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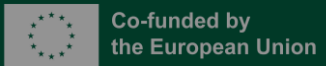
Project id n. 101103982  
CUP E31B23000120004

# EXCEED

Excellence in Green and digital manufacturing

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**ESCO**

European Skills/Competences, qualifications and Occupations



# Introduction to the European Classification of Skills, Competences, Qualifications and Occupations

## ESCO

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affairs and inclusion, Unit E1*

## Meeting agenda

1. Introduction to ESCO
2. ESCO continuous improvement process and ESCO versions
3. ESCO Use Cases (Education and Training sector focus)
4. Linking learning outcomes to ESCO Skills

# Meeting agenda

- 1. Introduction to ESCO**
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# What is ESCO?



ESCO works as a dictionary  
**describing, identifying and classifying**

professional **occupations, skills, and competences**

relevant for the **EU labour market and education and training**

**Encourage intra-European mobility**

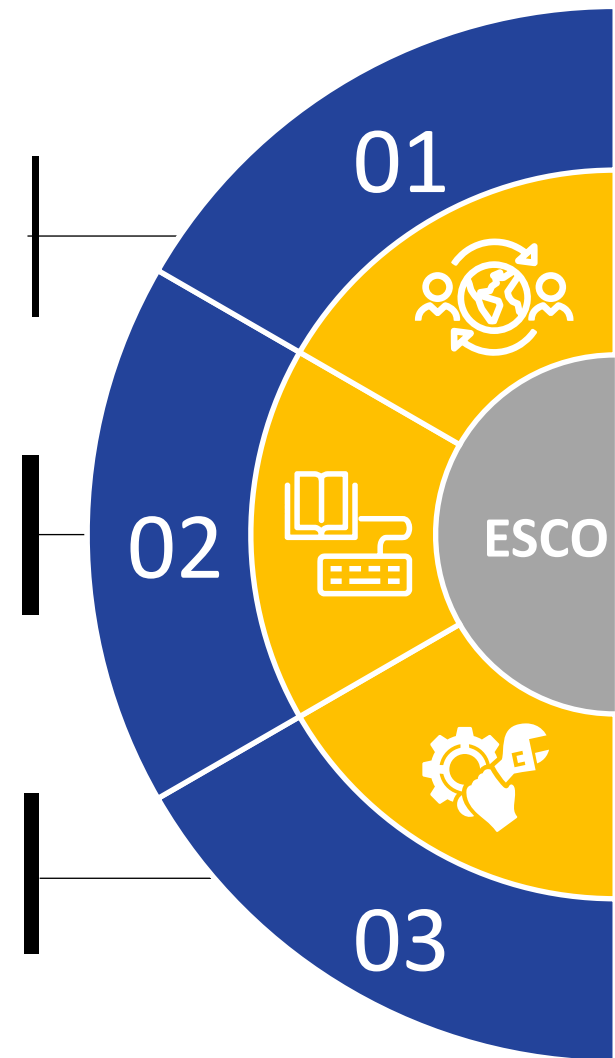
→ Common language for information exchange

**Align people's skills with industry needs**

→ Bridge the world of education and employment

**Skills-based labour market services**

→ Need for a common skills-language



# Structure of ESCO

ESCO

!  
EUROPASS



OCCUPATIONS



SKILLS



QUALIFICATIONS

# Structure of ESCO

Search occupations

Q economist

Find

Hierarchy view ↗

- 0 - Armed forces occupations +
- 1 - Managers +
- 2 - Professionals +
- 3 - Technicians and associate professionals +
- 4 - Clerical support workers +
- 5 - Service and sales workers +
- 6 - Skilled agricultural, forestry and fishery workers +
- 7 - Craft and related trades workers +
- 8 - Plant and machine operators and assemblers +
- 9 - Elementary occupations +

## economist

Discuss in the forum  
Download

Professionals >  
Legal, social and cultural professionals > Social and religious professionals > Economists > economist >

### Description

#### Code

2631.2

#### Description

Economists perform research and develop theories in the field of economics, whether for microeconomic or macroeconomic analysis. They study trends, analyse statistical data, and to some extent work with economic mathematical models in order to advise companies, governments, and related institutions. They advise on product feasibility, trend forecasts, emerging markets, tax policies, and consumer trends.

#### Alternative Labels

Q Search ...

Find

- K - knowledge +
- L - language skills and knowledge +
- S - skills -
- S1 - communication, collaboration and creativity +
- S2 - information skills +
- S3 - assisting and caring +
- S4 - management skills +
- S5 - working with computers +
- S6 - handling and moving +
- S7 - constructing +
- S8 - working with machinery and specialised equipment +
- T - transversal skills and competences +

## apply statistical analysis techniques

transversal skills and competences >  
core skills and competences > working with numbers and measures > carry out calculations > skills > information skills > analysing and evaluating information and data > analysing and evaluating information and data > apply statistical analysis techniques >

### Description

#### Description

Use models (descriptive or inferential statistics) and techniques (data mining or machine learning) for statistical analysis and ICT tools to analyse data, uncover correlations and forecast trends.

