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Manual for DocTalent4EU credentials issuing

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¹ PU: Public, SEN: Sensitive



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Deliverable D3.1

Manual for DocTalent4EU credentials issuing

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Abbreviations and Acronyms

Abbreviation / Acronym	Description
DG RTD	Directorate-General for Research and Innovation
DoA	Description of the Action
EC	European Commission
ECR	Early Career Researcher
EDC	European Digital Credential for Learning
EDCI	European Digital Credential for Learning Infrastructure
ELM	European Learning Model
EQF	European Qualifications Framework
ERA	European Research Area
ESCO	European Skills, Competences, and Occupations
eSeal	Qualified or advanced eIDAS compliant electronic seal
EUA	European Universities Alliances
EUF	European University Foundation
GA	Grant Agreement
GDPR	General Data Protection Regulation
HEI	Higher Education Institution
HVL	Western Norway University of Applied Sciences
IPR	Intellectual Property Rights
KER	Key Exploitable Result
KPI	Key Performance Indicator
TUIASI	Gheorghe Asachi Technical University of Iasi
UAH	University of Alcalá



UCA	University of Cote D'Azur
UiT	The Arctic University of Norway
UL	University of Limerick
UPORTO	University of Porto
URI	Uniform Resource Identifier
WP	Work package



Executive Summary

Deliverable No 3.1 – “Manual for DocTalent4EU credentials issuing” summarizes the process of issuing digital credentials for the DocTalent4EU project. This document presents the concept of digital credential as one of the key components of the European policy for micro-credentials and [achieving the European Education Area by 2025](#). In the past decade, micro-credentials have gained track as the way to implement the lifelong learning policy and the up-/reskilling of the workforce in a dynamic labour market.

Deliverable 3.1 presents the considerations taken to select the platform to issue digital credential credentials. Two options were considered within the framework of the project: [Open Badges](#) and [European Digital Credentials for learning](#). Both will be used to recognize the skills and competences acquired by PhD candidates that participate in the course units piloted by the DocTalent4EU consortium. The “Manual for DocTalent4EU credentials issuing” describes how to use the online credential builder of the Europass Digital Credentials Infrastructure to issue the DocTalent4EU digital credentials. It also highlights the difficulties and limitations that the consortium experienced in the use of the platform. A step-by-step tutorial on how to issue a DocTalent4EU credential is provided in tutorial format.

1 Introduction

This manual constitutes the Deliverable No 3.1 – “Manual for DocTalent4EU credentials issuing” which is an output of work package 3 (WP3) of the [DocTalent4EU project](#). DocTalent4EU aims to enhance PhD employability through a strong, visible and innovative recognition-system of the most in-demand transferable skills (relying on the ESCO framework) that early-career researchers (ECRs) acquire or will acquire through their doctoral training and research activities. WP3 contributes to two strategic objectives of the project:

- SO4: facilitate formal recognition & wide acknowledgement of the transferable skills, by implementing digital credentials.
- SO5: facilitate the issuing and take-up of DocTalent4EU credentials by HEIs.

The overall objectives of WP3 are:

1. To create a common system to recognise the transferable skills and competencies that PhD candidates developed during their doctoral programme through the development of digitally-signed credentials (DocTalent4EU credentials);
2. To define a governance and branding approach to ensure credentials are issued consistently and to increase their recognition and perceived value;
3. To issue DocTalent4EU credentials for the trainings attended, including for pilot courses of WP2, but also for the generic PhD candidate skills developed through their regular research activities;
4. To develop guidelines and good practices for other HEIs beyond the consortium to adopt such digital credentials.

In summary, WP3 contributes to the main goal of the project by creating a formal system of digital credentials to enhance the recognition of PhD candidates’ transferable skills and competences. Digital credentials can be easily shared in the digital ecosystem and thus provide a higher visibility of the candidate’s skills and knowledge.

This deliverable serves as a manual on how to issue DocTalent4EU digital credentials. The document summarizes the current state of development of digital credentials and micro credentials in the European context. It describes the European Digital Credentials for Learning (EDC) platform which was used for the DocTalent4EU digital credentials and documents, in detail, the characteristics of the system. It also provides a practical tutorial on how to issue digital credentials.

Figure 1 shows the relationship between the seven WP of the DocTalent4EU project. WP3 is related to WP1 – “Skills definition”, namely by the selection and definition of the ESCO skills dataset that will be used in the project. For each course to be piloted in WP2 – “Training courses” a DocTalent4EU digital credential will be issued. Thus, WP3 will use the description of the learning outcomes and ESCO skills that were defined in WP2 to create the digital credentials. Finally, WP3 is directly connected with WP4 – “Career development”, as the digital credentials will be used to enhance the career of ERCs.

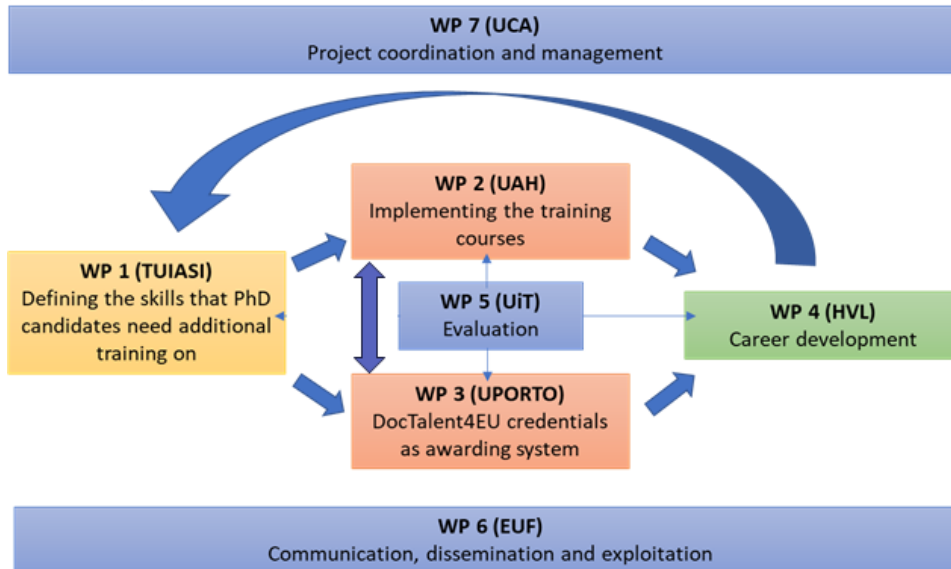


Figure 1 - Relationships between DocTalent4EU work packages.

Deliverable No 3.1 – “Manual for DocTalent4EU credentials issuing” is divided in seven chapters and one appendix. The first chapter, Introduction, highlights the main goals of the deliverable within the context of the DocTalent4EU project. Chapter 2 makes a brief overview of the European policy and legislation on micro-credentials. The third chapter briefly introduces the past and current EU projects that use digital credentials for recognition of short-term trainings. Chapter 4 describes the digital credential platforms considered for the DocTalent4EU digital credentials. Chapter 5 details the process of issuing the DocTalent4EU digital credentials. Chapter 6 addresses the limitations and challenges faced by the consortium team when issuing digital credentials. Finally, Chapter 7 summarizes the main findings of this deliverable. Appendix A provides a list of fields used to create the digital credentials, describing the purpose, possible alternatives and data types used.

Besides the research work done by the DocTalent4EU consortium, the team developing the EDC software was contacted for comments on the present document. The purpose was to validate the information provided in this deliverable and to also confirm that the limitations identified in Chapter 6 did not derive from a lack of research on our side. For their availability to revise this document and improvement suggestions we are sincerely thankful.

2 European micro credentials policy and legislation

Micro-credentials certify the learning outcomes of short-term learning experiences, for example a short course or training. They offer a flexible, targeted way to help people develop the knowledge, skills and competences they need for their personal and professional development. Figure 2 shows the worldwide trends on google searches for the term “micro credentials”. It can be observed that the number of searches has been growing steadily since 2016. Figure 3 shows the regional interests of these searches. The term is most popular in searches in New Zealand and Australia. In the top-5 of countries with most searches, are mainly countries that follow the Anglo-Saxon system of education. In Europe, the most searches for “micro credentials” occur in Ireland and Germany. Figure 4 shows the number of results in Google Scholar for scientific works on “micro credentials in higher education”. This graph also shows an increasing number of results from 2010 till present. It can be concluded that the interest for micro-credentials has been growing in the past decade.

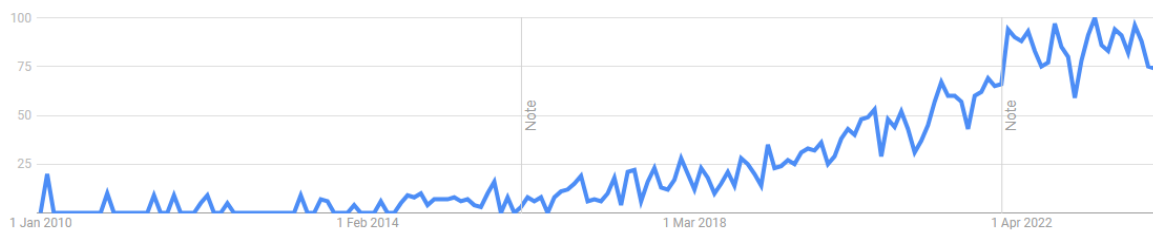
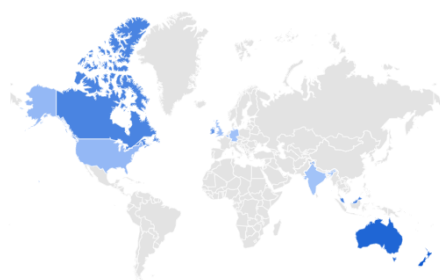


Figure 2 - Google trends on micro credentials worldwide (2010-2023)



1	New Zealand	100
2	Australia	87
3	Malaysia	63
4	Canada	60
5	Ireland	48

Figure 3 - Regional interest in the term micro credentials.

