><td>Online</td></tr><tr><td>Contact hours with the teacher</td><td></td><td></td></tr><tr><td>Group work</td><td></td><td></td></tr><tr><td>Individual</td><td></td><td></td></tr><tr><td>Total</td><td></td><td></td></tr></table>			Learning hours	Face to face	Online	Contact hours with the teacher			Group work			Individual			Total		
Learning hours	Face to face	Online																	
Contact hours with the teacher																			
Group work																			
Individual																			
Total																			
18.	Assessment strategy	How you assess student performance (knowledge, skills, competences). What are requirements? Describe formative and summative approach during learning. Decide on number and type of assignments. Choose appropriate criteria for different types of assignments																	
19.	Certification	Requirements for general certification in case of completion of learning programme.																	
20.	Credentialisation	Describe if recognition of intermediate achievements is implemented in the course (e.g. by digital badges).																	
21.	Link of the course with the formal curricular	Describe the links with existing formal curricular in VET (or links with vocational standards) or HE (or links with EQF or NQF).																	
22.	Type of Creative Commons licence for the course																		

## Assessment Strategy

Description of open online course assessment strategy covers decisions on: a) number and type of assignments; b) formative and summative approach during learning; c) assessment of student's performance (knowledge, skills, and attitudes); d) criteria for different types of assignments (see 18 line, Table 2).

Digital technologies provide avenues for students to submit assignments in several ways as e.g. written essays to digital drop boxes, discussion forum attachments, wikis, or "assignment" modules. Different submission pathways enable create different types of assignments. Teachers might use a discussion forum to allow peer review, wikis to engage students in collaborative writing exercises, or assignment modules to make it easy to collect all the essays.

Reports of competences gained should be provided to learners. Reporting may be in terms of completed assignments provided that the relationship between learning outcomes and student's achievement. This is done through defining assessment criteria, which link learning outcomes to relevant collections of student work.

For assessment strategy it would be advisable to provide:

- A criterion under a learning outcome is foreseen;
- Each criterion also has a weight which determines how much this criterion is worth relative to rest of the report;
- Select an assessment type for the criteria. This specifies how the evaluation will be expressed. Possible types include numeric fields, pass/fail categories, Likert scale categories, and bands;
- Every criterion must be linked to evidence.

## Certification

Persons demonstrating all prescribed learning outcomes in an accredited digital course should obtain a credential or statement of attainment which is recognized within the national qualification framework (see lines 19-21, Table 2). The recognition of intermediate achievements implemented in the course (e.g., by digital badges or digital certificates) should be described.

Where an open learning digital course is guided by a formal curriculum, a credential should state not only the fact of the completion of the programme but also its connectedness to the formal learning programmes and institutions.

Description of the links with EQF or NQF needs to be provided in order to allow for continuing education or better access to the labour market. Having in mind that NQF and EQF promote flexibility of education and training by supporting exemption from parts of a programme or avoiding repeating learning already achieved, the importance of links is obvious. For learner, when entering formal university programme, the savings in money and time are also significant.

Finally, identification the type of Creative Commons licence for the digital course should be included (see line 22, Table 2). As it gives a standardised way to grant the public permission to use creative work under copyright law.

## 4. Digital Badges as a Type of Digital and Micro-Credential

There are many advantages to implementing micro-credentials into educational institutions. For instance, the introduction of micro-credentials enables a smoother transition for higher educational institutions from traditional face-to-face classrooms to online education (O'Connor, 2014). Additionally, micro-credentials may help educational institutions adopt a learner-centered approach in a much easier and more sufficient way (O'Connor, 2014). Finally, micro-credentials are considered to be versatile as they can be used for multiple purposes, including recognition and acknowledgement, assessment, and motivation (Abramovich, 2016).

As mentioned above, micro-credentials are often used for the purposes of recognition. To illustrate, micro-credentials, especially digital badges, can be used to recognise certain competences, both soft and hard skills, to acknowledge knowledge and experience in certain and/or specific subject areas, and, finally, to empower learners to study (Ifenthaler et al., 2016; Iwata et al., 2017). As a result, it should be noted that micro-credentials enable flexibility, because they can be applied in diverse subject areas to recognise a wide range of skills, competences, and capacities.

Regardless of the fact that digital badges are considered to be a quite popular tool for recognition and student motivation, their value for assessment is still questionable. Indeed, digital badges are not yet commonly used for the purposes of certification and/or assessment of learning and learning outcomes.