#### Alternative Labels

apply numerical analysis to data   apply statistical analysis techniques

#### Skill type

skill

## OCCUPATIONS PILLAR

3039 Occupations

## SKILLS PILLAR

13939 Skills/Competences

# Occupation profiles

- Occupation hierarchy
  - Built on ISCO 08
  - Can have further specialisations
- Description, alternative labels, regulatory aspect
- Essential and optional skills and knowledge
  - A set of skills for each occupation
- Machine readable
  - One URI
- Translated in 28 languages

## palaeontologist

[Discuss in the forum](#)
[Download](#)

[Professionals](#) >
 [Science and engineering professionals](#) >
[Physical and earth science professionals](#) >
[Geologists and geophysicists](#) >
[geologist](#) >
[palaeontologist](#) >

### Description

#### Code

2114.1.9

#### Description

Palaeontologists research and analyse forms of life that existed in ancient eras of the planet Earth. They strive to define the evolutionary path and the interaction with different geological areas of all kinds of once organisms and such plants, pollen and spores, invertebrate and vertebrate animals, humans, traces such as footprints, and ecology and climate.

#### Alternative Labels

[palaeontology analyst](#)
[palaeontology research analyst](#)
[palaeontology scholar](#)

[palaeoecologist](#)
[paleontologist](#)
[ichnologist](#)
[palaeontology researcher](#)

[palaeontology scientist](#)
[palaeontology science researcher](#)

[palaeontology research scientist](#)
[micropalaeontologist](#)

#### Regulatory Aspect

To see if and how this occupation is regulated in EU Member States, EEA countries or Switzerland please consult the Regulated Professions Database of the Commission. Regulated Professions Database:  
[http://ec.europa.eu/growth/single-market/services/free-movement-professionals/qualifications-recognition\\_en](http://ec.europa.eu/growth/single-market/services/free-movement-professionals/qualifications-recognition_en)

### Skills & Competences

#### Essential Skills and Competences

[promote the transfer of knowledge](#)
[speak different languages](#)

[manage findable accessible interoperable and reusable data](#)

[manage intellectual property rights](#)
[perform project management](#)

# Skill & knowledge profiles

- Multiple hierarchies
  - Skill hierarchy
  - Transversal skill hierarchy
  - Knowledge hierarchy
  - Language hierarchy
- Description, alternative labels, reusability level
- Essential and optional occupations
  - A set of occupations for each skill
- Labels: green, Digital, research
- Machine readable
  - One URI
- Translated in 28 languages

## apply for research funding

communication, collaboration and creativity  
 negotiating > negotiating and managing contracts and agreements > find grants > skills >  
 information skills > documenting and recording information >  
 preparing documentation for contracts, applications, or permits > apply for research funding >

### Description

#### Description

Identify key relevant funding sources and prepare research grant application in order to obtain funds and grants. Write research proposals.

#### Alternative Labels

generate research funding identify research grants apply for research grants

draft research grants applications

#### Skill type

skill

#### Skill reusability level

cross-sector skills and competences

### Relationships

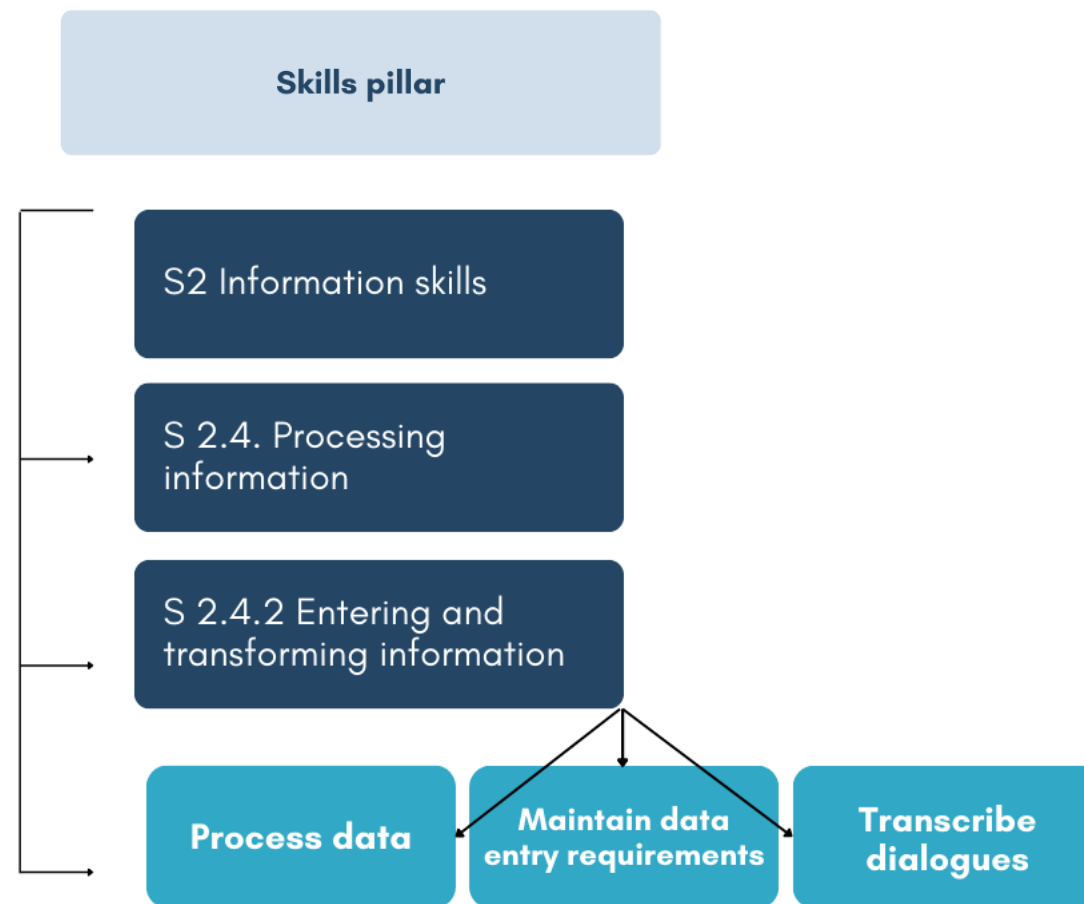
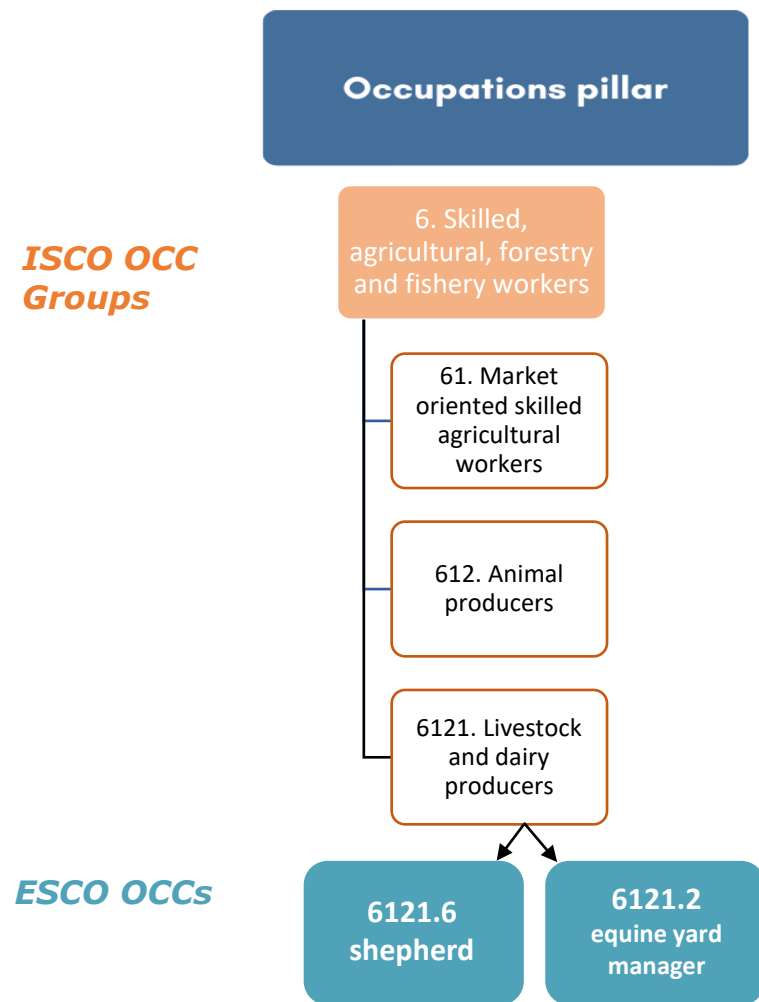
#### Broader concepts