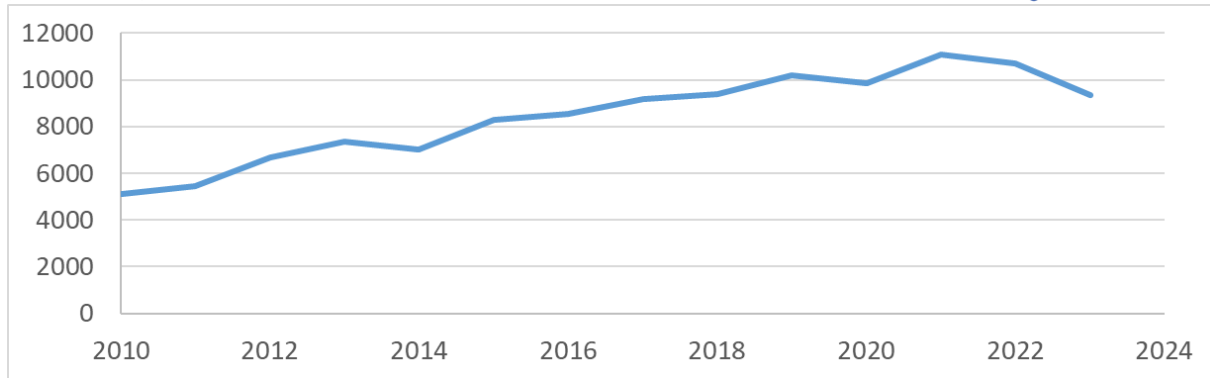


Figure 4 - Search results in Google Scholar of micro credentials in Higher Education

In the [Digital Education Action Plan](#) adopted in January 2018, the European Commission (EC) highlights the importance of providing a digital infrastructure to issue digitally-signed credentials, encouraging the wider use of digital credentials in the EU. In the [Europass Decision](#) adopted in April 2018, the European Commission was tasked with developing a digital framework to document, share and verify learning achievements (including skills and qualifications) from formal and non-formal setting, leading to the development of the European Digital Credentials for Learning Infrastructure (EDCI). The legal basis for the creation of the tool is thus in the Europass Decision. Additionally, the [European Skills Agenda](#) launched in July 2020 highlights EDCI as an important tool to create flexible lifelong-learning pathways for EU citizens. The [Micro-Credentials Recommendation](#), of 16 June 2022, also mentions the use of European Digital Credentials to support the recognition of micro-credentials. The European Commission's [Communication on achieving the European Education Area by 2025](#) (September 2020), mentions micro-credentials as a means to help widen learning opportunities and strengthen the role of higher education and vocational education and training institutions in lifelong learning by providing more flexible and modular learning opportunities. Finally, the [European Strategy for Data](#) adopted in February 2020 calls for the creation of a Common European skills data space and for Member States to prepare high-quality data on qualifications and learning outcomes as part of their plans to develop digital credentials. Micro-credentials make use of the [European Learning Model](#) (ELM) to present data in a standardized format which is recognized by all EU member states. The ELM was last updated in May 2023 with version [ELM v.3](#).

3 European projects using European digital credentials for learning

A short, non-comprehensive list of EU projects that worked, one way or another, with EDCs and/or the ELM standard is provided next.

3.1 OEPASS: OPEN EDUCATION PASSPORT

The recognition and transfer of individual credits through ECTS was created for an era of physical mobility, and is optimised accordingly. EU recognition instruments, such as the diploma supplement and the EQF, support the award of qualifications in the areas of formal learning, and are supported by recognition procedures for non-formal and informal learning.

While these tools can be used to support open education and virtual mobility, a number of caveats exist to their use, including that:

- little to no guidance exists on how to document virtual mobility / open education experiences for the purposes of credit transfer;
- procedures for recognition of prior learning or of non-formal/informal learning do not scale to the massive numbers of students enrolling in open education programmes such as MOOCs;
- there is no European approach to recognising, transferring or scaling open education modules.

These problems are so pronounced, that many open educational providers are creating parallel systems of credentials that are not even described in terms of ECTS – leading to a situation where millions of students per year are enrolling in open courses offered by universities which do not necessarily award valid or recognised forms of credit.

[OEPASS](#) intends to address these issues by creating a standard format for describing open education and virtual mobility experiences in terms of ECTS which:

- addresses common criticisms (lack of trust) of open education, in particular with respect to student assessment and identity;
- is scalable to hundreds or thousands of students through automatic issuing and verification of certificates;
- can capture a wide range of non-formal and formal open education experiences.

3.2 MicroHE, MicroBol, MicroCredX

The [MICROBOL](#) project (Micro-credentials linked to the Bologna key commitments) supports ministries and stakeholders in exploring, within the Bologna Process, whether and how the existing Bologna tools can be used and/or need to be adapted to be applicable to micro-credentials. In this project an international consortium organised various meetings and workshops where governments, experts and stakeholders came together to evaluate the current practices and policies relating to

micro-credentials. Based on the findings of these meetings, a common European framework for micro-credentials has been proposed.

[MicroHE](#) aims to provide the most comprehensive policy analysis yet conducted of the impact of modularisation, unbundling and micro-credentialing in European Higher Education by:

- Gathering the state of the art in micro-credentialing in European Higher Education today
- Forecasting the impacts of continued modularisation of Higher Education on HE Institutions
- Examining the adequacy of European recognition instruments for micro-
- Proposing a ‘credit supplement’
- Proposing a meta-data standard and developing an online clearing house .

The [MicroCredX](#) project addresses the needs of the strategic triangle of HEIs, the world of work and students. The key questions the project addresses are:

- How can this cooperation be strengthened in order to cater to the skill demand of employers, and at the same time improve the employability rate of university students and raise the profile of HEIs embracing the adoption of study programme unbundling and micro-credential recognition?
- What are the skills and competences the industry requires the most?
- How can curricula adapt to current and emerging labour market needs?

3.3 ECCOE - European Credit Clearinghouse for Opening up Education

The main aim of [ECCOE](#) was to facilitate the endorsement and appropriation of open, online and flexible higher education. In support of this overarching objective, the project aimed to increase trust in technology-enabled credentials among students, higher education institutions (HEIs) and employers.

ECCOE was an Erasmus+ project which ran from September 2019 to August 2022.

ACTIVITIES AND OUTPUTS

- Develop quality descriptors for credentials relating to courses, modules, MOOCs and groups of competences;
- Create and validate a Model Credit Recognition Agreement which will be available in 6 languages (DE, EN, FR, IT, LT, NL);
- Set up an online catalogue of over 60 disciplinary and transversal modules which have passed the selection criteria for cross-institution recognition;
- Design a system for technology-enabled credentials;
- Lay the ground for wider take-up via the ECCOE-System network and piloting, by producing and disseminating the supporting documentation that institutional stakeholders need.

3.4 SEA EU

[SEA EU](#) is an Alliance of 9 European Coastal Universities (Cadiz, Bretagne Occidentale, Kiel, Gdansk, Split, Malta, Naples, Algarve and NORD) dedicated to the creation of a European Coastal Campus



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where all students and staff could experience Europe through a rich and varied offer of activities and cooperation.

SEA-EU is one of the pioneers in the European Universities Initiative, which started in 2019 and that, after the renewal achieved, is working towards ambitious objectives such as the European Degree Label for joint programmes, the Legal Status or the goal of 50% of mobilities.

SEA-EU's microcredential programs offer focused, bite-sized learning experiences that empower individuals to acquire specific skills and knowledge. Whether you're a student looking to enhance your academic journey or a professional seeking to upskill, SEA-EU's microcredentials provide a flexible pathway to personalized growth and advancement.





4 Digital credential platforms

The DocTalent4EU project aims to facilitate formal recognition & wide acknowledgement of the transferable skills of PhD candidates obtained from DocTalent4EU courses or informal training, by implementing digital credentials. The concept of digital credentials is to provide the credential owner an easily shareable form to prove the acquisition of a set of skills and competences. A digital credential needs to convey in a secure way that the owner of the credential is entitled to the achievements the credential claims. It also must prove that the credential issuer is a trustworthy training institution. It also needs to be easily shareable and to have an appealing graphical layout. Since the DocTalent4EU project focuses on the ESCO skills and competences, the choice of platform also needed to consider the possibility of including them in the digital credentials.

Examples of digital credential platforms include Credly, Badgr, Accredible, and Open Badge Factory. These platforms have gained popularity in education, professional development, and various industries as a modern and efficient way to recognize and communicate skills and achievements in the digital age. A recent initiative from the European Union and more especially from Europass, in the field of digital credentials, is providing a new tool to allow education and training institutions to easily authenticate, validate and recognise credentials of any size, shape or form. This new tool is called “European Digital Credentials for learning” and offers many benefits for citizens, employers, and organisations: <https://europa.eu/europass/en/europass-tools/european-digital-credentials>

Two digital credential issuing methods were considered for the DocTalent4EU digital credentials: [Open Badges](#) and [European Digital Credentials for learning](#). The [Open Badges standard](#) was originally developed by the [Mozilla Foundation](#) and is currently maintained by the [1EdTech](#) non-profit membership organization. 1EdTech maintains the standard through its members and input from the broader community, and also tests and certifies products for their conformance to these standards. The consortium leader, Université Côte d'Azur, had previous experience issuing Open Badges as a form of recognizing PhD candidates informal training such as guiding undergraduates in laboratorial tasks. It was thus of advantage to use this experience in the execution of the project. [European Digital Credentials for learning](#) are an initiative of the EC. EDCs can be directly added to the [Europass profile](#). They use [European Learning Model](#) and have the ESCO skills and competences embedded.

