Operational guidelines on
PLANNING AND DESIGNING
MICRO-CREDENTIALS

MICROCREDENTIALS

Co-funded by
the European Union

ProctoGo

Yerun
Young European Research Universities

About ProcToGo

ProcToGo is a KA2 Strategic Partnership co-funded by the Erasmus+ programme of the European Union that explored innovative approaches for connecting higher education institutions and the labour market, with a specific focus on the area of Digital & Sustainable Procurement.
By integrating traditional academic learning paths with non-traditional approaches based on competency learning and, in particular, by adopting a micro-credential approach, the project designed online materials and organised blended programmes as well as structured the approach described in these guidelines. in particular, the project partners developed an e-learning course in the area of Digital and Sustainable Procurement consisting of four modules on the key core concepts of ProcToGo project (Digital Transformation and Artificial Intelligence; Sustainability & Sustainable Management; Value Creating Procurement; and Supply Chain Management) plus two cases (Designing a Sustainable Public Procurement Tender; and Procuring Smart Logistics Services in a Sustainable Way). These online contents are accessible on the project website: https://proctogo.it/intellectual-outputs/

ProcToGo Members

Led by Tor Vergata University of Rome, the ProcToGo project involved a transnational partnership with University of Antwerp, University of Bremen, Universidad Carlos III de Madrid and Universidade Nova de Lisboa. Associate partners were: Dublin City University (DCU), the Council of Supply Chain Management Professionals (CSCMP), the Italian Alliance for Sustainable Development (ASviS) and the Young European Research Universities Network (YERUN).

About YERUN

The Young European Research Universities Network (YERUN) founded in 2015 and based in Brussels, brings together excellent and value-driven young research universities. The network's objective is to strategically represent its members in the decision-making process at EU level, thus shaping their future and promoting their role in European societies. Further to its policy advocacy activity, the network also strengthens cooperation opportunities among its members in areas of mutual interest and raises their visibility via a dedicated communication strategy.

YERUN Members

Brunel University London, Nicolaus Copernicus University in Toruń, Nova University Lisbon, Maastricht University, Tallinn University, Tor Vergata University of Rome, UiT - The Arctic University of Norway, Ulm University, Universidad Carlos III de Madrid, University of Antwerp, University of Bremen, University of Cyprus, University of Essex, University of Eastern Finland, University of Klagenfurt, University of Konstanz, University of Limerick, University of South-Eastern Norway, University of Southern Denmark, University Paris Dauphine-PSL, University of Potsdam, University of Rijeka, University of Stirling.

Table of content

Introduction

Context

In recent years, new forms of recognition of qualifications have challenged the traditional concept of higher education institutions which are commonly bound to credit-bearing curricula. The labour market requires from actual or potential employees a frequent reskilling and upskilling due to an exponential technological change, frequent changes of job, a continuous transformation of industries and a longer working life. Therefore, short courses are essential to achieve key competences and skills.

In this context, micro-credentials have emerged as a powerful tool to facilitate more accessible and flexible lifelong learning opportunities, enabling individuals to acquire targeted competencies quickly to face the rapidly evolving landscape of education and employment.

Present students, former graduates, individuals aspiring to enhance their professional prospects or boost their income, those requiring skill enhancement or considering a career shift, those aiming to re-enter the workforce, and even those searching for enjoyable, stimulating learning experiences can earn a micro-credential tailored to their requirements.

Furthermore, micro-credentials can better respond to the need for more transparency on the educational experience to facilitate recognition, transferability and portability of learning outcomes at different levels.

Synergies between ProcToGo project and YERUN Working Group on Lifelong Learning

ProcToGo (Procurement: Digital Tools for Sustainable Goals) is an Erasmus+ Strategic Partnership project that aims to foster specific competencies and profiles required by the labour market in the area of digital and sustainable procurement by adopting a micro-credential approach.

YERUN (Young European Research Universities Network) has been exploring the role and potential of micro-credentials in the context of its Lifelong Learning Working Group (LLL WG), collecting experiences and exchanging views and approaches to micro-credentials at national levels.

All five ProcToGo full partners are part of YERUN, and the discussions of the two groups naturally merged so as to obtain a deeper analysis and stronger impact.

These guidelines have been created, bringing together the experiences and challenges collected by implementing the ProcToGo blended courses and by the YERUN working group on Lifelong Learning. ProcToGo partners wrote down these guidelines after discussing and reviewing them within the YERUN LLL WG.

Discover more about ProcToGo project:
https://proctogo.it

Discover more about YERUN:
https://yerun.eu

Purpose of the guidelines

These guidelines aim to provide higher education institutions and educators with practical support for developing and delivering micro-credentials.

Its purpose is to:

- facilitate a common understanding of basic principles and concepts related to micro-credentials;

- highlight the most relevant features for the effective planning and design of micro-credential courses;

- identify the challenges educators must grapple with when dealing with micro-credentials and propose solutions that have proven their effectiveness in the context of the ProcToGo project or in the experience of the YERUN partners.

DEVELOPING & DELIVERING MICRO-CREDENTIALS

common understanding

effective planning & design

challenges & solutions
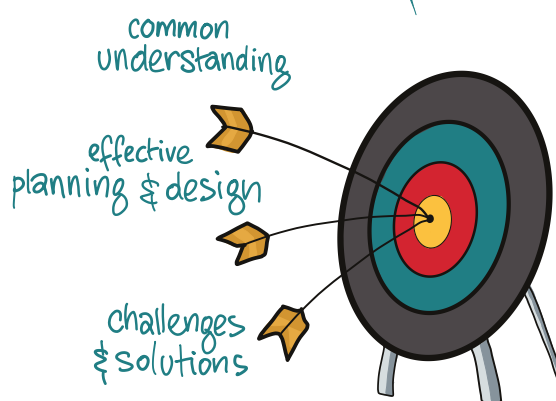
Structure of the guidelines

These guidelines are structured in four main sections:

