



ESCO version 1.1, new content and quality review of existing content

MAI 34-02

1. Background

The update cycle of ESCO started in 2018, when the Commission invited sectoral experts to provide feedback to further improve the content of the classification. The second half of 2019 was dedicated to the analysis of the input provided by ESCO stakeholders and implementers through different channels: the ESCO community fora, surveys, individual contacts with sectoral stakeholders and Blueprints as well as contributions and KPIs from ESCO implementers.

The analysis of such feedback made it possible to identify different challenges related to the continuous improvement of ESCO¹, which were discussed in detail in a dedicated workshop during the 32nd MAI meeting of 12 November 2019.

The conclusions of the workshop were used to identify bundles of issues to be prioritised taking into account the effort and costs for these updates. In particular, the following issues were identified as priorities to be included in the scope of ESCO version 1.1.

a. Quality

ESCO contains several inconsistencies and mistakes that need to be resolved in order to improve the quality of the classification. Examples of identified quality issues are:

- Disguised skills: some skills are disguised attitudes and values, transversal skills, knowledge concepts or tasks/activities.
- Ambiguous skills: skills that can be interpreted in different ways and therefore are difficult to classify (in the hierarchy), leading to confusion for the end-users. This could be due to broad descriptions, usage of more than one action verbs in the concept's title (Preferred Term) or descriptions that do not correspond to the given Preferred Terms.
- Duplicate concepts: occupations and/or skills that are similar in meaning and could be merged. Non-Preferred Terms (NPTs)² that are repeated across occupations, leading to confusion or making it difficult to distinguish among different occupations.
- Formulation issues: Preferred Terms that are too long, Preferred Terms or descriptions that are formulated inappropriately, have typographic errors, wrong sentences, action verbs used in terms (preferred or non-preferred) that need revision, etc.
- Inconsistent level of detail:

¹ For a detailed overview of all identified challenges, please refer to the Information Note of the Joint ESCO MSWG – MAI meeting of 2 October 2020.

² Non-preferred terms can be synonyms (words with similar or same meanings) but can also be spelling variants, declensions, abbreviations, etc. They are regularly used by the target group (jobseekers, employers, education institutions) to refer to concepts that are described in ESCO with the preferred term.

- Contextualisation of (transversal) skills: many contextualised skills are not related to one another, making it difficult to easily visualise this contextualisation.
- Some skills are too detailed and are actually detailed tasks or activities while others are very generic and ambiguous.
- Some sectors have many occupations while others have only few.
- Some occupations have many skills while others have only few.

b. Content update

The next version of ESCO will need to reflect new realities that emerged in the labour market since the official launch of ESCO in 2017. Trends such as digitisation, the greening of the economy and the impact of Covid-19 should be reflected in the update of the classification taking into account the political priorities set by the European Commission, notably with the publication of the European Skills Agenda.

The following sources are considered in scope to update the ESCO content:

- The feedback register from ESCO implementers will serve as a central register for all structured feedback including ad hoc feedback, feedback from domain experts, implementers and Member States through the forum, feedback collected through surveys and feedback from blueprint projects.
- The KPI dashboard (Key Performance Indicator dashboard) will give a clear overview of KPIs provided by implementers. Examples include suggestions for new terms and concepts, most and least used concepts, etc.
- Reports on the evolution of the labour market will be the basis for desk research. Sources include publications from international organisations (such as ILO, OECD, UNESCO, the World Economic Forum, the World Bank), results from the Blueprints for sectoral cooperation on skills and other relevant EU funded projects, publications by sectoral skill councils, reports from the industry, national observatories, Cedefop, etc.
- Online job vacancies are an excellent source for potential new content and for validating the results of the desks research and the proposals for new occupations coming from stakeholders.

c. Quality of translations

The multilingualism of ESCO is one of the strongest points for implementers to use ESCO across language borders. However, this requires the translations to be of high quality. Several issues with the translations in ESCO were documented by the MAI and the MSWG, highlighting the need for a comprehensive review of the ESCO translations in all languages.