In task 3.1, both [Open Badges](#) and [European Digital Credentials for learning](#) were analysed in their capacity to answer to the project’s requirements. The consortium has reached a consensus that European Digital Credentials for Learning emerge as the most pertinent mechanism for acknowledging transferable skills acquired through formal training. This approach not only provides a more robust and officially sanctioned framework but also ensures a heightened level of security and stability for the university. The adoption of European Digital Credentials for Learning is anticipated to lend greater credibility to the credentials conferred upon PhD candidates, thereby enhancing the overall recognition and value of their academic achievements.

In the realm of informal training, the consortium still is reflecting on leveraging Open Badges. This digital credential system is deemed highly efficient for spotlighting specific skills within digital curricula



and professional networks. The utilization of Open Badges is anticipated to offer a streamlined and effective means of showcasing and validating the diverse skill sets acquired through informal learning experiences. This approach aligns with contemporary trends in recognizing skills beyond traditional academic contexts and underscores the project's commitment to providing a comprehensive and adaptable credentialing framework. The limitation lies in the governance of universities, which do not consider the open badges solution to be sufficiently relevant and credible to recognize the transferable skills acquired by PhD candidates through informal training (including MOOC) and research activities.

4.1 European Digital Credential for Learning

European Digital Credentials for Learning (EDCs) are standardised, tamperproof electronic documents describing that their owner has acquired particular skills or has achieved specific learning outcomes through formal, non-formal or informal learning contexts. Figure 5 shows the metadata which an EDC can contain. They can describe:

- 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.

EDCs are typically used to qualify for job positions, university placements and more. They are legally equivalent to paper-based certificates in all Members of the European Education Area. In practice, they could be a digital version of a University diploma, course certificate, or any other type of credential.

EDCs include the most common higher education certificates metadata, such as volume of work, grades, ESCO skills and competences, assessments, achievements, organizations delivering content, etc. Making use of the ELM, all metadata is accepted as standard by EU member states HEI. An EDC contains (see Figure 5) information on the credential, the issuer of the credential, the claims on the credential owner and the eSeal, which guarantees the validity of the credential.

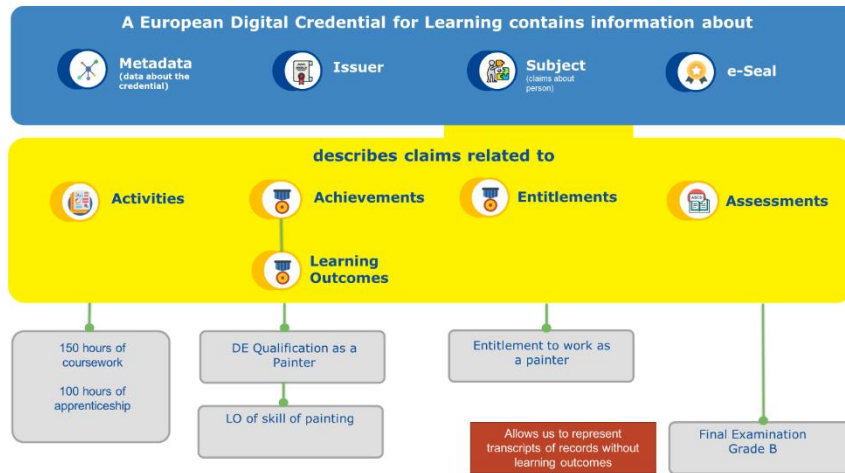


Figure 5 – Europe and Digital Credential for Learning scheme according to ELM v.3 (source: [EUROPASS](#))

4.2 Open Badge Factory

The Open Badge Factory serves as a web-based platform utilised by organisations of varying sizes globally for the creation, issuance, and administration of their Open Badges:

<https://openbadgefactory.com/en/>

Open Badges are digital credentials that represent skills, achievements, or learning experiences. They provide a way to recognize and showcase a person's abilities and accomplishments in a verifiable and shareable format. Open Badges are typically created based on a set of standards developed by the Open Badges Initiative, which ensures interoperability and compatibility across different platforms and systems. Key features of Open Badges include:

Digital Representation: Open Badges are digital images that contain metadata, providing details about the issuer, the criteria for earning the badge, and evidence of the accomplishment.

Portability: Individuals can transfer their Open Badges across various online platforms, social media, or personal websites. This portability allows users to build a comprehensive and easily shareable digital portfolio of their skills and achievements.

Verification: Open Badges are designed to be verifiable, allowing anyone to check the authenticity of a badge and confirm the criteria for earning it. This verification is crucial for establishing trust in the credentials.

Issuer Diversity: Open Badges can be issued by a wide range of organizations, including educational institutions, employers, non-profits, and other entities. This diversity allows for a broad recognition of skills and achievements.

Open Standards: The Open Badges framework operates on open standards, promoting interoperability and ensuring that badges earned on one platform can be displayed and verified on another.

Overall, Open Badges provide a flexible and transparent way to acknowledge and communicate skills and achievements in the digital era. They have been widely adopted in education, professional development, and other fields where recognizing and showcasing skills is important.

University Côte d’Azur is using Open Badges through Open Badge Factory to recognize ESCO skills acquired by students and PhD candidates during events, specific training programmes or extracurricular activities. The procedure below describes the creation of the Open Badge that will be issued to the participant of the DocTalent4EU MOOC included in Course 1 “Enhancing Communication and Negotiation skills of PhD candidates”:

- ✓
- ✓ **Creation of the visual layout (designed by EUF):**



✓
Communication and Negotiation

- ✓ **Information provided:**

Period of validity: N/A

Language: English

Description: The **DocTalent4EU MOOC on Enhancing Communication and Negotiation Skills for PhD Candidates** is intended to provide doctoral candidates with the essential skills and knowledge required for effective communication and negotiation. The course aims to enhance participants' abilities to communicate their research effectively, negotiate effectively in academic and professional settings, and understand the role of such skills in advancing their research and careers. The course is divided into ten components, each covering specific aspects of the subject matter.

Key words: negotiation, communication, transferable skills.

Badge issuance procedures/criteria:

- Complete the DocTalent4EU MOOC “Enhancing Communication and Negotiation skills for PhD candidates”

Message to be delivered with the badge:



“Congratulations!

You have successfully completed the DocTalent4EU MOOC "Enhancing Communication and Negotiation Skills for PhD Candidates."

We are delighted to present you with your "DocTalent4EU" open badge, which you can proudly share across all your social networks!

An Open badge is a digital certification that attests to the acquisition of experience, knowledge or skills. It is used to recognize, value and make visible a certain number of elements such as know-how, interpersonal skills, a role or a contribution."

✓ **List of the ESCO skills that are recognized:**

- [T1 - core skills and competences](#)
- [T1.3 - working with digital devices and applications](#)

- [T2 - core skills and competences](#)
- [T2.1 processing information, ideas and concepts](#)
- [T2.2 planning and organising](#)
- [T2.3 dealing with problems](#)
- [T2.4 thinking creatively and innovatively](#)

- [T3 - core skills and competences](#)
- [T3.1 working efficiently](#)
- [T3.2 taking a proactive approach](#)
- [T3.3 maintaining a positive attitude](#)
- [T3.4 demonstrating willingness to learn](#)

- [T4 - core skills and competences](#)
- [T4.1 communicating](#)
- [T4.2 supporting others](#)
- [T4.3 collaborating in teams and networks](#)
- [T4.4 leading others](#)

- [T6 - core skills and competences](#)
- [T6.3 applying civic skills and competences](#)
- [T6.4 applying cultural skills and competences](#)
- [T6.5 applying entrepreneurial and financial skills and competences](#)
- [T6.6 applying general knowledge](#)

✓ **Endorsement:**



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Endorsement lends credibility to the badge, reinforces impact and visibility. The initial plan was to get the endorsement of all the partners within DocTalent4EU. At this point, only University of Limerick agreed to endorse the open badge because they led the development of Course 1 “Enhancing Communication and Negotiation Skills for PhD Candidates”, with the contribution of Université Côte d’Azur. The 5 other universities of the consortium were not directly involved in the development of the MOOC and consequently, they did not get the approval from their governance bodies to recognize and endorse the training. This will require further discussion, also to get the endorsement of the EUF, but there is no insurance that these 6 partners will endorse the open badge at the end.



5 Issuing DocTalent4EU digital credentials

The DocTalent4EU digital credentials are based on the European Digital Credentials for Learning¹ (EDC). At the time of writing this manual, there are two ways to create an EDC. The first uses the online credential builder provided by the Europass tools. The second uses the EDCI issuer, which is an open-source software provided for those institutions that are interested in developing their own EDC issuing software. Since developing software to issue DocTalent4EU digital credentials was out of the scope of the DocTalent4EU project, this manual will focus on using the online credential builder. The reader is advised to read the documentation provided by the European Digital Credentials for Learning infrastructure carefully. The page on [how to issue EDC](#) is recommended as a starting point. For those wishing to implement an in-house developed EDCI issuer, it is recommended to read the [information for developers](#) and to explore the [github repository](#).

The EDCI provides two environments to issue EDC: the [playground](#) and the [production](#). The [playground](#) environment can be used in training to get acquainted with the process of issuing. To issue EDC, the [production](#) environment must be used.

Appendix A lists and describes all the fields in the EDC's elements and template, complementing the description of the DocTalent4EU digital credential issuing process.

5.1 Technical requirements and prerequisites

This section lists the requirements and prerequisites to issue an EDC using the online credential builder. The criteria to issue EDC using the EDCI issuer will not be addressed, as this method is out of the scope of the DocTalent4EU project.

5.1.1 EU Login ID

The first requirement is to create an EU Login ID. As an example, the register in the Europass portal will be used. The user can register at <https://europa.eu/europass/en>, as shown in Figure 6, and follow the 'Create your free Europass profile' link (see Figure 7). The Europass portal shares the same login as all EU sites, which means that, if the user already possesses EU login credentials, they can use them to log in to Europass.