01 Chapter 1 provides an overview on the concept of micro-credentials and its innovative characteristics, with a focus on the role of digital technologies.
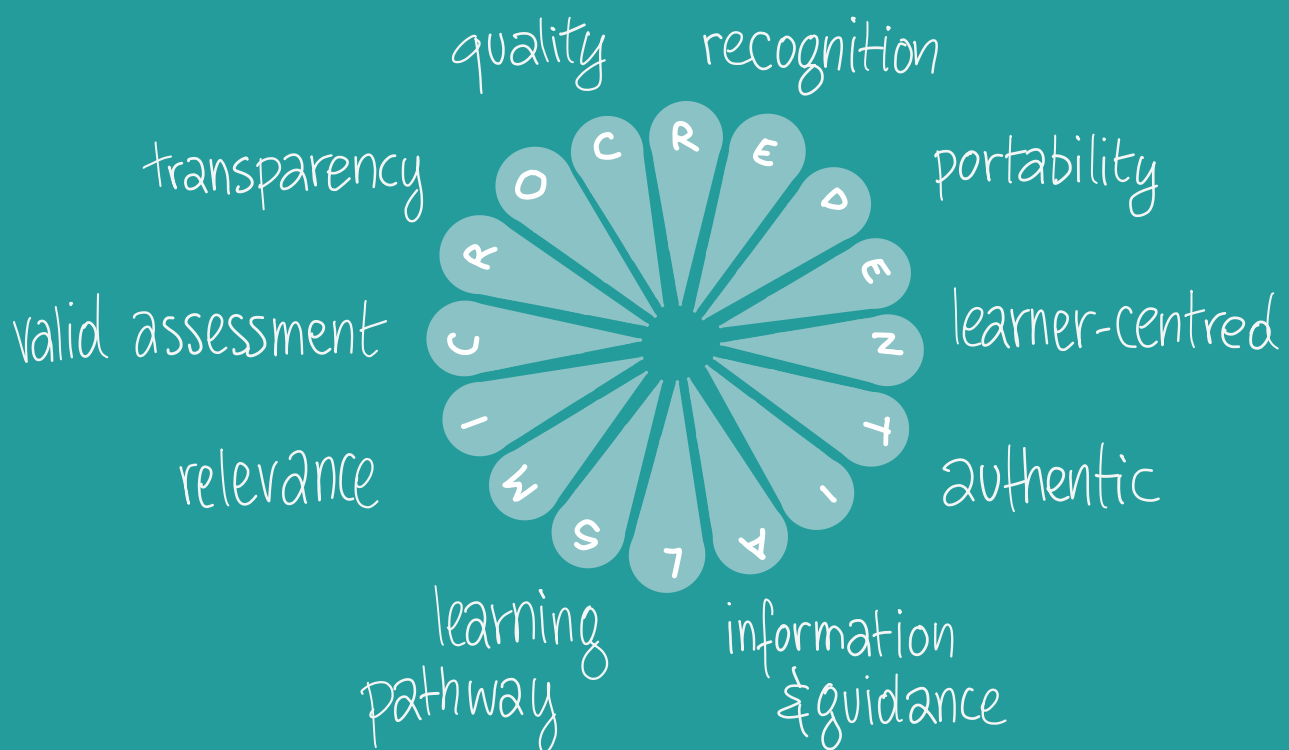
02 Chapter 2 focuses on the planning of the micro-credential initiative. It analyses the strategic evaluations, the key organisational procedures and the IT infrastructure that HEI should put in place in order to effectively launch the micro-credential initiative. This section includes a snapshot on how they are framed in different national and regional contexts, from the experiences of the ProcToGo project and the YERUN Lifelong Learning Working Group.

03 Chapter 3 looks at the design of a micro-credential course. The key pedagogical and managerial decisions course planners/instructors should take when launching micro-credential courses. This section includes a snapshot on how they are designed in very rapidly changing areas such as digital transformation and sustainability, from the core topics of the ProcToGo project.

04 Chapter 4 describes ProcToGo proposal for a micro-credential framework as to digital skills in procurement, taking into account other reference frameworks in the area of procurement and a possible three level structured training path. It includes a description of the actual ProcToGo experience with micro-credentials and digital badges.

CHAPTER 1

Overview of micro-credentials

quality   recognition

transparency   portability

valid assessment   learner-centred

relevance   authentic

learning
pathway   information
&guidance

Definition of micro-credentials

These guidelines adopt the definition indicated on 16 June 2022 by the Council of the European Union:

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

The most relevant characteristics of micro-credentials are:

- Limited length of learning activities. They are short, even if there is no min-max duration internationally agreed.

- Labour market relevance. They focus on specific knowledge, skills and competencies relevant to the labour market and are able to generate broader societal impact.

- Portability and stackability. They are part of a portfolio of learning opportunities supporting upskilling and reskilling.

10 KEY PRINCIPLES IN DESIGNING AND ISSUING MICRO-CREDENTIALS

The European Recommendation Document on micro-credentials defines 10 key principles:

1. **Quality**: micro-credentials are subject to internal and external quality assurance processes that must be fit-for-purpose, clearly documented, accessible, and meet the needs of learners and stakeholders.

2. **Transparency:** micro-credentials are measurable, comparable and understandable with clear information on learning outcomes, workload, content and level, as relevant.

3. **Relevance**: micro-credentials should be designed as distinct, targeted learning achievements, and learning opportunities leading to them are updated as necessary, to meet identified learning needs.

4. **Valid assessment:** micro-credential learning outcomes are assessed against transparent standards.

5. **Learning Pathway:** micro-credentials are designed to support flexible learning pathways, including the possibility to stack, validate, and recognise micro-credentials from across different systems.

6. **Recognition:** micro-credentials are recognised for academic or employment purposes based on standard recognition procedures, when dealing with micro-credentials issued by formal education providers.

7. **Portability**: micro-credentials are owned by the credential-holder (the learner) and may be stored and shared easily by the holder, including through secure digital wallets (e.g Europass), in line with GDPR.

8. **Learner-centred**: micro-credentials are designed to meet the needs of the target group of learners.

9. **Authentic**: micro-credentials contain sufficient information to check the identity of the credential-holder (learner), the legal identity of the issuer, and the date and location of issuance of the micro-credential.

10. **Information and guidance**: Information and advice on micro-credentials should be incorporated in lifelong learning guidance services and should reach the broadest possible learner groups in an inclusive way.

Source:https://education.ec.europa.eu/sites/default/files/2022-01/micro-credentials%20brochure%20updated.pdf

The role of digital technologies

Micro-credentials can be easily shared and are portable because they are normally offered in a digital format. They represent a **deeper level of digitalisation** beyond a mere release of documents that are just signed electronically and provide a comprehensive account of learning outcomes and skills that have been achieved. These digital features support transparency and authenticity and can enhance employability making job searches and offers matching easier and more effective.

In order to effectively support the authenticity and the sharing of records, digital credentials must be based on interoperable standard data models, ensuring an effective better verifiability.

In the European Commission model, micro-credentials tend to be digital because they are based on portability and authenticity: two technological aspects that accompany the other eight academic aspects in the 10 key principles of the EU Recommendations, as shown here below.

Micro-credentials should not be confused with **digital badges.** Although both terms are often used interchangeably, badges signal advances in the learning process (quizzes passed, skills obtained, etc.), whereas credentials recognise the achievement of learning outcomes. In virtual learning environments, badges can be used in the formative process for fostering motivation and encouraging learners' self-regulation during the learning process and they may be based on gamification.

Credentials, on the other hand, act as authoritative signalling for summative assessment as a product of the learning process; they are released as a type of external documentation and may imply some legal value.