Digital badges are a relatively new phenomenon in the educational sector, especially in higher education. The very concept of digital badges has been borrowed from the gaming industry and later adapted and integrated within the digital educational contexts in a form of open credentials (McIlvenny, 2015). The Bologna Open Recognition Declaration (2016) has expressed the need for a common, open system that could be used for the identification of accomplishments through life-long learning. In this declaration, all the stakeholders involved are being encouraged to create a reliable system of learning credentials and to implement accessible guidelines that would enable an easier transition of these learning credentials within different platforms. The Mozilla Foundation's Open Badges project has accelerated the implementation of digital badges in various sectors, such as commercial, industrial, and education. By definition, digital badges are digital certifications or micro-credentials that are used to acknowledge learners' accomplishments, soft and hard skills, knowledge, and competences (Devedzic & Jovanovic, 2015; Stefaniak & Carey, 2019) (Figure 21).



**Figure 21.** *Icon of Digital Badge.*

Digital badges are unique in that they carry all the relevant information in their meta-data descriptions; this feature allows addressing a number of learning problems (Catalano & Doucet, 2013).

Digital badges as digital credentials may be a rather attractive idea to university students, who are getting ready for the labor market, where ability to demonstrate certain skills and competences is vital. Unlike in conventional university transcripts, in the meta-data descriptions of digital badges all the information regarding skills and competences is provided. Considering the fact that digital badges may be integrated and travel within different platforms (Devedzic & Jovanovic, 2015), employers may easily reach relevant data from the digital badge metadata, thus facilitating employability processes. Nonetheless, educational institutions and employers still hesitate to accept the value of micro-credentials for certification. However, the importance of digital badges for assessment is undeniable. Digital badges can facilitate the assessment process and increase its transparency. Digital badges are instrumental in uncovering both specific and recognizable educational features for all involved, thereby instituting an application wherein acknowledged skills, experience and understanding can be shared through an easily shared and accessible online structure (Gibson et al., 2016). Therefore, it can be stated that digital badges can contribute to increasing the transparency of the assessment process as well as to facilitate recognition of learning outcomes, skills, knowledge and competences (Devedzic & Jovanovic, 2015).

Another important thing that should be mentioned is that digital badges are useful in assessing soft skills as well. Evaluation of soft skills can be rather beneficial for the learner's personal growth as it can foster the development of certain capacities, such as self-regulatory skills, critical thinking, determination, problem solving, empathy, and creativity, as well as it can contribute to the development of social skills and competences, including collaborative and communicative skills, leadership, abilities to work in teams, and networking (Law, 2015; Zucker & Hicks, 2019).

In fact, digital badges can be successfully used to evaluate and to assess how students acquire vital research skills; as well, they can be used as guidance to monitor the development of the desired skills and competences throughout the entire study cycle, which is often described as lacking control in regards to course work (Mewburn et al., 2014).

Also, digital badges can be applied to recognize a student's achievements outside a formal learning environment. To illustrate, digital badges can be used to recognize a student's attainments in both non-formal and informal learning contexts as well as in the professional/vocational sector (Dyjur & Lindstrom, 2017). Here, meta-data descriptions of digital badges play a crucial role as they hold valuable information on specific criteria or evidence of learning and accomplishments that the learner had to meet in order to be awarded with a digital badge (O'Byrne et al., 2015).

In fact, digital badges can be used in all learning settings, including formal, informal, and non-formal (Dyjur & Lindstrom, 2017) and at three different levels, such as course level, program level, and institutional level. For example, if the digital badges are integrated within the course, a student can be awarded one once the criteria for receiving the badge are fulfilled. An example of introduction of digital badges at a program level: If digital badges are integrated within the program, teachers from different courses of that program can choose whether to use the badges or not. Finally, digital badges used at the university level, when the university integrates them within its management systems or uses them in the learning environment. All of these possibilities, along with their likelihood, work towards a positive

feeling about the outcomes, however, they need to be tied in with the recent inclination to use digital badges as a way of signalling about digital qualifications alongside, or even within, the standard methods, which have a longstanding history within the field.

However, there is no single established and commonly accepted system that would describe criteria for meta-data descriptions. To put it in other words, there is no quality standard for meta-data descriptions. Some learning environments, e.g. Moodle, have embedded digital badges in their systems (Figure 22). Nonetheless, the template embedded in the system is rather vague as there are no requirements on what specific details the description should include.