¹ <https://europa.eu/europass/en/stakeholders/european-digital-credentials>

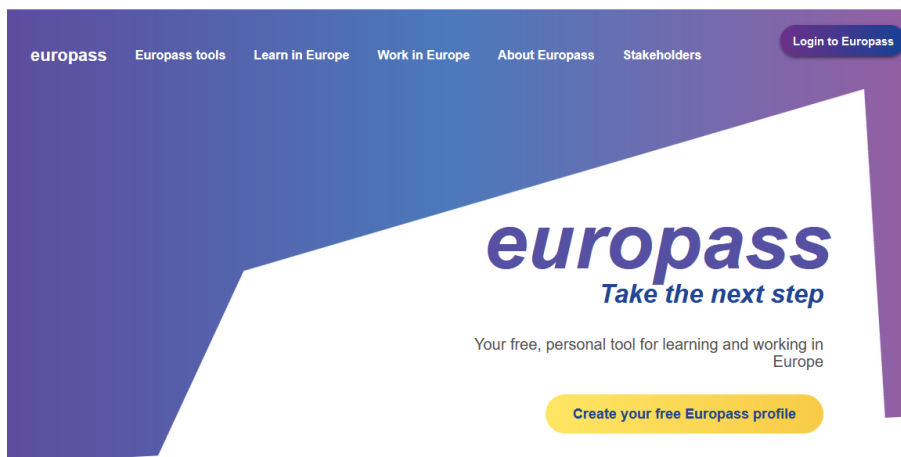


Figure 6 - Europass main page.

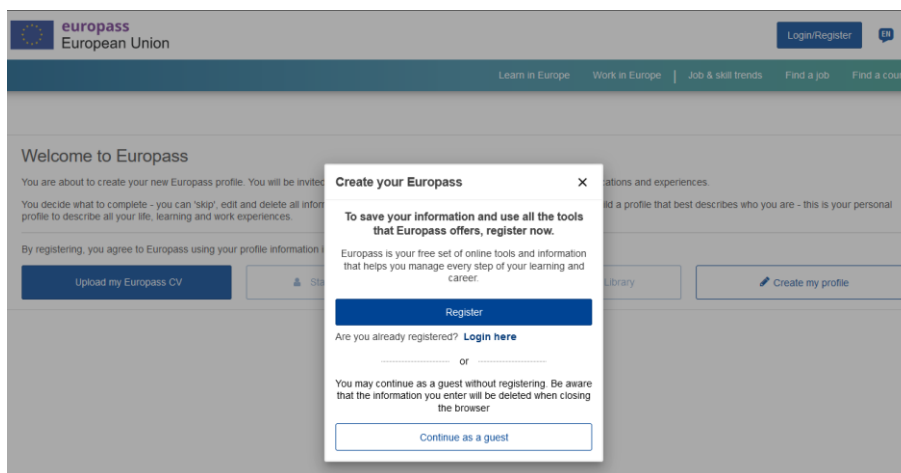


Figure 7 - Registering to Europass.

5.1.2 NexU software

To sign the EDC digitally, the user must install the NexU software. NexU is an innovative, open-source, multi-browser multi-platform remote signature tool to communicate with smartcards. It relies on [Nowina's](#) XSS-Sig Module to support the interoperability of electronic signatures in Europe. This software builds an interface between the qualified electronic seal, installed in a smartcard, USB dongle, or on the computer, and the online credential builder. Its multi-browser, multi-platform characteristics allow for almost universal use across the existing platforms (Windows, Unix, Mac, Linux, etc)

5.1.3 Qualified and advanced electronic seal

First, you will need to obtain an advanced or qualified electronic seal (eSeal), compliant to [EU Regulation No 910/2014](#) (eIDAS Regulation) for electronic transactions within the internal European



market. It enables verification of a document's issuer over long periods. Qualified electronic seals can be considered the digital equivalent of a legal entity's paper seal. The eSeal can be purchased by an institution from a trusted provider. An eSeal cannot be issued to individual persons, who can instead sign documents using a qualified certificate for signature. Without the eSeal it is impossible to issue EDCs, so this requirement must be met beforehand. If your institution does not possess a qualified electronic seal, please refer to the [list of trusted providers on the eIDAS Dashboard](#) (see Figure 8). When acquiring the eSeal, make sure a qualified certificate for electronic seal is provided. An eSeal can be stored in a smartcard, a USB dongle, an HSM (Hardware security module) or through a cloud service. The HSM solution requires a dedicated server to store the certificate and is suitable for those institutions wishing to develop their own EDC issuing software.

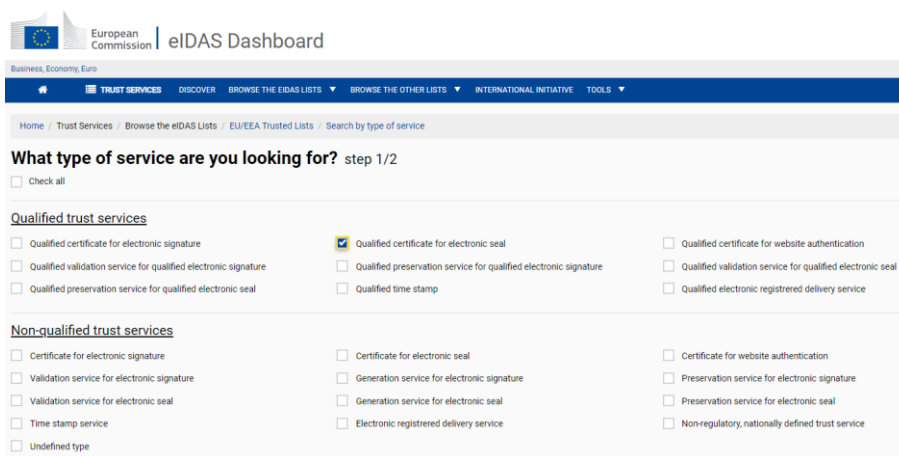


Figure 8 - Search for a trusted provider on the eIDAS Dashboard.

Once the eSeal is acquired, it can be tested using the [DSS demo app](#) (see Figure 9). Upload an xml file² to the demo app. Ensure the NexU software is running and the smartcard with the eSeal is connected, and then click the submit button. A new signed XML file is generated and automatically downloaded to the computer. Upload both xml files (the original, unsigned, and signed files) to the [validation page](#) (see Figure 10). A report will be produced showing whether a qualified electronic seal was used (Figure 11) or not (Figure 12).

² An example of xml file is available at <https://www.w3schools.com/xml/note.xml>





Sign a document

Privacy notice: Please note that by using the below functionality of the DSS demonstration, your files are going to be transmitted to the infrastructure of the European Commission. With your action to do so, you consent to this transmission of data and **we strongly advise you to use documents that do not contain sensitive material.** Files that have been transmitted are not retained.

Warning! The demonstration uses a dummy timestamp source.

File to sign note.xml

Container No ASiC-S ASiC-E

Signature format XAdES CAdES PAdES JAdES

Packaging Enveloped Enveloping Detached
 Internally detached

Level

Digest algorithm SHA1 SHA256 SHA384 SHA512

Allow expired certificate

Add a content timestamp

NexU ready. Please plug card reader, insert ID card and click on button below.

Figure 9 - Signing an xml document in the DSS demo app



DSS Demonstration WebApp

European Commission > DIGITAL > eSignature > Digital Signature Services > Validate a signature

- e-Signature**
- Sign a document
- Sign a digest
- Sign a PDF
- Sign with JAdES
- Sign multiple documents
- Counter-sign a signature
- Standalone application
- REST/SOAP WebServices
- Server side**

Validate a signature

Privacy notice: Please note that by using the below functionality of the DSS demonstration, your files are going to be transmitted to the infrastructure of the European Commission. With your action to do so, you consent to this transmission of data and **we strongly advise you to use documents that do not contain sensitive material.** Files that have been transmitted are not retained.

Signed file note-signed...seline-b.xml

Original file(s) note.xml

Send original file(s) as Complete documents
 SHA1 SHA256 SHA384 SHA512

More options

Figure 10 – Validating the eSeal in the DSS demo app





Validation results

Simple Report Detailed Report Diagnostic tree ETSI Validation Report

Validation Policy : QES AdESQC TL based [Print](#) [Download as PDF](#)

Validate electronic signatures and indicates whether they are Advanced electronic Signatures (AdES), AdES supported by a Qualified Certificate (AdES/QC) or a Qualified electronic Signature (QES). All certificates and their related chains supporting the signatures are validated against the EU Member State Trusted Lists and third country Trusted Lists with voluntary-based AdES recognition (this includes signer's certificate and certificates used to validate certificate validity status services - CRLs, OCSP, and time-stamps).

Signature SIGNATURE_FACULDADE-DE-ENGENHARIA-DA-UNIVERSIDADE-DO-PORTO_20240118-1633

Qualification:	QESal
Signature format:	XAdES-BASELINE-B
Indication:	TOTAL_PASSED
Certificate Chain:	<ul style="list-style-type: none"> FACULDADE DE ENGENHARIA DA UNIVERSIDADE DO PORTO [redacted] QUALIFIED CA G1 [redacted] - Certificadora Digital [redacted] GLOBAL ROOT RSA CA
On claimed time:	2024-01-18 16:33:24 (UTC)
Best signature time:	2024-01-18 16:35:04 (UTC)
Signature position:	1 out of 1
Signature scope:	Full XML File (FULL) The full XML file with transformations.

Document Information

Signatures status:	1 valid signatures, out of 1
Document name:	note-signed-xades-baseline-b_good.xml

Figure 11 - Report of a valid eSeal.