MINIMUM REQUESTED INFORMATION

The European Recommendation Document on micro-credentials identifies the following minimum information micro-credentials should have:

- ☑ Identification of the learner
- ☑ Title
- ☑ Country/Region of the issuer
- ☑ Awarding Body
- ☑ Date of issuing
- ☑ Learning outcomes
- ☑ Required workload (in ECTS if possible)
- ☑ Level and cycle of the learning experience leading to the micro-credential (EQF, QF-EHEA)
- ☑ Type of assessment
- ☑ Form of participation in the learning activity
- ☑ Type of quality assurance adopted

Source: education.ec.europa.eu/sites/default/files/2022-01/micro-credentials%20brochure%20updated.pdf
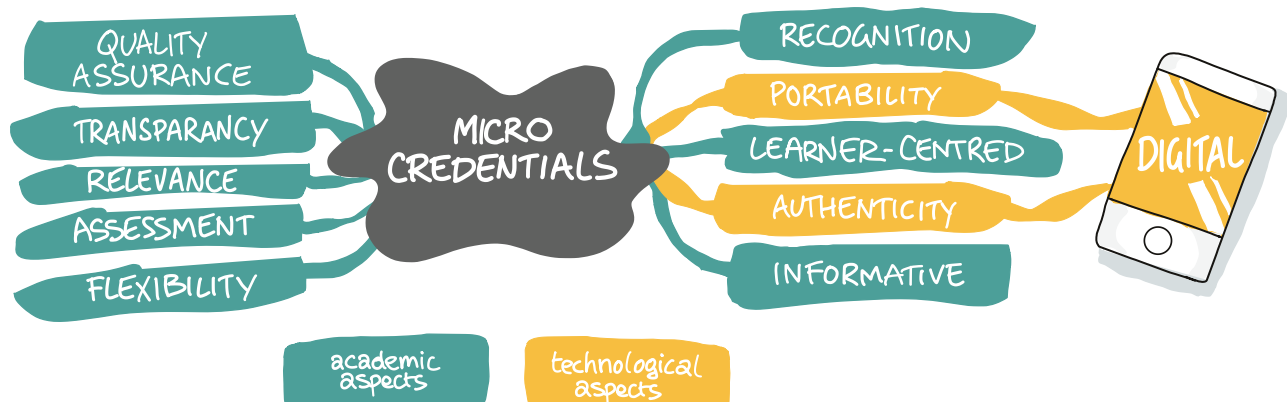
Innovative elements in micro-credentials

The adoption of micro-credentials can foster innovation in higher education institutions in terms of:

Diversifying the learning offerings by planning to design smaller units of learning in addition to traditional full degree programmes and, as a result, extending the scope of the HEI learning offer beyond what it can usually provide.

Widening the learning opportunities by providing access to education to a broader range of profiles, including disadvantaged and vulnerable groups (i.e. people with disabilities, minorities, people with a migrant background, refugees, etc.) and, as a result, reaching the key goal of the 'social dimension agenda' within the Bologna Process. The impact on inclusiveness is mainly reached through:

- flexible learning experiences, designed to be modular, achievable alongside work and other commitments;
- a shorter length of courses;
- more affordability in comparison with full degrees.

Targeting curricula contents by focusing on new and specific skills that respond to the rapidly changing labour market demand and, as a result, filling the gap between formal education and the needs of a fast-changing society.

Innovating teaching methodologies by testing new learning technologies or transforming learning practices and, as a result, improving the competencies of the teaching staff in designing courses with clear learning outcomes, appropriate teaching methods and engaging content.

Supporting transparency and recognition of skills and qualifications by improving, as a result of digital technology, the understanding and interpretation of competencies. In addition, fostering the transferability and portability of learning outcomes at different levels and, as a result, promoting the mobility of learners and workers in the European Higher Education Area.

Innovating relationships with local/professional communities by engaging relevant stakeholders in developing micro-credentials and, as a result, matching the HEI's own specialisation and research excellence with the most pressing reskilling and upskilling needs of the local labour market.

CHAPTER 2

Planning the micro-credential initiative

1. Incorporate the initiative within the overall HEI strategy

2. Assess the potential impact of the initiative

3. Create a supportive and accessible learning environment

4. Build an effective management approach to support the initiative

5. Ensure recognition and quality

1. Incorporate the initiative within the overall HEI strategy

HEIs should develop micro-credentials framing them within their overall vision, mission and strategy. To ensure alignment with the overall academic objectives, it is recommended that the HEI sets out guiding principles and procedures for the development, approval, delivery and recognition of micro-credentials.

Positioning micro-credentials within the HEI offering structure contributes to defining the university approach towards micro-credentials: building on its existing teaching offer (recombining some of the contents of the existing courses into new short modules) and/or building completely new offerings (also in partnerships with other HEIs, labour market representatives or learning platform providers).

Developing a common understanding of the purpose and value of micro-credentials is essential as integrating micro-credentials into higher education requires rethinking, adaptation, and changes that may be regarded with scepticism. Micro-credentials can be perceived as a useless increase in workload, considering that universities have significantly invested in traditional degree programmes. A common understanding can contribute to creating consensus around this initiative and its potential importance as part of the future strategy of HEIs, overcoming cultural obstacles that harm the possibility of scaling up the use of micro-credentials.

This strategic thinking should qualify micro-credentials as an institution-wide initiative, deserving of appropriate funds, dedicated staff, and specific procedures.

TIPS

A good practice for incorporating micro-credentials within the HEI overall strategy is to hold **preliminary collegial discussions** inside the governing boards (including key representatives from departments/units), focusing on the following questions:

- Academic Offering: Do the current degree programmes satisfy the demand for specific skills coming from the labour market? Can we identify learning pathways for people seeking to reskill or upskill? Can we identify potential short programmes to meet new, distinct learning outcomes?

- Target groups: can we extend our discipline(s) to a wider typology of learners? Can we meet their needs and interests?

The same discussions may be then extended to every department/unit in a cascade process, reassuring the staff that micro-credentials are not a replacement for the traditional university degree; instead, they might widen the HEI/department mission and strategy, fostering its effectiveness in fulfilling some skill gaps for specific target groups.

2. Assess the potential impact of the initiative

HEIs should assess the potential of the micro-credential initiative by looking at the strengths and weaknesses of their current academic offering, as well as the opportunities and threats in the skills requirements demanded by their reference labour market. HEIs should develop a complete SWOT analysis and improve their responsiveness to the rapid changes driven by the digital transformation, the growing sustainability concerns and more in general the rapid changes in society.

Mapping of the current academic offering of the higher education institution, with a specific focus on its long-life learning courses, is an effective starting point as it highlights the specific skills and competencies the HEI has developed a strong expertise in and avoids overlooking the existing potential that the institution can offer. At the same time, any relevant area of weaknesses should trigger the evaluation of whether HEI should invest in a given field.

Carrying out an in-depth labour-market analysis on the required skills is crucial as micro-credential skills training is often industry-specific and, to be effective, the training must be in line with current and future labour-market needs. The analysis must consider a variety of evidence and qualitative/quantitative data. Through labour market forecasting or projections, the analysis should also attempt to understand future needs and the knowledge and skills that will be needed to address them.

This assessment should take into account the potential social impact of micro-credentials given the opportunities they are offering for a renewed learning policy, supporting inclusion, and facilitating access to education.