The translation of ESCO concept descriptions was therefore accompanied by a revision of the quality of the translations of the Preferred Terms, in full cooperation with Member States. Feedback by Member States on the translation of the descriptions and of the underlying terms has been implemented with the publication of ESCO versions 1.0.7 and 1.0.8, which include changes to the translation of Preferred Terms for occupations, skills and knowledge concepts, changes to the translation of skill groups and improvements to the translation of ISCO groups.

d. Ecosystem development

The acceptance of a skill classification like ESCO goes hand in hand with its use by its stakeholders. To continuously improve ESCO so that it can better serve all stakeholders, feedback and constant dialogue are crucial. To this end, the Commission developed a KPI dashboard to get a better understanding of the different factors that drive the development and adoption of ESCO. The needs of different ESCO implementers led to the development of a coding system for occupations, extending the four digits coding system of the ISCO classification. Further improvements to the options available to download the ESCO dataset and to the functioning of the ESCO API are also important to promote the use of ESCO by public and private operators in the labour market and in the domain of education and training.

The figure below shows a summarized action plan for ESCO version 1.1, focusing on the challenges listed above.

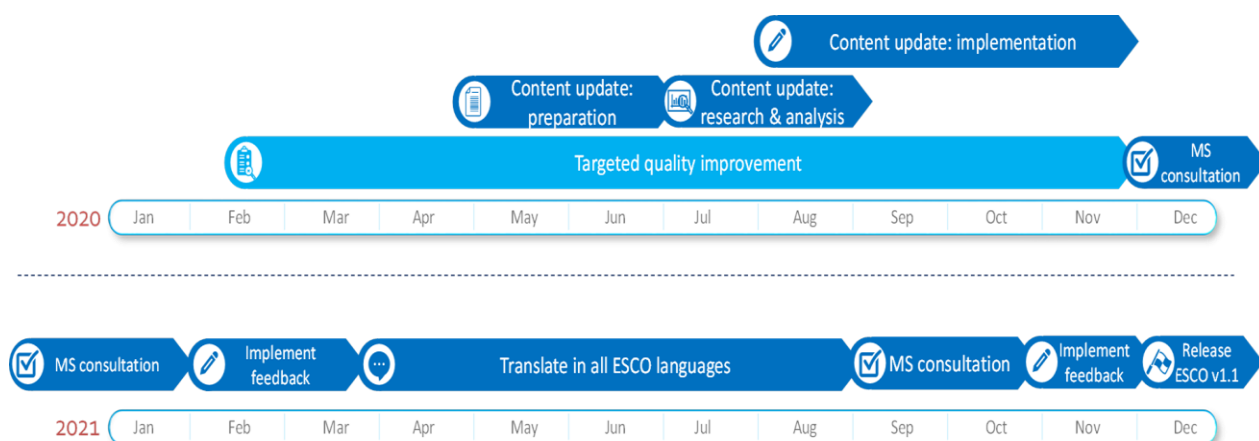


Figure 1 Summarized overview of planning for ESCO version 1.1

2. Overview of the actions undertaken

a. Targeted quality review

Based on the prioritised challenges described above (see 'Quality'), the Commission has executed a targeted quality review of all the skills in the skills pillar and is currently implementing the necessary changes to solve the identified quality issues, in accordance with the updated ESCO terminological guidelines.

At the same time, the Commission also performed a quality review of all ESCO occupations in order to detect potential duplicates, correct typos, identify skill gaps, correct the list of associated NPTs and adjust the mapping to ISCO when needed.

b. Review, update and apply guidelines

Terminological, conceptual and format guidelines have been evaluated to ensure they provide the necessary guidance to address the quality issues.

For future versions of ESCO, the Commission is currently exploring how new technologies could support finding these quality issues or deviations from the

guidelines and prevent them from occurring. This will make the quality assurance of ESCO more efficient, allowing more resources to improve ESCO in other areas.

c. Structuring the content update process

The process for updating ESCO content is structured in three work packages: the preparation phase, the research and analysis phase and the implementation phase (creation of new content and changes to existing occupations). The visual below summarizes the main steps undertaken.



The **preparation phase** took place in May and June and includes three main activities:

- Labour market analysis. The content update reflects the composition of the labour market around 17 different ecosystems corresponding to the key sectors of the European economy and fully integrated with the priorities set by the Commission in the European Skills Agenda and in the renewed Industrial Strategy for Europe.