Validation results

Simple Report Detailed Report Diagnostic tree ETSI Validation Report

Validation Policy : QES AdESQC TL based [Print](#) [Download as PDF](#)

Validate electronic signatures and indicates whether they are Advanced electronic Signatures (AdES), AdES supported by a Qualified Certificate (AdES/QC) or a Qualified electronic Signature (QES). All certificates and their related chains supporting the signatures are validated against the EU Member State Trusted Lists and third country Trusted Lists with voluntary-based AdES recognition (this includes signer's certificate and certificates used to validate certificate validity status services - CRLs, OCSP, and time-stamps).

Signature SIGNATURE_..._20240118-0025

Qualification:	N/A ⓘ
Qualification Details:	Unable to build a certificate chain up to a trusted list! The signature/seal is an INDETERMINATE AdES digital signature!
Signature format:	XAdES-BASELINE-B
Indication:	INDETERMINATE ⓘ
Sub indication:	NO_CERTIFICATE_CHAIN_FOUND
AdES Validation Details:	The certificate chain for signature is not trusted, it does not contain a trust anchor.
Certificate Chain:	🔗 [redacted]
On claimed time:	2024-01-18 00:25:35 (UTC)
Best signature time:	2024-01-18 00:33:51 (UTC) ⓘ
Signature position:	1 out of 1
Signature scope:	Full XML File (FULL) The full XML file with transformations.

Figure 12 - Report for an invalid eSeal.

5.2 Online Credential Builder

Figure 13 shows the data workflow that is needed to create an EDC. The first step is to create the 'Credential template'. A credential includes the elements 'Organisations', 'Accreditations', 'Entitlements' and 'Achievements'. The latter consists of 'Learning Outcomes', 'Activities' and 'Assessments'. Not all components are mandatory, allowing great flexibility in creating digital credentials. In the next step, the 'Credential template' is merged with the recipient's metadata to make the individual's EDC. Finally, the Qualified Electronic Seal (eSeal) is applied to the EDC and sent to the EDC's recipient or owner. The EDC can then be added to the owner's wallet to prove the recipient acquired the associated skills and knowledge.

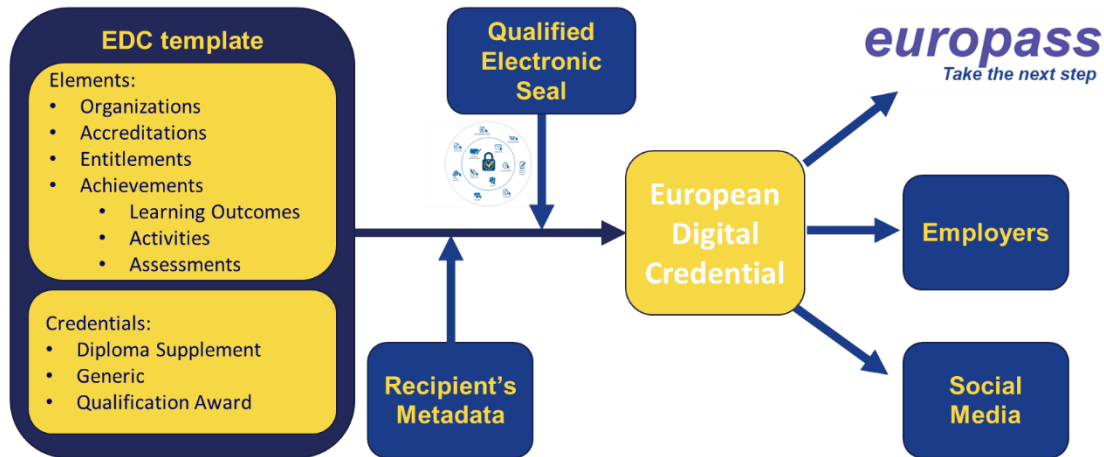


Figure 13 - Online credential builder workflow

5.3 Elements

This section describes the elements that compose an EDC. Appendix A provides a detailed description of the fields available for each element.

5.3.1 Achievements

Learning achievements are a recognised set of Learning Outcomes of an individual describing the acquisition of knowledge, skills or responsibility and autonomy. Learning Activities, proven by Assessments, often influence learning achievements, and they can indicate Entitlements that the credential holder has received as a result of their achievement (see Figure 14). An achievement can describe a qualification (e.g., bachelor's degree or master's degree), a course or any other training unit.

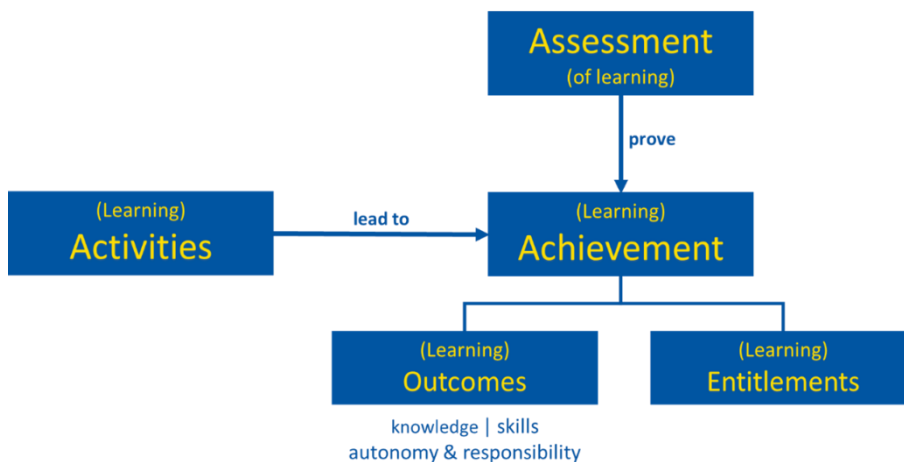


Figure 14 - EDC's Learning achievements (source: [EUROPASS](#))

5.3.2 Learning Outcomes

The [2017 EQF recommendation](#) defines learning outcomes as '...statements of what an individual should know, understand and/or be able to do at the end of a learning process, which are defined in terms of knowledge, skills and responsibility and autonomy'. The learning outcomes perspective is used for a number of different purposes, the most important being:

- Qualifications frameworks and their level descriptors
- Qualification standards
- Curriculum development
- Assessment and validation
- Quality assurance
- Teaching and training

For all these purposes, the learning outcomes approach strengthens the focus on the individual learner and the level of knowledge, skills and competence s/he is expected to achieve.

The 'Learning Outcome' element defines the type of outcome (skill or knowledge), the reusability level, and the related ESCO skills.

5.3.3 Activities

A learning activity is any process that leads to acquiring knowledge, skills, responsibility, and autonomy. Just like learning achievements, activities may also have components of sub-activities, and they can be described in terms of activity start and end dates, workload, activity modes and types, and languages of instructions.

5.3.4 Assessments

Assessments establish the extent to which a learner has attained particular knowledge, skills and competences against criteria such as learning outcomes or standards of competence. Assessment results are expressed in Grades, an individual's score from within a grading scheme that can be described in detail to make grades transparent and comparable. Other properties of an assessment, including mode, language, and method, can be described in this element.

5.3.5 Organisations

A European Digital Credential for Learning documents multiple aspects of the outcomes of learning. Organisations can play roles in the learning and accreditation process, such as by:

- delivering activities,
- conducting assessments,
- awarding achievements forming part of a complex credential or
- acknowledging entitlements received by the credential holder.

These functions are all clearly represented in the credential meta-data and can be visualised in the EDC Viewer.

5.3.6 Entitlements

An entitlement is principally a right, e.g. to practice a profession, take advantage of a learning opportunity or join an organisation due to acquiring knowledge, skills, responsibility or autonomy. Entitlements, by their status, can be prospective or actual.

5.3.7 HTML Information

HTML information is a helpful tool for customising the appearance of the EDC. In this element it is possible to insert a customised background image and text for the front page of the EDC.

5.3.8 Accreditations

The accreditation scheme and authority that accredits the achievement is defined in the 'Accreditations' element.

5.4 Credentials

The 'Credential template' is where the EDC is defined. It builds upon the elements described in section 5.3. At the moment, two credential types are foreseen: Accredited and Generic. If applicable, the 'Credential template' must define the accreditation used and the claims of the EDC ('Achievements', 'Activities', 'Entitlements', 'Assessments'). It also needs to identify the HTML information associated with the EDC. If a custom HTML template is not applied, a default template will be applied to the issued credentials.

5.5 Recipient's metadata

The recipient's metadata refers to the data specific to the owner of the EDC. This metadata can refer to personal data like the name, National ID number, etc. (see Figure 15) and the recipient's achievements and entitlements, like assessment grades, date of completion of an achievement or the EDC issuing date.

Select recipient Data

Select the properties which are different for every recipient. If you have already entered the data on the previous screen, and the same applies to all recipients, do not select the fields here.

Personal Data ^

- Given name
- Family name
- Delivery (Email or Wallet) Address
- Second Delivery Address
- E-mail Address
- Date of Birth
- Place of Birth
- Country of birth
- Country of citizenship
- Gender
- Country that issued national ID
- National ID number
- Other Identifier Scheme name
- Other Identifier
- Registered Address
- Registered Country
- Group Name


You can enter the recipient data in the browser, or download an Excel or CSV template to fill in the customizable data. Please note that the Recipient Template is credential specific, so you will have to download a new Excel or CSV file for each of your credentials.

Enter recipient Data in Browser >

Download Excel Template as XLS >

Download Excel Template as CSV >

Once you have completed the Excel or CSV template, upload it here



← Back

Figure 15 - Recipient's personal data.