TIPS

Given the variety and the rapid changes of the skills required in new emerging areas such as the digital and the green transition, **cooperating with industry stakeholders,** in particular establishing advisory boards with industry experts, is key to achieve and maintain the relevance of the micro-credentials for the labour market.

Given the high number of potential learners who should have access to reskilling and upskilling opportunities, HEIs should consider establishing agreements with other HEIs and with professional/industry associations in order to develop joint micro-credential courses and foster the recognition and the portability of the micro-credentials offered. These agreements might have a regional reference so to deal with local labour market specificities but, considering that many micro-credential courses will be delivered online, might be addressed at a national (potentially also cross-European) level.

3. Create a supportive and accessible learning environment

While micro-credentials might be useful to existing degree students in order to make more visible the skills they are achieving along their programmes, the nature of micro-credentials as standalone certifications and their focus on lifelong learning, push HEIs to extend the reach of their teaching activities and engage with new categories of learners interested to fill knowledge gaps, upskill or reskill.

These new learners might be recent graduates or mid-career employees and they might have already had some engagement with higher education or no previous experience with higher education at all. Unlike the students enrolled in full degrees, for many of these learners, learning and work-related activities are no longer separate. They have more than one competing priority and are unlikely to see themselves primarily as students. All these elements affect the way these learners engage both with the course itself and the higher education institution in general.

Therefore the planning of the initiative should take into account effective and structured actions to support learners in their micro-credential "journey."

As to the **mentoring activities**, the HEI needs to consider that these learners

- engage with a shorter time commitment
- might have very little or no physical presence on campus.

This means that a review of the existing mentoring procedures is needed to ensure that the support is appropriate and accessible.

As to the **operational support**, the HEI needs to consider that these learners

- ask for simple administrative procedures
- might care about rapidly achieving the key required skills as well as getting a formal evidence of completion and recognition.

This means that the student management systems must be adapted to integrate this new learner status and clear information must be provided to learners with regard to their access to services and facilities within the university.

TIPS

In their overall redesign of the supporting activities, HEIs should look at the emerging **customised and automated services** offered by IT tools as the use of the technology can help reduce the distance between learners, teachers and the institution and increase accessibility. Therefore, new communication tools should be tested, such as AI-driven chatbot for answering common questions, reminding tasks/ deadlines or scheduling meetings, considering that traditional supporting services can be very time-consuming and costly when they deal with students with different backgrounds and learning goals who are engaging only for a short period with the university.

HEIs might also experiment with advanced learning analytics tools that could assist tutors in providing timely and personalised feedback to students based on their performance in the overall course or in a specific assignment.

4. Build an effective management approach to support the initiative

The effective management of a micro-credential initiative requires:

- setting clear **roles and responsibilities**, with a coordinator, a steering committee and a dedicated staff, in line with the level of centralisation/decentralisation characterising the university;
- allocating enough **financial and human resources** so to allow the launch of the initiative, especially as to the update of the IT infrastructure and the training of instructors on innovative pedagogical approaches (should this be required);
- ensuring accessible, user-friendly catalogue service for providing information on the offer of micro-credentials relevant to potential learners as well as to recruiters/companies;
- strengthening (if necessary) the **e-learning environment** as many micro-credential courses will be delivered - partially or in full - online;
- setting up an analytic dashboard able to monitor the overall performance of the micro-credential courses as well as the progress of the individual student;
- upgrading (if necessary) the **student management system** to simplify the enrollment procedures and to support a seamless issue of course certificates (including the possibility of digital badges);
- Keeping a **record** of all the micro-credentials issued.

TIPS

The management of the micro-credential initiative is very much influenced by the available IT infrastructure, its effectiveness and flexibility. This might be quite challenging as a student management system designed for "regular" students might not be fully suitable for lifelong learners.

It is important to upgrade the I**T infrastructure** to facilitate the management of short courses. This might include a user-friendly administrative platform with many self-service functions (including the payment of course fees when applicable), an advanced learning analytics application (enriched with indicators on engagements levels/time in case of digital courses) and an efficient software for issuing the badges/certificates (normally directly usable in a digital format).

The IT infrastructure (and the organisational procedures) might be upgraded to enable online asynchronous micro-credential courses to be delivered **on demand**, allowing learners to start the course at any time and complete it at their own pace with their own schedule, while maintaining the required level of course quality.

5. Ensure recognition and quality

Assuring quality standards is crucial to establishing trust and recognising the value of the short learning courses leading to micro-credentials. It is not by chance that the EU Council Recommendation identifies quality as the first principle for the design and issuance of micro-credentials, taking into account both external and internal quality mechanisms.

In line with the European recommendations, HEIs can overcome many concerns regarding the recognition, portability and quality of these new forms of credentials:

- by referring to the legal instruments, procedures and transparency tools set by the **Lisbon Recognition Convention** and the **Bologna process** – in particular the European Qualifications Framework (EQF), classifying micro-credentials according to the framework levels, namely at level 6 (bachelor), level 7 (master), and, when applicable, level 8 (third cycle).
- by integrating the evaluation of micro-credentials within the **existing quality assurance systems**, just reconsidering some aspects of the quality management approach to make them more appropriate and proportionate to short learning courses.

Moreover, given the rapid changes in many skills and competencies, HEIs should make sure that micro-credentials are regularly monitored and reviewed, in order to verify whether the intended learning outcomes, the course assessments and the course content are aligned with the needs of the labour market.

TIPS

Quality is important to ensure that micro-credentials can acquire value in the labour market and be recognised for future learning pathways. Quality should be given particular attention when micro-credential courses are developed together with non-HEI partners.

HEIs should provide a clear and accurate description of the content, and even more of the learning outcomes, to facilitate the **transparency** and **portability** of micro-credentials. These learning outcomes should also be verified by an assessment mechanism aligned to a formal qualification level and described in the credential. To quantify the workload needed to achieve the micro-credential learning outcomes, the European Credit Transfer and Accumulation System (ECTS) should be used. The expression in ECTS represents a recognisable system – in line with the Bologna Process – which contributes to clearly reflecting their smaller volume compared to a full degree.

Planning micro-credentials
in different national frameworks

While the EU recommendations on micro-credentials should represent common principles incorporated into each national framework, the different national/regional contexts still ask for specific requirements, set specific boundaries (e.g., the duration of the micro-credential courses) and offer specific opportunities (e.g., the availability of public funding).

Based on the ProcToGo experience and with reference to the situation in 2023, here below are reported two very different national/regional frameworks for micro-credentials: more informal and unstructured in Flanders and more formal and structured in Spain.

The regulatory context

In Flanders, the Ministry of Education and Training is finalising an agreement on micro-credentials with all the 21 Flemish HEIs describing the framework for all those HEIs that want to include micro-credentials in their offerings. This agreement is based on the framework for micro-credentials developed two years earlier by Nova Academy, the alliance for lifelong learning (LLL) of the universities of Antwerp, Ghent and Brussels. This agreement defines a common view on the position of micro-credentials in the educational offering of HEIs as well as the key characteristics of micro-credentials. There is consensus that no extra legislation should be needed.