preparing documentation for contracts, applications, or permits find grants

#### Essential for

chemist religion scientific researcher agricultural scientist pharmacologist  
 climatologist environmental scientist university research assistant geneticist

# ESCO Hierarchy



# ESCO translations: state of play

24 EU languages

4 non-EU languages:

- Icelandic
- Norwegian
- Arabic
- Ukrainian



- Hungarian (hu)
- Maltese (mt)
- Dutch (nl)
- Polish (pl)
- Portuguese (pt)
- Romanian (ro)
- Slovak (sk)
- Slovenian (sl)
- Finnish (fi)
- Swedish (sv)
- Icelandic (is)
- Norwegian (no)
- Arabic (ar)
- Ukrainian (uk)
- Bulgarian (bg)
- Spanish (es)
- Czech (cs)
- Danish (da)
- German (de)
- Estonian (et)
- Greek (el)
- English (en)
- French (fr)
- Irish (ga)
- Croatian (hr)
- Italian (it)
- Latvian (lv)
- Lithuanian (lt)

# ESCO green and digital collections

The approach combining machine learning (ML) algorithms with human labelling and validation.

- **Green skills and Knowledge Concepts**

- A total of **578 ESCO skills and knowledge concepts** are labelled as green.



- **Digital Skills and Knowledge Concepts**

- **1,276 ESCO skills and knowledge concepts** have been classified as digital

# How to access ESCO?

ESCO is published as Linked Open Data: data is openly available and interconnected, fostering collaboration and interoperability

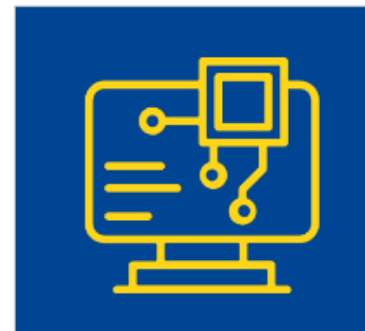
## Two possibilities:



### Download ESCO files

Download ESCO classification files in **various** formats:

- SKOS-RDF: ttl
- ODS
- CSV



### ESCO API

Access ESCO classification through two types of **Application Program Interface (API)**:

- an ESCO web-service API
- an ESCO Local API

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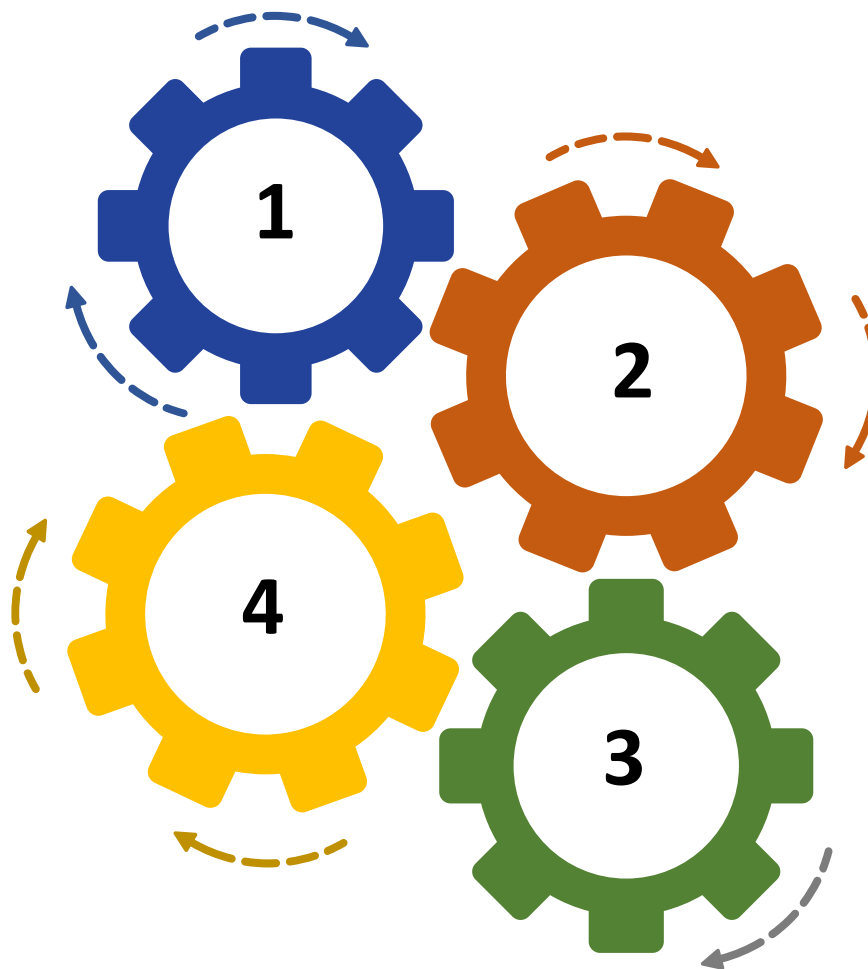
# Why continuous improvement of ESCO

## Changes in the labour market

- LM constantly evolving → **new occupations and skills emerging** in response to technological, societal, economic changes
- Some occupations and skills **obsolete** as industries evolve

## Changes in terminology

- Occupation and skill **terminology** can evolve due to LM updates, regional preferences or industry standards
- i.e. “Webmaster” → “Web Developer” reflecting modern terminology



## Changes in curricula

- Education and training programs updating content to align with the latest industry standards and emerging trends → **new knowledge, skills, and competences are introduced**

## Changes in the requirements of IT applications

- As technology evolves, ESCO must adapt to provide structured data for AI integration and meet user demands for efficient digital tools.

# Types of ESCO updates

## MAJOR Content Update

Involves the creation of **new content** and a **quality review** of the existing classification.

- Changes affect the concept level.
- Requires mapping tables update.
- Longer working period.

*Creation of concepts, semantic changes in PT/Description, deletion of obsolete concepts, changes in data model.*

**ESCO v1.1 & ESCO v1.2.**

## MINOR Content Update

Involves a **quality review** of the existing classification.

- Changes **DO NOT** affect the concept level
- It **DOES NOT** require mapping tables update.
- Existing concept scopes do not change.

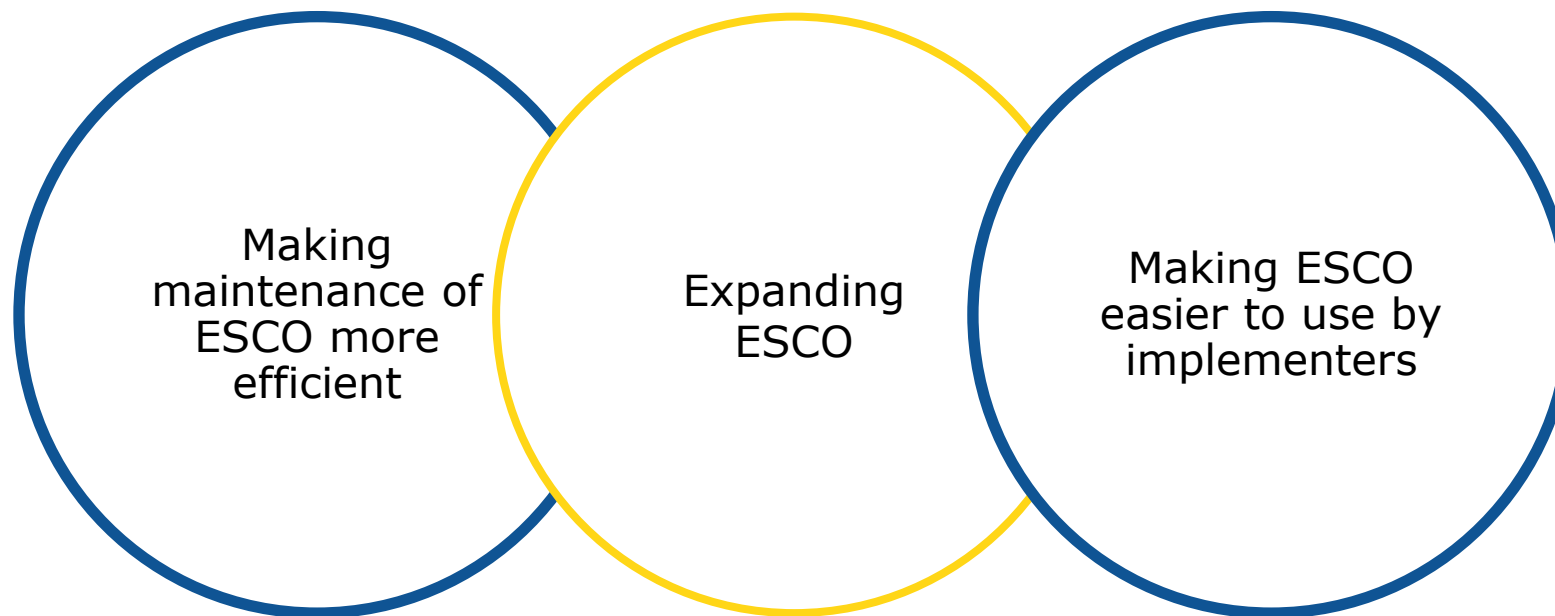
*Adding or removing concept relations, minor changes to alternative labels, typos, translations.*