5.6 EDC Sealing

The sealing of the EDC is the process by which the digital certificate becomes a tamper evident electronic document. The sealed EDC cannot be edited without breaking the seal. The eSeal will also mark the document with a timestamp, which provides proof of the moment of sealing. eSeals are awarded to legally idoneous institutions, in this case, HEIs. The acquisition of the eSeal requires the institution to prove to a trusted provider that they are a legal entity under the National legislation, for example by providing the VAT number and the statutes of the institution. The eSeal guarantees that the institution claiming to award the EDC is represented in the eSeal. Anyone visualising the EDC can verify which HEI issued the digital credential.

5.7 EDC Visualization

The EDC owner will receive an email with an attached JSON-LD file where the EDC is contained. This file can be uploaded to the [EDCI viewer](#) (Figure 16), showing the EDC online (Figure 17). If the EDC owner has created an EUROPASS account, the EDC can be imported to the “My Library” area (Figure 18) where it can be visualized and shared.



Figure 16 – EDCI viewer.

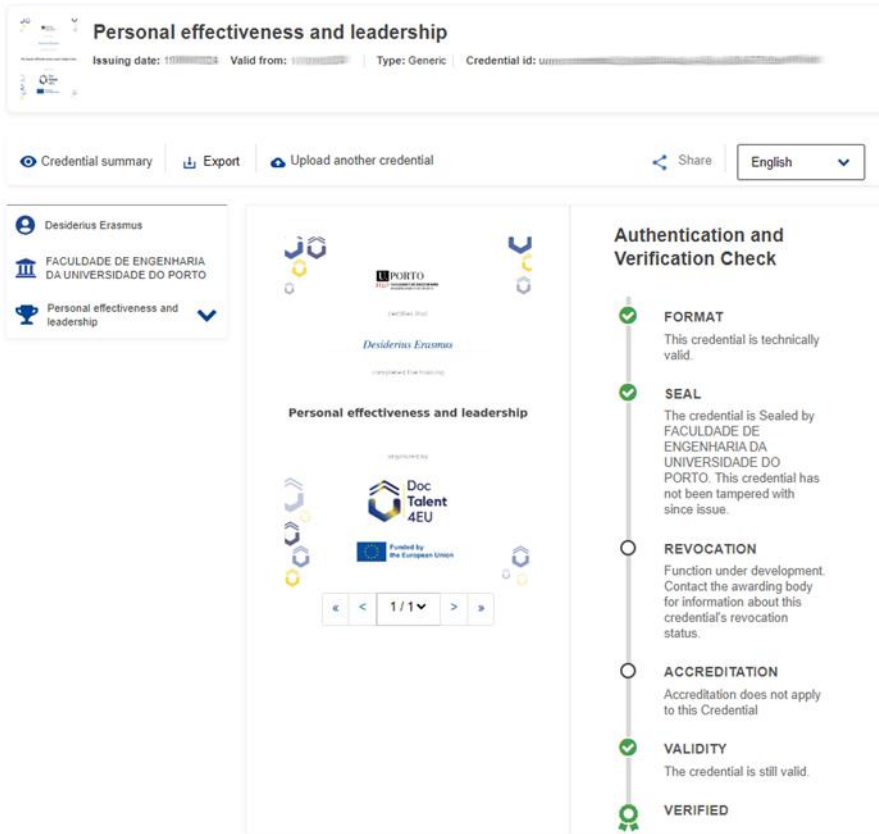


Figure 17 – EDC in the EDCI viewer.

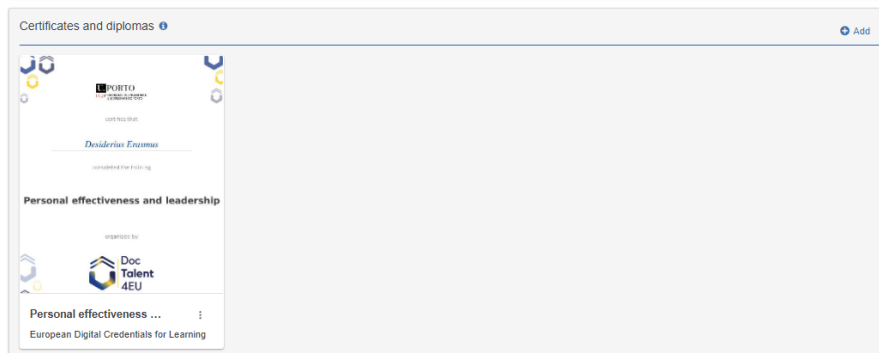


Figure 18 – EDC in the Europass wallet (My Library).

6 Limitations and challenges

The EDCI is a work in progress that is continuously being updated and improved. As such, not all the required features for the DocTalent4EU digital credentials were available. The integration of EU policies, such as the ESCO skills, was included, but the same does not apply to ResearchComp. At the moment of writing, several limitations of the online credential builder were identified in the issuing of EDC to recognise doctoral candidates' transversal skills and competences. These limitations do not prevent the issuing of digital credentials but result in a less efficient workflow and impose some artificial limits to the content of the digital credentials. This section outlines the limitations that were identified during the DocTalent4EU project. We note that the team developing the EDC software was contacted for comments on these limitations. Some of the information here provided was obtained by written communication between the DocTalent4EU consortium and the developers of the software.

6.1 Issued digital credentials are not stored

The online credentials builder does not store the issued EDCs. This behaviour is necessary for compliance with the General Data Protection Regulation (GDPR). By not storing any of the recipients' metadata, there is an automatic compliance with the GDPR. The user must still declare they are authorised to insert the metadata into the online credential builder. This declaration is not stored in the system. No (personal) data is stored by EDC - the information about the issued credentials is only visible at the time of issuing. This is to comply with GDPR requirements and to ensure that only the recipient of an EDC remains in control of their data. The undesirable result is that, when using the OCB, the issuer of the EDC must manually record which digital credentials have been issued and the recipients' metadata associated with them. More relevant than the time consumed in this operation is that it is only possible to record this information when issuing the EDC. An archiving function is planned for the future - but this presumption will likely not change to comply with GDPR requirements. However, some of these aspects could be expected to remain even when it would be in place.

6.2 EDC templates are bound to individual accounts and environment

One significant limitation of the online credential builder is that the EDC templates created in a given environment ('playground' or 'production') are bound to the personal account of the person who made the template. That means that it is not possible to create an EDC template and transfer to another account. This would be of great advantage, for example, for digital credentials concerning a course (or programme) that is developed by a consortium and delivered by two distinct institutions. Such was the case of the DocTalent4EU project, which produced three courses in WP2, which were offered by six of the HEI of the consortium. Each course was delivered by two different HEI, but the content was the same. Each HEI responsible for providing a course had to issue the corresponding DocTalent4EU credential, as HEI will not issue certificates and digital credentials for courses they did not deliver. This is often a legal obligation derived from the national legislation. The fact that the EDC template cannot be transferred between accounts meant that each HEI had to create their own template from scratch. On the one hand, this is a time-consuming task; on the other hand, this makes it harder to guarantee consistency between the digital certificates issued by the two HEIs. This will be possible in the future. However, in the meantime what is possible is to transfer unsigned credentials



to another institution. Meaning that an institution could create the credentials based on the existing template - and the unsigned credentials can be directly re-uploaded to the issuer for sealing by another organisation.

Even for the same account, it was not possible to transfer the EDC template from the 'playground' environment to the 'production' environment. This means that a user who starts exploring the OCB in the 'playground' environment needs to repeat the creation of the same elements and EDC template in the 'production' environment.

6.3 Embedded ESCO skills

As described in section 5.3 and Appendix A the OCB has the [ESCO skills framework](#) embedded in the 'Learning Outcome' element. The most recent version of the framework is the ESCO dataset - v1.1.1, and this was the one used by the DocTalent4EU project to describe the skills and competences of job ads of WP1 ([Deliverable D1.1](#)) and the learning outcomes of the courses piloted in WP2 ([Deliverable D2.2](#)). The version embedded in the OCB is ESCO dataset - v1.0.9. This meant it was not possible to include the ESCO skills of the piloted courses using the embedded framework. It was also not possible to include the ESCO dataset - v1.1.1 using the URI in the 'Related Skills' section in the 'Learning Outcome' elements, as this conflicts with the embedded framework. The only alternative available was to insert the ESCO skills (v1.1.1) using only the 'Name' field of the 'Related Skills' section. This allows to list the ESCO skills associated to a given learning outcome but without including all the other properties that the ESCO skills framework wants to promote.

A new version of the OCB which will use the ESCO dataset - v1.1.1 is planned to be in production by the Spring 2024.

6.4 ResearchComp skills framework

The ResearchComp skills framework was published shortly after the beginning of the DocTalent4EU project. From the kick-off meeting of the project, the DocTalent4EU consortium was incentivised by the European Commission's [Directorate-General for Research and Innovation](#) (DG RTD) to include the ResearchComp skills framework and learning outcomes description in the outputs of the project. This was done in WP1 and WP2 while describing the transversal skills and competences (deliverables D1.1, D2.1, D2.2).

When preparing the DocTalent4EU digital credentials, it was attempted to include the ResearchComp skills using the 'Related Skills' section of the 'Learning Outcome' element. At the time of writing of this document, the ResearchComp skills framework did not have a skills lexicon available, with an URI for each skill. For this motive, the ResearchComp skills were included in the 'Learning Outcomes' section of the 'Achievement' element of the EDC instead.

Please note that by ways of using the "related skill(s)" learning outcome property, knowledge, skill and competence concepts can be referenced. and linked to the credential, from any skill framework (that isn't ESCO).

6.5 Documentation

To prepare the present deliverable, the authors read the documentation on several websites describing how to issue it to EDC. Due to the continuous development of the EDCI, particularly the OCB, at the time of writing the present document, the existing information was incomplete, outdated,



or misleading. This is expected in a product which has not yet matured for widespread use. The following examples illustrate the difficulties encountered in the EDCI's documentation.