To this end, ESCO occupations have been assigned to different economic sectors by using the NACE classification as a reference point. The sectors identified following this mapping have been grouped in 17 ecosystems in order to prioritise those areas that are most affected by the digital and green transitions. The resulting list of ecosystems is reported below.

Ecosystem	Definition
Tourism	Hotels, short-term accommodation, restaurants and catering, events, theme parks, passenger transport and travel.
Creative and cultural industries	Audio-visual, music, books and press, heritage and libraries, arts and entertainment.
Aerospace and defence	Aeronautics, space and defence manufacturing and space-enabled services and applications.
Textiles	Production of natural and synthetic fibres into yarns and fabrics for the further production of technical textile, carpets, clothes, footwear and leather.
Electronics	Design and manufacturing of electronic components; includes raw materials (semiconductor wafers) and manufacturing tools.
Transport	Production of motor vehicles, ships and trains, accessories, their repair and maintenance, freight transport.
Energy-intensive industries	The main industrial users of energy and raw materials, suppliers of intermediate products and innovation to most ecosystems.
Renewable energy	Manufacturers of equipment (e.g. wind turbines, solar modules, electrolysers), key components, biofuel producers, utilities and maintenance and engineering services.
Agri-food	Food production, including agriculture and food processing.
Health	Pharmaceuticals and their ingredients, medical and protective equipment, health services, residential care, HealthTech.
Digital	Covers part of the ICT sector (manufacturing, services and telecommunication industries) and encompasses a number of mature and emerging technologies (e.g. AI, blockchain, quantum, cloud).
Construction	Comprises activities during the whole lifecycle of buildings and infrastructures. Contractors, construction product manufacturers, architects, engineers and others are part of the ecosystem.
Retail	Grocery, non-grocery retail including e-commerce, and relevant wholesale; also suppliers, transportation, logistics, relevant real estate and consumers.
Proximity and social economy	Social Economy: mainly locally anchored economic activity (production, financial or non-financial services) aiming at boosting social impact and inclusive growth in a redistributive manner.
Business and finance	Business administration, legal and accounting, financial services.
Education and science	Educational and scientific activities including research.
Public sector	Includes public policy, law enforcement and security services.

Figure 2 ESCO ecosystems for content update

- **Feedback analysis:** the input collected during the feedback process has been analysed and distributed across the different ecosystems for further processing. This material ranges from detailed comments to broader analysis of labour market sectors.

- **Prioritisation and assignment:** the feedback received and the different sources have been assessed against three key drivers of change in the labour market: greening of the economy, digitalization, and impact of COVID-19 in the labour market. This allowed to prioritise the changes to implement in the next version of ESCO and target the subsequent research activity and stakeholders' engagement.

The **research and analysis phase** took place in July and August and included the following activities:

- **Stakeholder engagement:** the ESCO team engaged with the different feedback providers (domain experts, NGOs, other Commission services, Blueprint project partners) to discuss in detail the input received and transform the feedback received into ESCO content, where relevant.
- **Desk research:** desk research has been conducted to identify emerging trends in the different ecosystems in terms of new occupations and skills. The research activity was targeted in particular on the greening of the economy and the impact of digital technologies.
- **Gap analysis:** the ESCO team analysed the ESCO occupations mapped to each ecosystem to identify existing gaps in the classification, taking into account the feedback received and the results of the desk research.

Based on the work done in the previous phases, the Commission identified three areas of intervention:

- Update of existing ESCO occupations to reflect the skills demanded in the labour market in the context of the twin transition in different ecosystems.
- Creation of new skills and knowledge concepts to reflect those competence areas emerged in the labour market after the publication of ESCO, i.e. blockchain, coding, data protection, big data analysis, green skills.
- Creation of new occupations to reflect emerging trends in the labour market and fill the existing gaps (i.e. public procurement profiles, data protection specialists, etc.).