**ESCO v1.1.1 & ESCO v1.1.2**

# Use of artificial intelligence in ESCO

*Historically expert driven classification*

*Today:* Use an analytical approach based on statistical analysis, data science and machine learning to assist in:



# ESCO Current version: ESCO v1.2.

- Twin transition and emerging technologies.
- Increased relevance of AI techniques within ESCO methodology.
- Collaboration with sectoral experts.

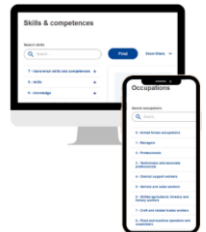


**ESCO 1.2: a global language for skills**

21 and 22 May 2024, online via zoom

**ESCO v1.2**  
A new major version!

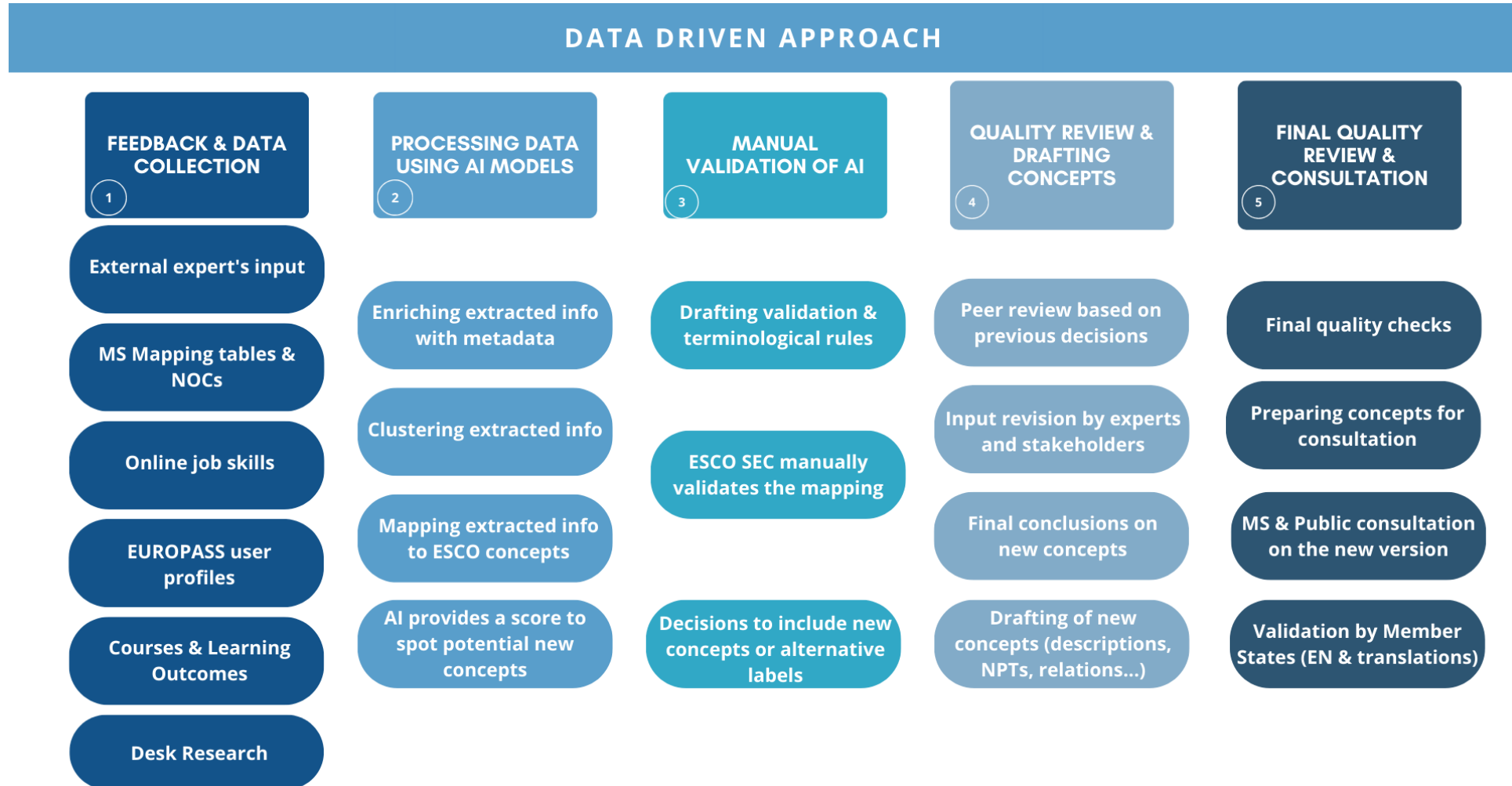
- ✓ New occupations and skills
- ✓ Quality improvements



NEW CONCEPTS	ESCO VI.2.
NEW OCCUPATIONS	35
NEW SKILLS	42
NEW KNOWLEDGE	196
	<b>273</b>

# ESCO v1.2. Methodology

A data driven approach



## Meeting agenda

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# ESCO Use Cases

## ESCO CONNECTS THE LABOUR MARKET TO EDUCATION & TRAINING

-Bridging the gap between E&T institutions and LM by making skills and qualifications visible and comparable at EU level.