The [Stakeholder information](#) and the [How to issue European Digital Credentials for Learning](#) pages describe the elements that compose an EDC and briefly explain the sections included in these elements. These excellent documents help the user get acquainted with the EDC issuing process. Yet, it was not possible to find, in an easy and accessible way, a description of the fields and data types that can be inserted in the referred elements. For example, there is often no explanation for what type of numeric fields are accepted (integer, float), the purpose of a given free text, or where to find the URI framework, among others. In several fields the user needs to fill in, there are tips (see Figure 19) that help and guide, but this is not true for all the fields. The technical documentation is actually available in the [ELM](#) itself, but is not so easily accessible.

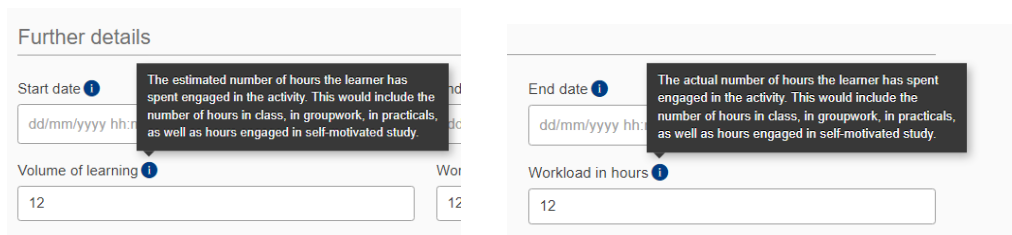


Figure 19 - Examples of tips to help the user in the Activity element.

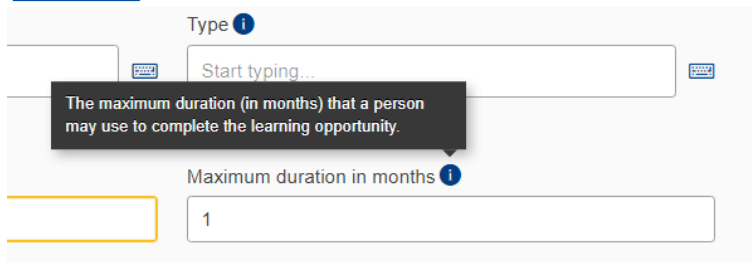
In some parts of the OCB, the existing documentation is either outdated or misleading. A relevant example is the HTML information element of the EDC, shown in Figure 20. The HTML template follows a set of rules to use wildcards to personalise the front page of the EDC. Though a link to a document with the rules on customising the EDCs is provided, the document cannot be accessed. The HTML template examples are available on [github](#). Another example is the tips for the 'Volume of learning' and 'Workload in hours' of the 'Activity' element. As shown in Figure 19, the description of both fields is very similar, and the difference between the two fields is not clear.



Figure 20 - HTML information element.

6.6 Digital credentials metadata

Some of the metadata to be inserted in the EDC template has restrictions which are not universally applicable. It is the case of some numerical fields that are restricted to integers when the user's needs might require a real number. An example, shown in Figure 21, is the 'Maximum duration in months' of the time available for a participant to complete a learning opportunity ('Achievement').



Type ⓘ

Start typing...

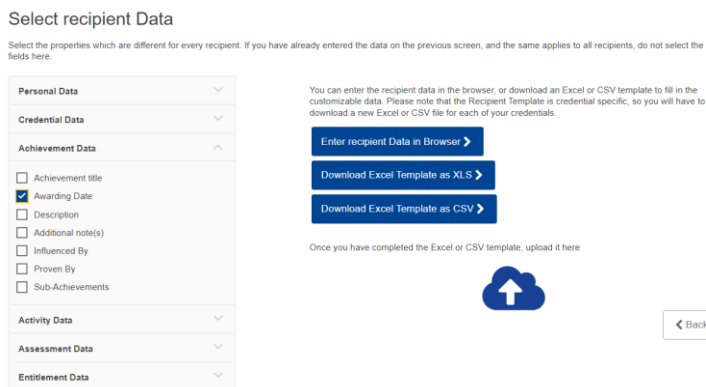
The maximum duration (in months) that a person may use to complete the learning opportunity.

Maximum duration in months ⓘ

1

Figure 21 - Example of a numeric field with restricted data type.

Another issue is that some metadata is specific to a given EDC recipient or edition of the achievement. For example, the 'Volume of learning' and 'Workload in hours' of the 'Activity' element refer to the metadata of the recipient. Another example is the 'Awarding date' of an 'Achievement', which can change from recipient to recipient and is different for each edition of that specific achievement. If the user is using the OCB to issue credentials, this metadata should be updated at the moment the EDC and the recipient's metadata are merged, as exemplified in Figure 22.



Select recipient Data

Select the properties which are different for every recipient. If you have already entered the data on the previous screen, and the same applies to all recipients, do not select the fields here.

- Personal Data
- Credential Data
- Achievement Data
 - Achievement title
 - Awarding Date
 - Description
 - Additional note(s)
 - Influenced By
 - Proven By
 - Sub-Achievements
- Activity Data
- Assessment Data
- Entitlement Data

You can enter the recipient data in the browser, or download an Excel or CSV template to fill in the customizable data. Please note that the Recipient Template is credential specific, so you will have to download a new Excel or CSV file for each of your credentials.

Enter recipient Data in Browser >

Download Excel Template as XLS >

Download Excel Template as CSV >

Once you have completed the Excel or CSV template, upload it here

Upload icon

Back

Figure 22 - Merging EDC and recipient's metadata while updating EDC's metadata.

7 Conclusions

This report summarizes the work of the DocTalent4EU consortium on the procedure to issue digital credentials using the OpenBadge and European Digital Credentials for learning platforms.

Deliverable 3.1 aimed to provide a easy to follow manual for issuing DocTalent4EU credentials. The immediate audience is the consortium members teams that will issue the digital credentials. Beyond the project's life, it is expected that this manual may become a reference for HEI who would also like to issue digital credentials.

This document starts by reviewing the European policy and legislation on micro-credentials and digital credentials. It then provides a summary of past and current European projects on micro-credentials. The selection of the digital credentials platforms used in this project is then presented, highlighting the characteristics and dis-/advantages. The procedure to issue DocTalent4EU credentials is then described, followed by the identification of the limitations of the EDC model. An appendix enriches the current deliverable: a detailed description of the EDC's elements.

It can be concluded that the EDC's online credential builder is fit for the purpose of issuing the DocTalent4EU credentials and for this reason was the adopted method. There are some limitations that limitations relative to the purpose of this project which could be overcome. For future developments HEI are advised to integrate EDCI's issuer in their own information system in order to more effectively issue digital credentials.

REFERENCES

D1.1 Report on current and future needs for transferable skills

D2.1 Open database on existing training programs to address selected transferable skills

D2.2 - Report on course design and learning outcomes

Appendices

Appendix A European Digital Credential elements

An European Digital Credential is built of several elements:

- **Achievements** - A Learning Achievement describes the acquisition of one or several learning outcomes. The description of an achievement is based on the following fields:

<i>Field</i>	<i>Description</i>
Achievement information	
Achievement title (*)	The title to give to the achievement. Examples of achievements are degrees (bachelor, master, etc) and course units.
Awarded by (*)	The institution/organisation that awards the achievement
Awarding date	Date when the achievement was completed
Description	Long text description of the achievement
Learning Outcomes	Learning outcomes associated with the achievement
Summary of learning outcomes	
Thematic Area	Thematic area according to the ISCED-F Classification
Languages	
Mode of Learning	Blended; Online; Presential; Project based; Research-Lab based; Workbased. Multiple choices possible.
Type	Course; Programme module; Mentoring; MOOC; Apprenticeship; Study visit; Short learning programme; Internship; Educational programme; Class; Service learning; Thesis; Challenge.
Volume of learning	Estimated number of hours the learning is expected to spend in learning to earn the award. These include hours spent in class, in groupwork, in practical classes and self-motivated study. At the time of writing, only positive integer numbers are permitted.
Maximum duration in months	Maximum time allowed for a student to complete this achievement. At the time of writing, only positive integer numbers are permitted.
Credit system	Credit system (European Credit Transfer System, European credit system for vocational education and training) and credits awarded with the achievement.
Target group	The intended audience of the educational program, such as students, professionals, or individuals with specific background or interests. Examples are: Persons in tertiary education (EQF 8), Persons who completed primary education, High Achievers, etc.
Learning Setting	Formal learning; Non-formal learning
Entry requirements	The criteria the person should meet to start this learning opportunity. This field should not be used to describe the admission procedure.
Links to other elements	
Assessed via	Assessments which prove the acquisition of the learning outcomes which make up the achievement.
Related activities	Activities which contributed to the acquisition of the learning outcomes.
Rights earned	Entitlements the owner has received as a result of this achievement. An example of an entitlement, would be a Master degree.
Sub-Achievements	Smaller units of achievement that compose this achievement.
Qualification	



EQF level	If the achievement is a qualification award, identify the corresponding level in the European Qualifications Framework.
NQF	Level on the Awarding Body's National Qualification Framework.
Partial qualification	Is the opportunity a partial qualification? (yes/no)
More Information	
Title (*)	
Level	An associated level of education with a semantic framework describing a stage of difficulty.
Education subject	Refers to the specific topic or discipline that the educational activity or program is focused on, such as mathematics, history or language learning.
About the national system	Additional information or details about the education system in a particular country or region, such as grading scales or accreditation bodies.
More information	Long free text.
Additional fields	Optional additional information about the achievement that provides information not covered by the standard fields (e.g., name of a person signing off the achievement). The user can add a topic and a content.
Homepage	Webpage describing the details of the achievement.
Other documents	Other web documents describing the achievement. Add a title and a publicly accessible URL.
Tag	A short informative label that can be referred to when searching for this achievement.