The **implementation phase** is currently ongoing and includes three main activities:

1. **Implementation of changes:** this concerns improvements to occupations and skills already present in the ESCO dataset. Examples are linking existing skills to existing occupations: digital ESCO skills might be now required in a higher number of occupations than those considered in the existing dataset. This is also linked with the findings from the quality review process.
2. **Creation of new skills:** the process for creating new skills and knowledge concepts requires the definition of the different metadata of an ESCO skill or knowledge concept: a description of the concept, alternative labels used in the labour market to refer to that concept, its reusability level and the allocation of the concept to the ESCO skills and knowledge hierarchy.
3. **Creation of new occupations:** the process for creating new occupations requires the definition of the different metadata of an ESCO occupation: a description of the occupation, the list of alternative labels used in the labour market to refer to that occupation, the ISCO group to which the occupation belongs and a list of essential and optional skills using existing ESCO skills and knowledge concepts where possible.

3. Overview of the content update

The following Tables and paragraphs offer a thematic overview of new content that will be included in ESCO v1.1³, further broken down in sectoral terms. Annexes 1 and 2 contain a detailed overview of the new content so far.

Table 1. New occupations for ESCO version 1.1

Sectors	COVID-19	Digital	Green	Other	Grand Total
Arts		1			1
Business		1		1	2
Digital		2			2
Education and science		1	1	1	3
Electronics			1		1
Energy intensive		5	1		6
Health	1			2	3
Public sector				6	6
Renewable energy			12		12
Retail				1	1
Social economy	2			4	6
Textile		2	1	2	5
Tourism and hospitality				3	3
Grand Total	3	12	16	20	51

Table 2. New knowledge concepts for ESCO version 1.1

Sectors	Digital	Green	Other	Grand Total
Agriculture	2	11		13
Business	2	2	6	10
Construction		1		1
Education and science	1		3	4
Energy intensive		1		1
Health			1	1
Public sector			4	4
Renewable energy		10		10
Social economy	1		17	18
Textile		1	3	4
Grand Total	6	26	34	66

³ The information provided in this section reflects the state of play of the content creation at the beginning of October 2020. This work is ongoing on a daily basis and therefore the number and type of new concepts is subject to further amendment.

Table 3. New skill concepts for ESCO version 1.1

Sectors	COVID-19	Digital	Green	Other	Grand Total
Agriculture		2	4		6
Arts		11		1	12
Business		1		7	8
Construction		2			2
Education and science				9	9
Electronics			3		3
Health		3		9	12
Public sector		1	1	13	15
Renewable energy			11		11
Social economy	5			5	10
Textile		2	3	11	16
Grand Total	5	22	22	55	104

a. Tourism

In the hospitality and tourism sector, building on the work of the Blueprint Next Tourism Generation Skills Alliance, **digital skills** related to **data management** and **the use of ICT tools and mobile applications** and **green skills** related to **ecotourism** and **sustainability** will be added to existing ESCO occupations. A new profile for the **Accommodation manager** has been proposed to reflect the emerging home-sharing format of hospitality. The occupations **Tourist guide** and **Tour manager** have been reviewed and a new occupation for the **Local representative** has been created.

b. Creative and cultural industries

In the ARTS sector, sectoral experts have performed a **comprehensive review** of all occupations (divided in technical profiles and live performance profiles) and skills currently present in ESCO, providing feedback on the relations between skills and occupations, on the formulation of preferred terms and alternative labels, on the concepts' descriptions and on the allocation under the ISCO classification. A new profile for the **Media integration operator** has also been proposed.

c. Aerospace and defence

In the aerospace sector, work is ongoing to analyse the possibility to include technical skills and knowledge produced in the context of the Blueprint project Eo4Geo – **Space/Geospatial** Sector Skills Strategy in ESCO and link them to existing geospatial profiles. As regards the defence sector, work is ongoing to include all **officers' ranks** from NATO countries and to analyse the potential addition of **further specialisations** linked to e.g. **engineering, electronics** or **logistics**.

d. Textile

Building on the results of the Blueprint project Skills 4 Smart TLCF industries, ESCO will integrate new occupations and skills in the fields of **sustainability, digital marketing, production planning, supply chains analysis and logistics** applied to

the textile sector, **CAD - based product design and development, leather and clothing production.**

e. Electronics

Building on the work done by the Blueprint for a Microelectronics Skills Strategy specific profiles for the **Microelectronics designer**, the **Microelectronics intelligent manufacturing engineer**, the **Microelectronics materials engineer**, the **Microelectronics maintenance technician**, the **Microelectronics software engineer** and the **Microelectronics test engineers** are currently being developed, together with relevant skills and knowledge concepts.