In Spain, the National Agency for Quality Assessment and Accreditation (ANECA) provided a conceptual framework on micro-credentials, linking them to legal statements approved in 2021 where "universities may offer their own courses of less than 15 ECTS that may or may not require a previous university degree, in the form of micro-credentials or micromodules, which make it possible to certify learning results linked to short-term training activities." This framework discusses the key elements of the quality assurance system micro-credentials rely upon.

The workload

In Flanders, the workload of a micro-credential could be between 1 and 60 credits based on an agreement framework.

In Spain, the maximum workload of a micro-credential is 15 ECTS, as stated legally by a Royal Decree.

The certification

In Flanders, the certification of micro-credentials is not regulated: each HEI issues its own certificate, which does not necessarily have to be recognised by another institution. Moreover, while all HEIs programs, courses and modules are registered in a central Higher Education Database (DHO) and the credits are stored in the Learnings and Experiences Database (LED), the registration of micro-credentials and their credits in these databases is not yet possible.

In Spain, the certification is based on CertiDigital (https://certidigital.es/?lang=en). CertiDigital is building a digital certification service based on a technical infrastructure that will be available to the whole Spanish University system. With the European Learning Model (ELM) as a reference, the digital credentials will be aligned with EDC (European Digital Credentials for learning) and EBSI (European Blockchain Services Infrastructure). Funded by the Ministry of Universities under the UniDigital programme, CertiDigital is an initiative coordinated by 6 universities, led by Universidad Carlos III de Madrid (UC3M), and involving 17 other partner institutions.

More detailed information on the national frameworks of the countries/regions where the ProcToGo partners are located can be found inside the right section on Intellectual Output 2 .
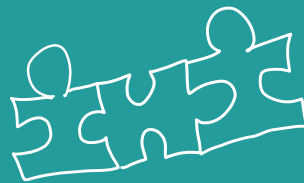
CHAPTER 3

Designing a micro-credential course

6. Base the course design on the target learning outcomes

7. Develop an effective assessment strategy

8. Design a student-centred course

9. Target stackability through modularity and transparency

10. Design the course for viability and success

student centred

modular

assessment strategy

target learning outcomes

success

6. Base the course design on the target learning outcomes

The course planner/instructor should base the course design on the targeted learning outcomes defined in terms of the competencies and the skills the learner should be able to achieve at the end of the course. The whole learning journey should aim towards these goals.

Learning objectives help maintain **student-centricity**, focusing on what the students will be able to do upon successful completion of the course rather than what the teacher will cover or do in the course.

Well-defined learning objectives are important also for the learners, as they give a clear understanding of where they are heading and a clear picture of what is expected to be successful in the course.

The course planner/instructor should identify the learning outcomes by analysing, with respect to their area of knowledge, which are relevant mismatches between skills sought and available in the labour market. The new challenges brought by the digital transformation (including the emergence of AI) and the ecological transition can be an effective reference in identifying the skill gaps.

The process of identifying relevant learning outcomes is more effective if carried out in **collaboration with industries and professional associations** which can provide guidance and support effective decisions about the knowledge, skills, and abilities that are highly relevant to the labour market. The cooperation between industry and university is also very attractive for students as it contributes to giving a greater value for micro-credentials, as a signal of the relevance of the initiative.

TIPS

A **backward-design methodology** can support selecting teaching and learning approaches aligned with the intended learning outcomes. According to such an approach, the identification of the content to be covered in the course comes as the final step of a design process that starts with a clear definition of the learning outcomes and of the characteristics the final assessment has to have in order to test the achievement of those outcomes. A series of in-progress assessments is then defined to identify the learning that should be achieved along the course. The selection of the topics and their distribution along the classes, that normally drives the course planning, arrive at the end.

Such a backward approach is particularly appropriate in designing micro-credentials as they have a limited span and therefore all teaching activities need to be strongly focused on the targeted outcomes as well as no important content should be left aside.

7. Develop an effective assessment strategy

Once the learning outcomes are clear, the course planner/instructor should identify the most appropriate assessment strategy, considering that the assessments represent an important reference for selecting the relevant materials to be included in the course as well as for proving to the learners and the labour market the effectiveness of the learning process and its alignment with the targeted learning outcomes.

The assessments can be very different on the basis of the thematic area, the target competency level and the course delivery method, ranging from abstract to applied, from qualitative to quantitative. In any case, the course planner/instructor should consider:

- the insertion of **frequent formative assessments.** They represent a valid opportunity for providing learners with feedback to support better and prepare them for their summative assessment. Measuring learners' progress toward the targeted learning goals - also through a self-assessment - offers relevant information to both the instructor and the learners on the learning pathway: instructors can better provide guidance and possible adjustments to reach the learning goals; learners are more stimulated in self-reflection and personal engagement in the learning process;

- the design of a **final summative assessment** in line with the professional orientation of micro-credentials. The final summative assessment should be designed to provide full evidence of the competencies learners have acquired with respect to the course level and duration. Also the weight of the different elements of the summative evaluation should be defined so as to reflect the competency-based nature of the course.

TIPS

A key element in assessing micro-credential is to ensure that learners can demonstrate the acquired targeted skills and are able to apply them to particular or specific workplace and/or social contexts. To be meaningful and relevant to learners and employers, the assessment must be "authentic", meaning that it must measure the learner's performance in the context where the learner will be expected to use the specific skills being assessed. **Authentic assessments** can be projects, case studies, video presentation, simulations, portfolios, or other performance-based tasks and can be related to internships or any other direct practical experience. Attention must be paid in the selection of the assessment format that must be balanced and appropriate with respect to the learning outcomes, the mode of delivery and the expected workload. Adopting a variety of assessment options can support learners' diversity.

8. Design a student-centred course

At the core of micro-credentials are the learners, not only the traditional HEIs learners but also individuals with different profiles, different reasons for approaching the course and with different constraints from other relevant activities (job, caring for family members, etc.).

In order to be effective, micro-credential courses should fully embrace the concept of student-centred learning and take into account the learners' needs with a variety of options and tools. At the same time, HEI quality standards have to be guaranteed.

Along these lines, in the design phase, the course planner/instructor should take into account that:

- micro-credentials can be delivered through a **variety of modes** (online asynchronous or synchronous; on-campus; blended). The choice of the delivery mode has a major impact on the level of flexibility provided to learners as to pace, time and place. If the online mode is chosen, especially if asynchronous, however, learners more frequently tend to lose their way and their motivation and therefore appropriate interactions and a dedicated mentoring should be considered;

- micro-credentials can be based on a **variety of teaching/pedagogical approaches** (lectures, workshops, seminars, class discussion, workgroups, flipped classrooms, project-based learning, game-based learning, etc.). The choice of the type of teaching and learning activities must be appropriate for the learning styles of the intended audience and consistent with the learning objectives. If technology is integrated, it is important to identify the specific objectives that digital tools will help to reach and to plan carefully how to integrate technology inside the learning journey.