## BIG DATA ANALYSIS OF LABOUR MARKET

- Facilitates the collection and analysis of skills and occupational intelligence.
- Helps identifying skills and occupational trends in the EU (together with technologies like machine learning).



## ESCO CONNECTS PEOPLE TO JOBS

-Improves e-services by helping develop more effective electronic labour market services (public and private).

-Saves time, reduces costs and increases efficiency of job-matching services

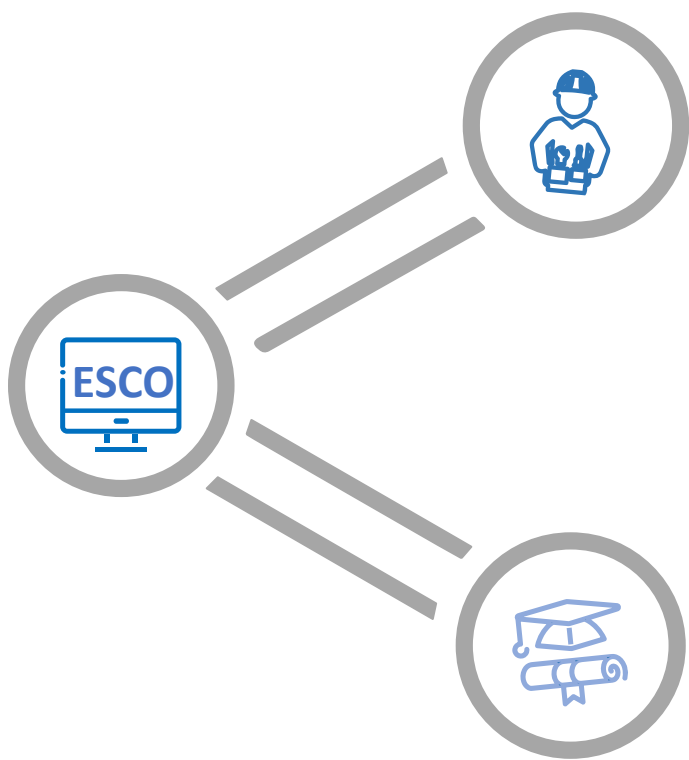


## MACHINE LEARNING & STATISTICAL RESEARCH

- ESCO analytical approach based on statistical analysis, data science and machine learning to assist in making it easier to use by implementers.



## **Focus: ESCO connecting the labour market to education and training systems**



### **Support the shift to learning outcomes:**

*- LO use knowledge, skills and competences → shared terminology between sectors and borders*

### **Transparency and comparability with other MS**

*- Qualifications data displayed in structured way → more informed choices*

**Adapt educational curricula to labour market needs**

## Focus: ESCO connecting the labour market to education and training systems



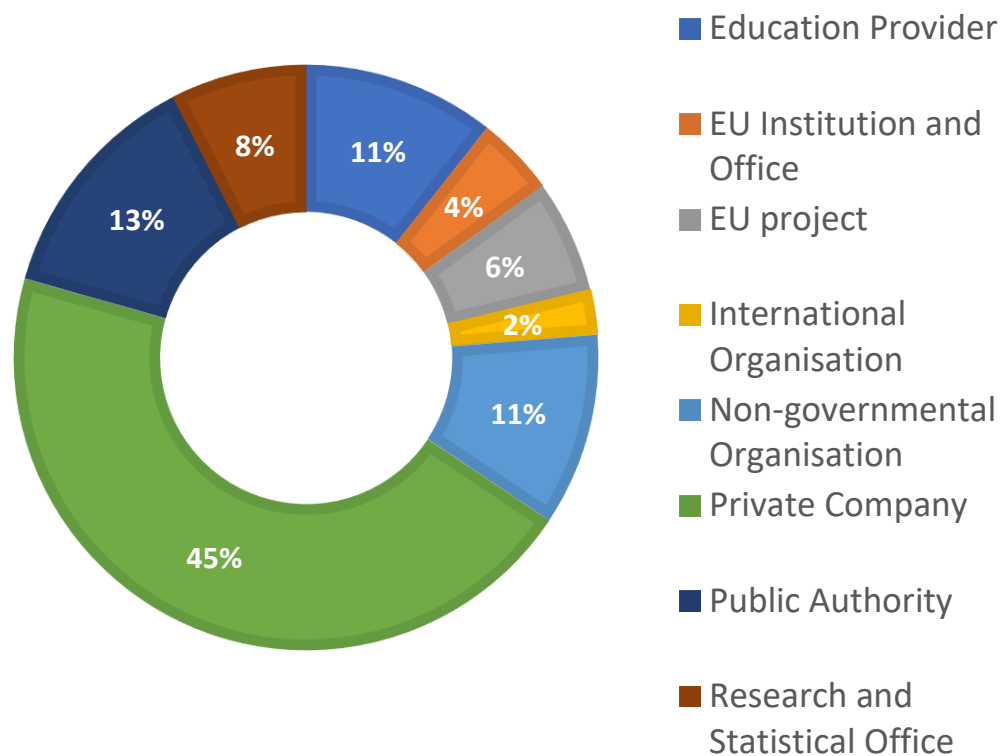
### Understand the development of emerging skills in an international context