In the field of the installation of **heating, ventilation, refrigeration and air conditioning equipment**, a new occupation of **Refrigeration, Air Conditioning and Heat Pump technician** has been created while the existing profiles of **Heating engineer** and **Heating, ventilation, air conditioning (and refrigeration) service engineer** will be modified in order to reflect the distinction between the installation of heating and ventilation equipment and the installation of refrigeration and air conditioning equipment.

f. Transport

In the transport sector, new content has been created in the fields of **automotive, shipbuilding and maritime transport**, building on the work done in three dedicated Blueprint projects: the DRIVES project, the MATES project and the Skillsea project.

For shipbuilding, a new occupation for the **Alternative fuels engineer** will be added to the classification and existing profiles will be improved by adding relevant digital and green skills. For the automotive sector, new concepts (skills and occupations) are being developed to reflect the impact of digital technologies (**such as automation, smart sensors, robotics and artificial intelligence**), **electrification and big data**. Finally, for maritime transport the focus has been placed on **digitisation and environmental sustainability**.

g. Energy-intensive industries

Energy intensive industries are heavily impacted by changes brought by key enabling technologies, digitisation and climate change. New occupations have been created in the field of **metal additive manufacturing** and work is ongoing to design skills linked to **carbon capture** and to reflect the importance of green skills in the **steel industry**. Specific focus is placed on the notion of **circular economy**, with the introduction of a specific profile for the **Sustainability manager** and the update of the profiles linked to **packaging design**.

h. Renewable energy

In the field of renewables, the content update is focusing on new occupations and skills in the sector of **offshore** (5 occupations and 18 skills) **and onshore** (2 occupations) **wind energy, geothermal energy and biofuels**. Existing profiles for energy consultants and environmental experts have been reviewed to reflect emerging trends in the labour market.

i. Agri-food

Digitisation and climate change will both impact the labour market in the agriculture sector. Work to update the content of ESCO is therefore focusing on skills and

knowledge concepts linked to **sustainable agriculture practices and techniques, sustainable forest management** and the promotion, quality assurance and labelling of **organic farming**. At the same time, the use of **ICT technologies** in crop production, farming and food labelling is also being reflected in terms of new skills and knowledge.

j. Health

The **Covid 19** crisis has accelerated the use of digital technologies in the healthcare sector and led to the creation of new jobs linked to **testing and tracing** of patients and to the **use of healthcare data** by healthcare institutions and public authorities. New skills related to the provision of **radiation therapy** will be added to the classification and a new profile for the **medical physics experts** is currently under discussion. The Commission is also looking at improving the coverage of **basic digital skills** in traditional healthcare profiles.

k. Digital

New digital technologies have appeared in the last years and are now impacting all economic sectors. Work is ongoing to reflect emerging trends such as **blockchain technologies, coding, artificial intelligence and machine learning, big data** and **smart-home systems** in terms of skills and occupations. Work is ongoing to reflect the changes in the labour market brought by the entry into force of the European legislation on the **protection of personal data**.

l. Construction

Desk research in the construction sector is primarily focusing on **green skills and sustainable construction techniques**. A specific profile for the **Drone pilot** has been developed to cover the use of drones in civil engineering.

m. Retail

In the retail ecosystem, the focus has been placed on the impact of digital technologies in the areas of **logistics, transportation and storage**. A new profile for the **Transportation manager** has been proposed to integrate the occupations currently present in ESCO.

n. Proximity and social economy

ESCO will reflect the growing importance of **social entrepreneurship** and **social innovation** by adding occupations and skills linked to the creation of **innovative and socially-oriented businesses** and the implementation of **participative decision making processes**. Work is also ongoing in the field of **international cooperation** and **sustainable development**, with a specific focus on **project monitoring and evaluation**. In the field of social care, work is ongoing to analyse two proposed occupations: the **Assistive technologist** and the **Youth information worker**.