Although the concept of student-centred learning is not new, there is still a need for more guidance and understanding about its application and practice among educators. Micro-credentials contribute to taking this concept to the next level by removing the design constraint of more conventional teaching models and opening up to multiple new learning modalities and tools. However, to be successful in the student-centred model, the course planner/instructor might have to acquire new expertise for designing and teaching student-led courses.

TIPS

Given that micro-credential courses are attended by students with different backgrounds and different prior knowledge of the course contents, a good practice is to allow **different learning paths**. This can be achieved, for instance, by having an initial asynchronous section matched with a highly interactive synchronous section. According to such an approach, students can prepare in advance the asynchronous section at their own pace, concentrating more on the subjects that are new to them while skipping or just briefly going through the subjects they are already familiar with. This will allow all students, regardless of their background, to arrive at the synchronous section (either on campus or online) prepared enough to actively participate in the class interactions.

Whenever feasible, the course planner/instructor might also consider using the asynchronous section to enable **adaptive learning paths**, tailored to the students' individual progress and performance, offering a wide and guided selection of online materials, to provide learners with a personalised journey that aligns with their own previous knowledge and their interests.

9. Target stackability through modularity and transparency

In case of micro-credentials selected from a **coherent grouping of courses** within an institution or within a consortium, stackability is not an issue. In a similar manner to a predefined series of "traditional" courses leading to a degree, learners can easily achieve a more comprehensive competence and a broader certification. In this scenario, the course planner/instructor can ensure stackability toward higher-level certification (including a degree) by designing the overall volume and depth of the acquired learning, balancing fundamental concepts and theories with a strong focus on industry competencies.

In case of micro-credentials obtained **outside any predefined path** by the learners following their interests or needs, even more if acquired at different institutions or from private-sector providers, stackability can be an issue, and learners might find it difficult to get such micro-credentials recognised for a broader certification. In this scenario, the course planner/instructor can only make sure that the content of and the learning from a given micro-credential are transparent and clear, so as to facilitate its possible recognition in a future path, even by a different institution.

In any case, the digital infrastructure plays a very relevant role as it supports the sharing of rich and authentic information on the course contents and characteristics as well as on the learner identity, fostering micro-credential portability.
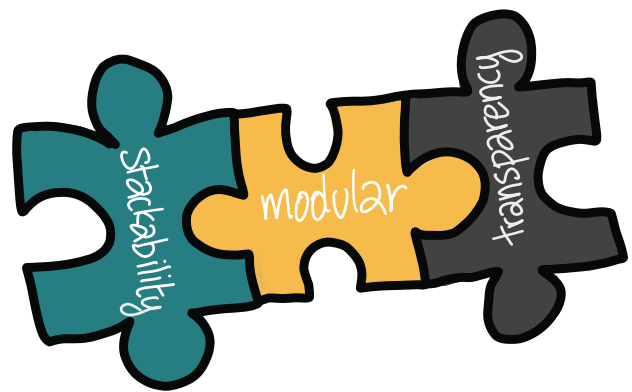
TIPS

HEIs should support the creation of **lifelong learning records** that allow learners to accumulate a diverse range of micro-credentials over time and build a comprehensive profile of their skills and achievements. The adoption of open standards for micro-credentials can ensure that such a portfolio of different micro-credentials can be easily recognised and verified by various parties, including employers and other educational institutions.

Transparency as to the learning outcomes, the activity content and the assessment criteria are the key pillars for stackability and portability.

The alignment with professional standards in relevant industries, as well as the agreements with educational institutions and industry partners can enhance the actual portability of micro-credentials in the workplace and their appreciation by the employers, contributing to their recognition as credits or qualifications.

10. Design the course for viability and success

The lack of institutional funding that normally characterises micro-credentials poses significant management challenges related to the viability of any new course and to its growth into a successful programme.

Along these lines, in parallel to the concerns on the course quality, the course planner/instructor should make sure that:

- the course achieves **financial equilibrium**, balancing the costs associated with developing and delivering the micro-credential with the expected revenues from enrollment fees and other contributions.

- the intended learning outcomes and the course content are **aligned with the state of the art on the topic** and the skills and competencies developed in the course are attractive for potential learners as well as for the labour market. If relevant, the course planner/instructor should make sure they comply with professional/industry standards and best practices.

- the **pricing strategy** is competitive, considering the course positioning and the pricing of competing courses offered by other academic institutions and, when relevant, by non-academic players. Opportunities for getting sponsorships and funding from private and public organisations should be considered.

- potentially interested learners and sponsors/recruiters are well **aware of the course**. The goal is to create a positive reinforcing loop where learners are attracted by the recruitment opportunities, and recruiters are attracted by the possibility to get in touch with strong candidates.

- procedures for **regular monitoring and reviewing** are in place. The aim is to ensure the micro-credentials keep their effectiveness and relevance in a rapidly changing labour market.

TIPS

Given the fast changes that often affect the skills and competencies that micro-credentials target, HEIs should promote an **agile management approach** based on frequent (although simplified) monitoring and reviewing cycles and establish a system for continuous improvement based on external and internal feedback. Similarly to what happens in the next generation of software development where applications need to be continuously improved and short-term management cycles, called sprints, are being adopted, any edition of a micro-credential course can be designed as a sprint. The course planner/instructor should approach every edition as an opportunity to finetune the course, from the initial interactions with the key stakeholders before the start of the course to the final feedback from the learners and the placement impact achieved. In line with an agile approach, before any edition, the course planner/instructor should define a priority list of targeted improvements and, at the end, should retrospectively revise the achieved results.

Designing micro-credential courses in different thematic areas

The design of micro-credentials in different thematic areas has its specificities but also many communalities, especially when the content areas share similar features, e.g. refer to rapidly evolving topics or are in high demand.

Based on the experience of the ProcToGo project, here below are reported a few relevant design decisions in the two thematic areas of digital transformation and sustainability. The relevance of these two topics for micro-credentials is confirmed by the decision of the European Commission to select them as reference areas for micro-credentials policy framework initiatives in 2024.

Design micro-credentials according to a learning path: make learners aware of the key challenges; present basic theories; train them on specialised approaches/tools. In all these steps practical projects can be introduced.

For digital transformation: basic literacy (including AI literacy) is expected to become important for everyone and digital skills have become a requirement in many jobs.

For sustainability: micro-credentials training can effectively contribute to UN Sustainable Development Goal 4 "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all".

Deal with the interdisciplinary nature of the topic: engage faculty from different departments and practitioners from different industries; develop interdisciplinary projects that draw on diverse expertise.

For digital transformation: micro-credentials can support launching interdisciplinary collaborations (e.g. computer science and management, or computer science and philosophy).

For sustainability: micro-credentials can support launching interdisciplinary collaborations by connecting the "triangle of sustainability": ecology, economy and social/society (e.g. environmental engineering and law, or natural sciences and management).

Monitor micro-credentials contents in a rapidly evolving area: collect regular feedback from stakeholders and students; include industry professionals and subject experts in the curriculum review committee; monitor the evolution of professional certifications (when relevant).