- *Multilingual character of ESCO*

### Speak the same language as employers:

- *employers → understand the suitability of a candidate on the basis of their qualifications;*
- *education systems → feedback on labour market needs, identify skills gaps and adapt their qualifications accordingly*

# ESCO Implementers overview



### 3. Education Providers 11%

*Universities, vocational training centers, and e-learning platforms use ESCO to **develop curricula, describe learning outcomes, issue digital credentials.***

# ESCO and Education Providers

## Topics that are mostly covered:

- Curricula development
- Linking course descriptions with ESCO skills
- Graduate tracking
- University research projects focused on specific topics (ie. Digital Skills or Green Skills)

## - Example:

Research pilot project focused on **School-Work Alternation (SWA) program in Italy** → aiming to strengthen the partnership between educational institutions and the job market

- using ESCO as the basis for matching students' skills with internship requirements;
- overcoming the language barrier in describing skills and competences with ESCO
- enhancing the alignment of student skills with industry standards



UNIVERSITÀ  
DEGLI STUDI  
DI MILANO



# ESCO matches people to jobs

- **Exchange labour market information**
- **Facilitate the design** of job vacancies and job profiles in different languages
- Receive accurate, **skills-based job matching** results
- Implementers: EURES & Jobs Ireland

## EURES

[Statistics](#) [Help and support](#)

[Home](#) [Jobseekers](#) [Employers](#) [Living & Working](#) [EURES Services](#)

### Find a job in Europe

There are currently **3463776 jobs** waiting for you!

Keywords, company, job title, ...

All European Countries

Search

Advanced search

Specific data quality disclaimer and terms of use for job vacancies



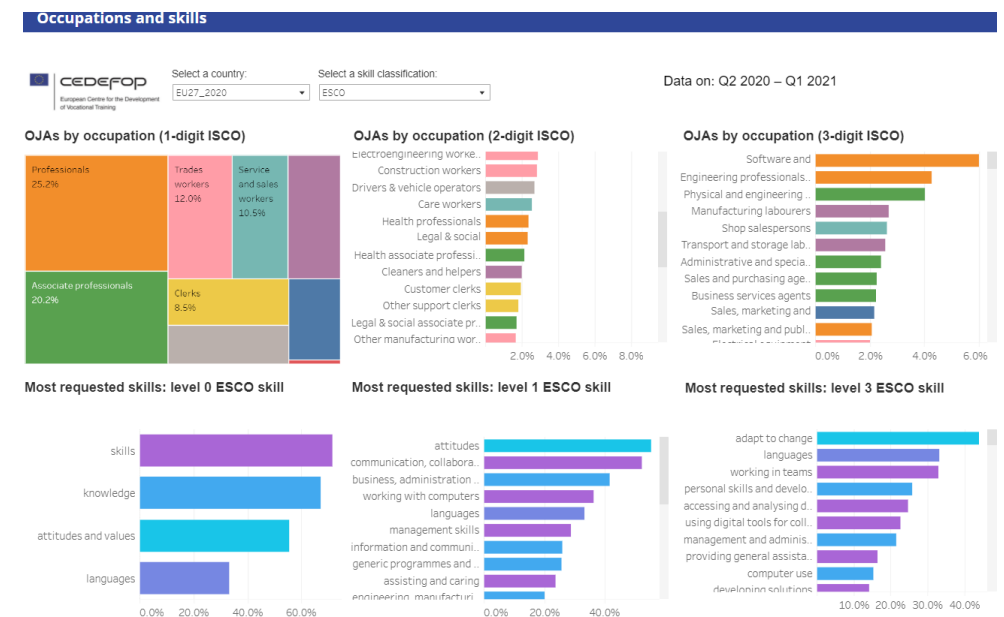
### The use of ESCO by Jobs Ireland

**Employers** across Ireland have been using ESCO to **create vacancies**, and **Jobseekers** use the classification to **describe their work details**.

Insights from implementers

# ESCO supports the analysis of labour market data

- Access to multilingual data
- Ensure interoperability with other data sources
- Collect data at **local, regional** and **national** level, and compare it at EU level
- Improves the collection, comparison and dissemination of data through tools that capture skills intelligence and statistics.



## Meeting agenda

1. Introduction to ESCO
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3. ESCO Implementers and Use Cases
4. **Linking learning outcomes to ESCO Skills**

# Introduction: Why linking qualifications to skills?

- to bridge the gap between education and employment → using ESCO to **identify and analyse** which skills are related to a particular qualification (further used to indicate matches and/or mismatches with skills needs of occupations and sectors);
- helps making **qualifications more transparent across Europe** and allows educators, students and employers aligning their needs
- Demonstrates how ESCO classification can be used to **enrich the descriptions of educational curricula**;
- Help the **translation, comparison and/or review** of qualifications
- The use of AI **reduces the costs and resources** needed to perform a similar activity

# Introduction: Users

Linking learning outcomes of qualifications to ESCO skills means that:

**Employers, training providers and educational sector institutions** can more easily grasp the labour market value of a qualification, in particular in a **cross-border context**