o. Business and finance

New skills and occupations related to **project management** will be added to the classification in order to integrate the PM² methodology developed by the European Commission. In the area of **banking and finance**, new skills and knowledge concepts will cover the fields of **sustainable finance, impact investment** and **microfinance**. The current profile of **Risk manager** will be improved in order to reflect the distinction between corporate risk managers and financial risk managers. New concepts linked to

digital marketing have been developed to reflect the different techniques used by businesses to plan and implement digital sales strategies and marketing campaigns using **digital tools** and **social media**.

p. Education and science

Following the quality review of occupations, a separate profile for the **Marine biologist** will be added to the existing occupation of oceanographer. The ESCO classification will also reflect the skills and knowledge needed to promote the mobility of **Researchers** across Europe. In the field of education, the Covid 19 crisis accelerated the deployment of e-learning and online learning solutions as a tool to ensure the continuity of education and training: a new profile for the **E-learning advisor** will be added to the occupations already existing in ESCO. Given the importance of skills recognition to promote employability and match people with the right jobs, the profile of **Career guidance advisor** will be improved and a new profile for the **Assessor of prior learning** will be created in the field of validation of non-formal and informal learning.

q. Public sector

The recently adopted **European competence framework for public procurement** will be integrated into ESCO through the creation of **six occupations** and several skills and knowledge covering the different phases of the procurement management. Work is ongoing to reflect skill needs in the field of **EU funds management** at regional and local level and the professionalization of **smart cities** professionals.

4. Outlook towards ESCO version 1.2

To stay up-to-date and relevant, ESCO must evolve continuously both in conceptual terms and in terms of content. The scope of ESCO version 1.1 includes a careful selection of challenges, prioritised taking into account the effort and costs. However, several conceptual challenges still remain. In order to plan ahead and organise deeper discussion and analysis, the Commission has started taking stock of these challenges. Below, some of these challenges already identified are summarised.

a. Re-establishing the vision for ESCO

Digitisation, the greening economy, economic shocks, and new technologies such as Artificial Intelligence impact every sector. Maintaining a managed classification such as ESCO needs to follow such evolution. Therefore the Commission needs to analyse whether the ESCO vision has to be adapted to these technologies.

b. Proficiency levels for skills and occupations

Several ESCO implementers advocate for including proficiency levels in ESCO to distinguish more clearly between skills requirements for an occupation at a senior versus a junior level. In the original version of ESCO, this was explicitly excluded; however the numerous requests on this matter require a renewed discussion.

c. Level of detail

In some sectors, ESCO skills and occupations are very detailed while in others they are more general. At the same time, there are different levels in the hierarchies, while skills and occupations are broader/narrower than other skills and occupations. These factors may pose challenges for implementers to use ESCO in labour market services in such a way that is consistent and useful for users.

Additionally, stakeholders request to provide ESCO also in aggregated forms, which illustrates the different needs implementers have when it comes to the level of detail of skills and occupations.

d. Consistent contextualisation

Many skills in ESCO change in nature depending on the context. This applies to some extent to occupations too. To capture these nuances, the concept of contextualisation was implemented and this was particularly important for transversal skills. However, the quality review has shown that contextualisation has not been applied consistently throughout the classification. The main challenge in this case will be to find an efficient approach to apply contextualisation equally throughout the classification.

e. Connection with other classifications and labour market information

The Commission receives on a regular basis queries about mappings between ESCO and other classifications that are widely used such as O*Net, classifications that focus on a niche such as EntreComp and DigComp, and a connection with labour market data related to skills and occupations. Further analysis is needed to establish the use cases related to these requests as well as a future-proof solution to support these use cases.

f. Consistency throughout the classification

ESCO contains many skills, however these skills are not always linked to all relevant occupations. Preliminary observations of analysis of ESCO using Artificial Intelligence have shown that some occupations have gaps when compared to current job vacancies but these skill gaps could be filled with skills that already exist in ESCO.

An important use case of ESCO is to support citizens in making transitions between occupations or sectors. The gaps that have been observed limit the usefulness of ESCO for this use case. Therefore further analysis is needed to establish an efficient approach to improve the consistency of ESCO in this regard.