The screenshot shows a web form for creating a digital badge. It is organized into three main sections: 'Badge details', 'Issuer details', and 'Badge expiry'. The 'Badge details' section includes fields for Name, Version, Language (set to 'Lithuanian'), and Description. The 'Image' section features a file upload area with a 'Choose files...' button, a note about a 250KB limit, a drag-and-drop zone, and a list of accepted file types (GIF, JPEG, PNG, SVG+XML). Below this are fields for the image author's name, email, URL, and caption. The 'Issuer details' section has fields for the issuer's Name ('Vytauto Didžiojo universitetas') and Contact ('nuotolines@vdu.lt'). The 'Badge expiry' section is currently collapsed. At the bottom, there are 'Create badge' and 'Cancel' buttons, and a message indicating that required fields are marked with a red icon.

**Badge details** Expand all

Name ❗

Version ❗

Language ❗

Description ❗

Image ❗ ❗ Choose files... Maximum size for new files 250KB

You can drag and drop files here to add them

Accepted file types

- Image (GIF).gif
- Image (JPEG).jpeg
- Image (PNG).png
- Image (SVG+XML).svg svgz

Image author's name ❗

Image author's email ❗

Image author's URL ❗

Image caption ❗

**Issuer details**

Name ❗ ❗

Contact ❗

**Badge expiry**

Create badge Cancel

There are required fields in this form marked ❗

**Figure 22.** Requirements for Meta-data Description.

Teachers determine what information will be provided in the meta-data descriptions. Thus, sometimes meta-data descriptions may seem chaotic or lacking relevant information that could specify students' achievements, skills, and competences. As a result, the value of digital badges for assessment and recognition of previously acquired skills and competences is still rather limited and educational institutions and employers are still hesitant about the legitimacy of micro-credentials, i.e. digital badges. However, an attempt to increase popularity and raise validity and applicability of digital badges for assessment and recognition has been made. After in-depth research and analysis, the following set of parameters that would help to improve the quality of meta-data descriptions and increase the level of informativeness is suggested (see Table 3 below). Also, the relation between every criterion and its value to assessment and recognition is demonstrated in the Table 3.

**Table 3.** *Quality criteria for digital badge metadata description template (Trepule et al., 2021).*

Quality criteria that need to be visible in digital badge description metadata template in virtual learning environment	Assessment	Recognition
Information about the learner (name and ID number)	X	X
Type of badge (open digital badge; digital badge)		X
Name and type of the issuing institution (HE institution; continuing education institution; online/MOOC provider together with a HE institution; online/MOOC provider; employer organisation; professional organisation/chamber, etc.)		X
Type of learning (short learning programme (qualification, modular, etc.); ECTS based non-formal course; non-formal course (not ECTS based) certificate; informal learning activity evidence; ECTS based informal learning activity evidence)		X
Badge category (formal qualification/degree; non-formal certificate; record of experience/portfolio/badges)		X
Type of learning outcome (knowledge; skills; autonomy/responsibility)	X	X
Level of learning (EQF or NQF)		X
Mode of learning (online; face-to-face; blended; placement; workplace)		X
Activity type (workshop, seminar or conference; discussion; group work; teamwork; individual work; internship/placement; apprenticeship/shadowing; job experience; project work)		X
Volume of learning (in ECTS and contact hours)		X
Type of assessment (formative (accumulative); summative (at a conclusion of a defined instructional period); or both)	X	



Quality criteria that need to be visible in digital badge description metadata template in virtual learning environment	Assessment	Recognition
Procedural requirements for learner authentication and ID verification (online assessment without ID verification; online assessment with ID verification (proctoring); ID verification with secure login + password in learning management system; ID verification with third party tool; ID verification against national ID databases; biometric ID verification; other)	X	
Assessed by whom (peer assessment; self-assessment; teacher assessment; independent assessor (third party))		X
Format of assessment (automatic grading; manual grading; both, automatic and manual grading)		X
Grading scheme (pass or fail; 100% to 0%; A+ (excellent) to F- (fail); 10 (excellent) to 0 (fail) grade scale)	X	

As demonstrated in the table above, the criteria, presented in Table 3 may contribute to the quality and informativeness of meta-data descriptions of the digital badges. Thus, the value of digital badges for the purposes of assessment and recognition of students' skills and competences may be significantly increased.

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