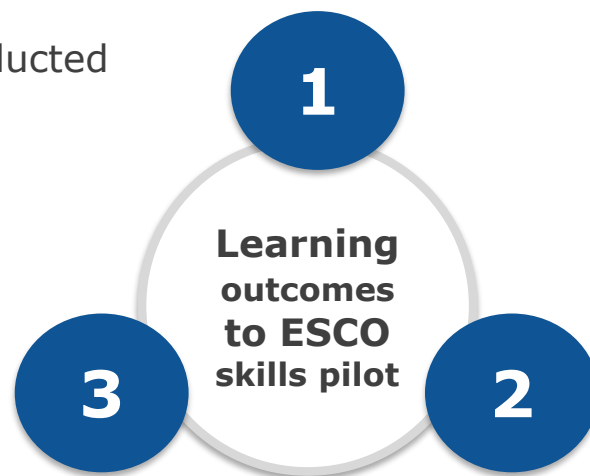
**Individuals** improve chances on labour market through **better skills-based job matching and richer qualifications information.**

# Background: LO-linking platform

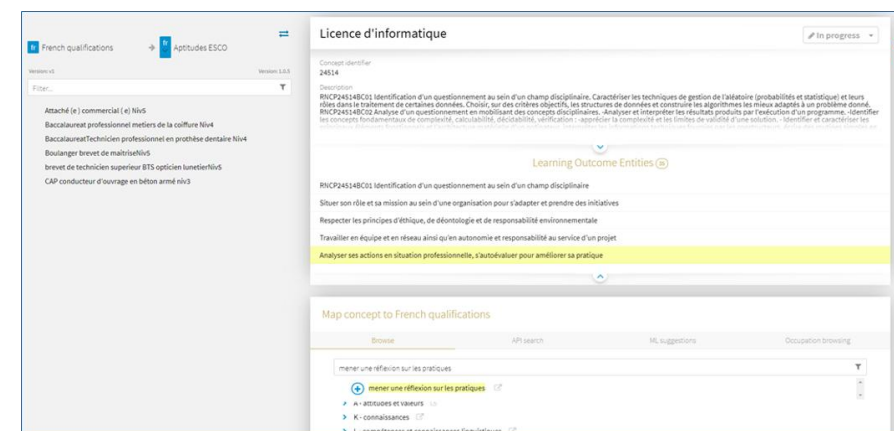
**1. Purpose:** Test the suitability of the linking approach for different actors/institutions, different types of qualifications and different publication processes across Member States. Conducted in 3 phases (started in 2019)

## 3. Participants

- EU Member States
- Social partners
- European Training Foundation (ETF) for African qualifications
- Private training providers



**2. Linking platform service tool:** Multilingual algorithm based on machine learning for suggesting relevant skills and knowledge concepts.



The screenshot displays the 'Licence d'informatique' page on the platform. It includes a search bar, a list of French qualifications, and a section for 'Learning Outcome Entities'. The following table summarizes the entities shown:

Entity ID	Description
RICP24514BC01	Identification d'un questionnement au sein d'un champ disciplinaire. Caractériser les techniques de gestion de l'incertitude (probabilités et statistiques) et leurs rôles dans le traitement de certaines données. Choisir, sur des critères objectifs, les structures de données et concevoir les algorithmes les mieux adaptés à un problème donné.
RICP24514BC02	Analyse d'un questionnement en mobilisant des concepts disciplinaires. Analyser et interpréter les résultats produits par l'exécution d'un programme. Identifier les concepts fondamentaux de complexité, calculabilité, récursivité, vérification, respecter la complexité en les limitant au vu de la taille d'une solution. Identifier et caractériser les...
RICP24514BC03	Identification d'un questionnement au sein d'un champ disciplinaire
	Situer son rôle et sa mission au sein d'une organisation pour s'adapter et prendre des initiatives
	Respecter les principes d'éthique, de déontologie et de responsabilité environnementale
	Travailler en équipe et en réseau ainsi qu'en autonomie et responsabilité au service d'un projet
	Analyser ses actions en situation professionnelle, s'autoévaluer pour améliorer sa pratique

Below the entities, there is a 'Map concept to French qualifications' section with a search bar and a list of suggestions:

- mener une réflexion sur les pratiques
- mener une réflexion sur les pratiques
- A - attitudes et valeurs
- K - connaissances
- L - compétences et connaissances linguistiques

## Next steps

- Open Access Mapping platform connecting qualifications to ESCO skills → **free-of-charge** and multilingual
- *LO-linking platform remains available after the pilot: focus on improving user experience. Use case: users with larger number of qualifications that prefer project-based setup*

### Learning Outcome Linking

Language

English

Top K

15

Input

Demonstrate a specialised understanding of the sales and marketing functions in a Property Services business. Devise a range of marketing materials for a property sale. Manage a negotiation strategy and agenda for a property service context. Formulate a marketing plan for a property or land sale.

Do you want to continue from where you left? Open your summary file!




Unhappy with the split? Fix it! [🔗](#)

### Learning Outcomes Suggestions

Demonstrate a specialised understanding of the sales and marketing functions in a Property Services business. +

Devise a range of marketing materials for a property sale. +

Manage a negotiation strategy and agenda for a property service context. +

Formulate a marketing plan for a property or land sale. +

# Questions?

**THANK YOU!**

**The ESCO Secretariat is always available to support ESCO stakeholders.**

**May you have any question, please contact us via email at [EMPL-ESCO-SECRETARIAT@ec.europa.eu](mailto:EMPL-ESCO-SECRETARIAT@ec.europa.eu)**

**<https://esco.ec.europa.eu/>**