For digital transformation: the publications on digital skills gap by international bodies and the reports by leading consulting companies can be an effective reference point.

For sustainability: the UN publications on Sustainable Development Goals, other publications by international bodies and the reports by leading consulting companies can be an effective reference point.
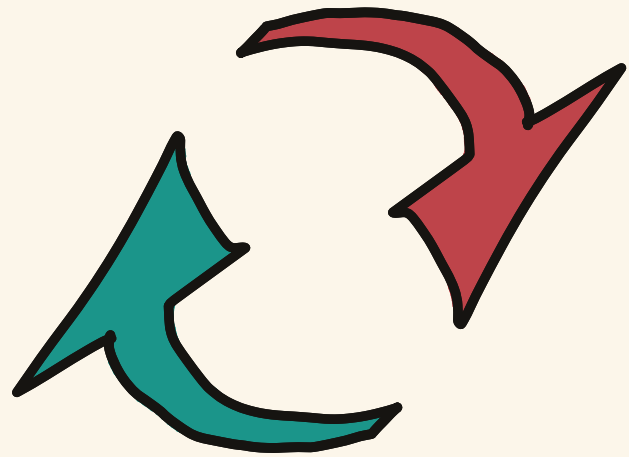
(Re)Use micro-credentials within different programmes: develop standard content formats on the key topics; combine (and recombine) the contents in different modules, eventually considering also micro-degrees or specialisation paths; use these modules as standalone or as integrated in different programmes (including bachelor and master degrees).

For digital transformation: a micro-credential on digital transformation can be included in a master programme on procurement in modules like the redesign of the procurement process or the digital supply chain.

For sustainability: a micro-credential on sustainability can be included in a master programme on procurement in modules like the green public procurement or the sustainable supply chain.

ProcToGo project partners have developed two micro-credentials on these areas, with a focus on procurement. The training contents developed in the project can be accessed from the ProcToGo website, registering and entering the e-learning platform. More detailed information on the approaches to micro-credentials in the key thematic areas of the ProcToGo project can be found in the ProcToGo webpage inside the right section on Intellectual Output 2.

CHAPTER 4

ProcToGo proposal for a micro-credential framework as to digital skills in procurement

- Digital skills in the area of procurement

- Structure of a micro-credential framework for digital skills in procurement

- ProcToGo experience with micro-credentials in the area of procurement

Digital skills in the area of procurement

Digital skills play a crucial role in the area of procurement, transforming traditional procurement practices and contributing to more efficient and effective procurement processes. More and more, the procurement function is framed within digital supply networks and the job of the buyers and the managerial coordination of their activities rely upon digital tools, in particular digital platforms.

All the major professional associations are stressing the importance of digital skills in this area. For example, the Chartered Institute of Procurement & Supply (CIPS), the International Federation of Purchasing and Supply Management (IFPSM), the Institute for Supply Management (ISM) and, more broadly, the Council of Supply Chain Management Professionals (CSCMP) and the Association for Supply Chain Management (ASCM). In particular, the ACSM "Digital Capabilities Model for Supply Networks" mentions "Intelligent Supply" as a key digital capability. Intelligent Supply, meaning IT-enabled procurement processes, impacts every component of the procurement function to source goods and services from leading suppliers at the best value while driving efficiencies in procurement operations, improving supplier relationships and mitigating risks".

The relevance of digital skills is also very significant in public procurement. Competences on "e-Procurement and other IT systems and tools" are listed as key horizontal competencies in the European Competency Framework for Public Procurement Professionals.

The relevant digital skills in the area of Procurement are both operational and managerial.

Operational digital skills refer to the efficient use of IT tools in the procurement process, namely the e-procurement platforms, the company Enterprise Resource Planning (ERP) and the Supply Chain Management suite (SCM). These IT tools support the automation of routine tasks such as purchase requisitions, order processing, and invoice management. These IT tools can have a very positive impact, as automation can reduce manual errors and accelerate the whole procurement process. At the same time, buyers need to acquire the digital skills required to use them in their daily activities

Managerial digital skills refer to the effective use of IT tools in the procurement strategy, namely market intelligence tools (for monitoring supply trends and identifying/tracking potential suppliers) and advanced analytics tools (for analysing more in-depth key indicators such as spending patterns and suppliers' performance). These IT tools are often included as a management information layer inside the IT tools used for support procurement transactions. These features help management in making informed procurement decisions, optimising purchasing costs, and identifying strategic supply opportunities.
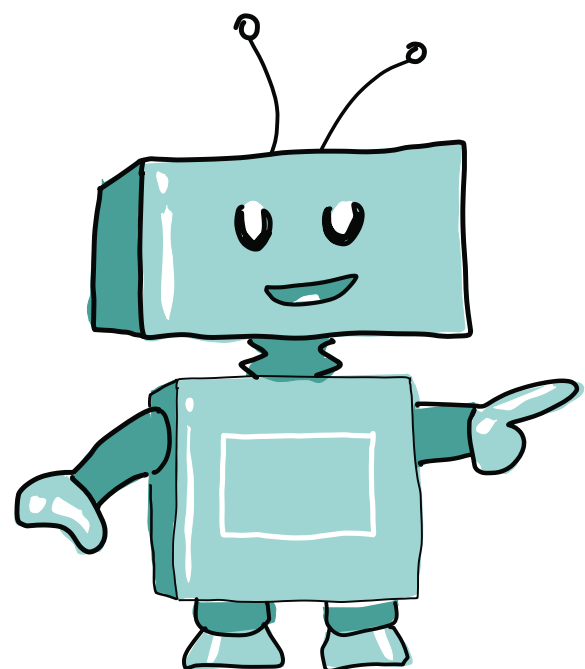
Structure of a micro-credential framework for digital skills in procurement

The micro-credential framework for digital skills in procurement has to be shaped, as suggested by EU Recommendations, along a learning path starting from an initial awareness of the potential impact of IT tools, and then moving into courses focused on the key operational or managerial skills.

ProcToGo proposal on micro-credentials for digital skills in procurement defines three major groups:

Group 1 - Awareness of IT impact on procurement processes.

It includes introductory micro-credential courses on what digital transformation is and what impact it is having on companies and society and how procurement is being affected by digital technologies. These are the main digital applications supporting the automation of procurement activities which are the main risks related to the adoption of digital tools (e.g. data protection and cybersecurity). It also includes the foresight on the potential future impact of emerging digital technologies on the procurement function (at present, mainly artificial intelligence and blockchain). Assessment in these courses is mainly based on testing the knowledge.

Group 2 - Operational digital skills.