- **Learning Outcomes**

Field	Description
Learning outcome information	
Learning outcome title (*)	The title to give to the learning outcome.
Further details	
Type	Knowledge; Skill
Reusability Level	The extent to which the learning outcomes of a program or course can be applied in various sectoral or occupational contexts (cross-sector; occupation specific; sector specific; transversal)
Related ESCO Skills	Entitlements the owner has received as a result of this achievement. An example of an entitlement, would be a Master degree.
Related skills	Knowledge and/or skills that the learner has, or is expected to have, acquire as a result of their learning process, from a controlled vocabulary other than ESCO. For each related skill a "Framework URI", a skill "URI" and the "Name" must be provided. A Uniform Resource Identifier (URI) is a unique sequence of characters that identifies a logical or physical resource used by web technologies. The 'Related skill(s)' property is designated to use concepts from NON-ESCO frameworks, such as e.g. the Digital Competence Framework - EU Vocabularies - Publications Office of the EU (europa.eu) or other taxonomies published in linked open data format.



Tag	A short informative label that can be referred to when searching for this achievement.

- **Activities**

<i>Field</i>	<i>Description</i>
Activities	
Activity title (*)	The title to give to the activity.
Directed by	The organisation, or part of an organisation such as department, faculty, which directed the learning activity.
Awarded by (*)	The organisation that awarded the assessment claim to the individual.
Description	Long text description of the activity.
Further details	
Start date	
End date	
Volume of learning	Estimated number of hours the learning is expected to spend in learning to earn the award. These include hours spent in class, in groupwork, in practical classes and self-motivated study. At the time of writing, only positive integer numbers are permitted.
Workload in hours	The actual number of hours the learner has spent engaged in the activity. These include hours spent in class, in groupwork, in practical classes and self-motivated study. At the time of writing, only positive integer numbers are permitted.
Level of completion in %	At the time of writing, only positive integer numbers are permitted.
Learning activity type	Classroom coursework; e-learning coursework; apprenticeship; educational programme; internship; job experience; lab / simulation/ practice coursework; research; self-motivated study; volunteering; workshop, seminar or conference.
Mode of learning	Blended; Online; Presential; Project based; Research-Lab based; Workbased. Only one choice is possible.
Language(s) of instruction	
Activity took place at	Provide a label to identify the address (Description), an Address, Location and Country (required). It is possible to add multiple places.
Links to other elements	
Sub-activities	Smaller units of activities which combined create this activity.
More Information	
Title	Activity's title.
More information	Long free text.
Additional fields	Optional additional information about the achievement that provides information not covered by the standard fields (e.g., name of a person signing off the achievement). The user can add a topic and a content.
Contact hours	The number of hours spent learning in contact with teaching or associated staff.
Homepage	Webpage describing the details of the activity.



Other documents	Other web documents describing the activity. Add a title and a publicly accessible URL.
Tag	A short informative label that can be referred to when searching for this activity.

- Assessments

<i>Field</i>	<i>Description</i>
Assessment information	
Assessment title (*)	The title to give to the assessment.
Assessed by	The organisation that conducted the assessment.
Awarded by (*)	The organisation that awarded the assessment claim to the individual.
Description	Long text description of the assessment.
Further details	
Assessment date	
Assessment reliability proven by	Method used to ensure assessment reliability, e.g. whether the assessment was supervised and/or if the learner's ID was verified. Choose one option from: Supervised with ID Verification; Supervised without ID Verification; Unsupervised with ID Verification; Unsupervised without ID Verification.
Assessment type	Free text. Multiple entries.
Mode Of assessment	Choose one option from: Blended; Online ; Presential ; Project based ; Research-Lab based ; Workbased.
Language(s) of assessment	
Links to other elements	
Sub-assessments	Smaller units of assessment which combined create this assessment.
Grading Scheme	
Title of grading scheme	The grading scheme's title.
Grading scheme identifier.	The unique code assigned to the grading scheme, issue by the administering organisation.
Description	
Other documents	Other web documents describing the activity. Add a title and a publicly accessible URL.
More Information	
Title	Assessment's title.
More information	Long free text.
Additional fields	Optional additional information about the achievement that provides information not covered by the standard fields (e.g., name of a person signing off the achievement). The user can add a topic and a content.
Homepage	Webpage describing the details of the assessment.
Assessment took place at	Provide a label to identify the address (Description), an Address, Location and Country (required). It is possible to add multiple places.
Other documents	Other web documents describing the activity. Add a title and a publicly accessible URL.
Tag	A short informative label that can be referred to when searching for this activity.



- Organisations

<i>Field</i>	<i>Description</i>
Organisation information	
Legal name (*)	Full legal name of the organisation, as registered with national authorities. The legal name should only be translated into languages where official translations exist. Credential issuers are advised to supply the name recorded in their eSeal, otherwise the data supplied in this template will be overwritten during the issuing process.
Common name	The commonly used, often abbreviated (acronym), name of the organisation.
Homepage	Webpage describing the organisation.
Logo	File with a max of 1MB, in formats .JPEG, .JPG or .PNG.
Accreditation	
Accreditation	Linked accreditation scheme.
Further details	
Mandatory legal identifier (*)	The official identification number of the organisation as awarded by the relevant national authority. Credential issuers are advised to supply the registration number recorded in their eSeal, otherwise the data supplied in this template will be overwritten during the issuing process. Provide country and number.
eIDAS ID	A unique electronic identification number used by organisations in the European Union. It helps verify the identity of the organisation and facilitates secure electronic transactions.
VAT Number	A unique identification number assigned to an organisation for Value Added Tax (VAT) purposes. The identifier is usually composed of a country code followed by a 8-12 digit alphanumeric string.
Tax/fiscal ID	A unique identification number assigned to an organisation by a government agency for tax and financial purposes. The identifier is usually composed of a spatial ID (e.g. country code) followed by a 8-12 digit alphanumeric string.
Other Identifiers	Provide scheme name and number.
More Information	
Legal Address	Provide a label to identify the address (Description), an Address, Location and Country (required). It is possible to add multiple places.
Contact information	Details of various means the organisation can be reached, including email, phone, and address. It is recommended to provide an email address.
Member of groups	The name of a separate body or alliance that the organisation is a member of. It helps to categorise and identify organisations based on their association with a larger entity. Several groups can be added.
More Information	Long free textd.
Last modification date	The date when the information related to the organisation was last updated.
Tag	A short informative label that can be referred to when searching for this organisation.



- Entitlements

<i>Field</i>	<i>Description</i>
Entitlement information	
Entitlement title (*)	The title to give to the entitlement.
Awarded by (*)	The organisation that awarded the entitlement.
Description	Long text description of the assessment.
Further details	
Issue Date	
Expiry Date	
Entitlement type (*)	A credential holder may be entitled to membership of an organisation or professional association; to access a learning opportunity; or to perform a specific occupation. Choose from : learning opportunity; membership; occupation
Status (*)	An entitlement may be prospective, i.e. allowing the credential holder to apply for higher level educational programmes (e.g. MSc after completing BSc); or actual, i.e. the credential holder having earned the right to practice an occupation (e.g. nurse or engineer) Choose from: actual; prospective.
Related occupation	ESCO The specific profession or job function that the credential holder is entitled to perform, based on the skills and knowledge acquired through their education and training, from the European Classification of Skills, Competences and Occupations (ESCO).
Entitlement to work as	The occupation or occupational class which the individual may access through the entitlement.
Entitlement valid within	The counties where the entitlement is valid.
Links to other elements	
Entitlement valid with	The organisation which acknowledges the entitlement (i.e. the organisation offering learning opportunities, membership or employment in a certain occupation).
Sub-entitlements	Smaller entitlement, which when combined make up this entitlement.
More Information	
Title (*)	Entitlement's title.
More information	Long free text.
Additional fields	Optional additional information about the achievement that provides information not covered by the standard fields (e.g., name of a person signing off the achievement). The user can add a topic and a content.
Homepage	Webpage describing the details of the assessment.
Other documents	Other web documents describing the activity. Add a title and a publicly accessible URL.
Tag	A short informative label that can be referred to when searching for this activity.



- **HTML Information**

<i>Field</i>	<i>Description</i>
HTML information	
HTML (*)	Custom formatting in Thymeleaf format. This html template will format the text that appears in the front page of the EDC. Text can be customisable recurring to pre-defined tags and additional wildcards.
Background	Background image with a portrait orientation and a DIN A4 format. This image will be used as background for the first page of the digital credential. File with a max of 1MB, in formats .JPEG, .JPG or .PNG.
Wildcard labels	Provide a label key attribute and the corresponding custom text that should appear on the customised credential preview. Labels should be unique.
Tag	A short informative label that can be referred to when searching for this template.

- **Accreditations**

<i>Field</i>	<i>Description</i>
Accreditation information	
Accreditation title (*)	The title to give to the accreditation.
Accrediting agent (*)	The legal person who is issuing the accreditation decision.
Description	Long text description of the assessment.
Further details	
Accreditation type (*)	EQAR Institutional accreditation; EQAR Programme accreditation; Institutional License; Institutional Quality Assurance; Programme License; Programme Quality License.
Accreditation decision	Negative; not applicable; positive; positive with conditions.
Jurisdiction of accreditation	The administrative territories in which the accreditation decision is valid.
Accreditation report	The URL of a publicly accessible report on the quality assurance decision.
Accreditation valid for EQF level	
Accreditation valid for thematic area	The fields of education for which an organisation is accredited to provide studies.
Date of accreditation	
Accreditation expiration date	
Accreditation review date	
More Information	
Title (*)	Accreditation's title.
More information	Long free text.



Additional fields	Optional additional information about the achievement that provides information not covered by the standard fields (e.g., name of a person signing off the achievement). The user can add a topic and a content.
Homepage of accreditation	Webpage describing the details of the accreditation.
Other documents	Other web documents describing the activity. Add a title and a publicly accessible URL.
Tag	A short informative label that can be referred to when searching for this template from others.