It includes micro-credential courses on how digital technologies are changing the key operational roles and tasks in the area of procurement. It might also include hands-on courses on the specific IT tools supporting the automation of the procurement processes, eventually with the direct engagement of the IT vendors. Along these lines are all the micro-credentials that can build up the digital competencies for the public buyers, as described by European Competency Framework for Public Procurement Professionals (ProcurCompEU) with respect to "e-Procurement and other IT systems and tools" in the preparation, submission and tendering phases. Assessment in these courses includes both testing the knowledge and assessing knowledge application capabilities.
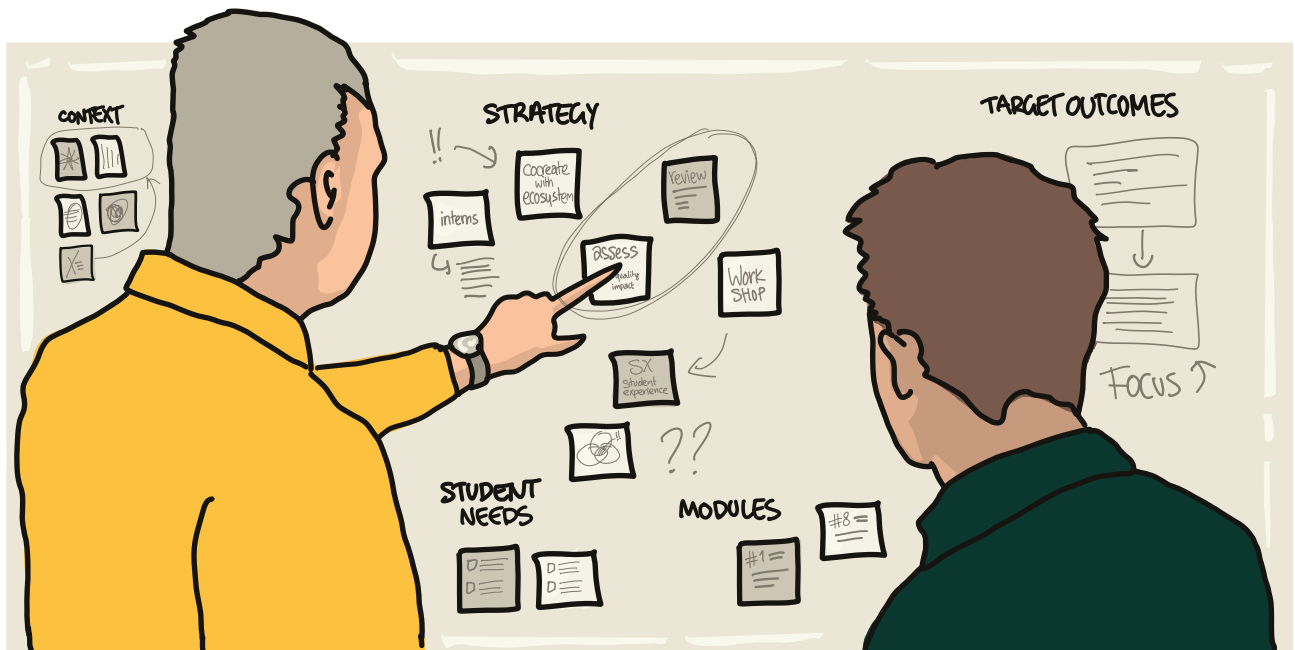
Group 3 - Managerial digital skills.

It includes micro-credential courses on the managerial capabilities required to make use of IT potential in Procurement. They relate to market intelligence, accessing and analysing data on supplier capabilities, industry trends, and market conditions. In addition, advanced data analytics, extracting meaningful insights from large datasets and enabling better understanding of spending patterns, supplier performance, and market trends. Furthermore, Supplier Relationship Management, tracking supplier performance, assessing supply risks, and developing a collaborative strategy with key suppliers. These micro-credentials have to be grounded on the business logic underlying the IT tools, linking the technological features with the procurement strategy targets. Assessment in these courses includes not only testing the knowledge and assessing knowledge application capabilities but also the actual application in real cases.

There are a wide variety of courses that can be included at each level.Therefore the list reported is illustrative and non-exhaustive.

The proposed structure by levels and the approach to the types of assessment is shaped along the certification approach proposed by the Council for Supply Chain Management Professionals (CSCMP), who is a ProcToProject associate partner. CSCMP has established a training and certification program, the SCPro™, based on three levels:

1. Level One: Basic Knowledge of each of the eight key areas of supply chain management;

2. Level Two: Analysis and application of supply chain challenges;

3. Level Three: Initiation of supply chain transformation.

In the CSCMP certification programme each level is characterised by a different type of assessment:

1. in Level One, the assessment is a multiple-choice exam that assesses the candidates' knowledge of the eight elements of supply chain management;

2. in Level Two, there is a case study-based exam that assesses the candidates' ability to apply supply chain knowledge;

3. in Level Three, the successful completion requires a "real world" project that can demonstrate the candidates' ability to positively impact an organisation thanks to their supply chain management skills.

In line with CSCMP approach, ProcToGo micro-credential guidelines propose an approach to selection of the topics that is driven by the learning objectives to be achieved (Guideline 6 - Base the course design on the target learning outcomes), an assessment strategy that gives learners the opportunity to demonstrate their skills in the context of work-related situations (Guideline 7 - Develop an effective assessment strategy), within a micro-credential course structure that deals with different level of knowledge and capabilities (Guideline 9 - Target stackability through modularity and transparency). In this way, the courses and the assessments can be meaningful and relevant to learners as well as to employers.

ProcToGo experience with micro-credentials in the area of procurement

ProcToGo project partners developed two blended micro-credential courses:

- Sustainable Public Procurement in the Digital Age
- Procurement as Lever towards a Sustainable and Digital Future

Both courses combined:

- Four self-paced training modules on the fundamentals, namely Digital Transformation and Artificial Intelligence; Sustainability and Sustainable Management; Value creating procurement; Supply Chain Management. These e-learning are accessible on Open edX and YouTube. They are common to both courses.
- Five-day in-person lectures mainly taught by practitioners.
- Two weeks (part-time) hybrid group work on the specific course assignment.

Both courses granted 3 ECTS each.

Sustainable Public Procurement in the Digital Age

The main topics developed in the lectures were: sustainable development in theory and practice; key steps in the public procurement process; public procurement, sustainability resilience of global supply chains; centralised strategies for public procurement; strategic approach to public procurement.

The lectures took place at the conference centre of Tor Vergata University of Rome, every day with the speeches from different practitioners.

The group work was focused on building an SPP tender, merging a product focus and market/supply chain focus, collecting and analysing key data for the procurement process, and then defining the tender strategy.

See digital badge on Sustainable Public Procurement in the Digital Age.

Procurement as Lever towards a Sustainable and Digital Future

The main topics developed in the lectures were: a strategic perspective on procurement; procurement and supply chain management excellence; value-creating procurement strategies; end-to-end supply chains; sustainability-oriented procurement strategies; innovative procurement framework.

The programme consisted of an introductory day at Antwerp Management School, three days of company visits in different locations (namely imec in Leuven, UCB in Brussels/Braine L'Alleud and CEGEKA in Hasselt) and a closing day at Antwerp Management School.

The group work was focused on innovative procurement cases based on the inputs received by the practitioners and the academics.

See digital badge on Procurement as Lever towards a Sustainable and Digital Future.

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ProcToGo project website (in the intellectual outputs section)
YERUN website (in the publications section)

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