



ESCO: practical uses in skills and qualifications

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The European Classification of Skills, Competences and Occupations

ESCO works as a dictionary, **describing, identifying and classifying** professional occupations, skills, and qualifications relevant for the EU labour market and education and training.



Structure of ESCO

Search occupations

Search: economist Find

Hierarchy view ξ

- 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

OCCUPATIONS PILLAR

3008 Occupations

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

SKILLS PILLAR

13890 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*
 - *Based on SKOS*
- **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
2114.19

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

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, DigComp, research**
 - *Working on a digital label*
- **Machine readable**
 - *One URI*
 - *Based on SKOS*
- **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 portal showcase

Find in the ESCO portal

ALL ESCO portal Find



OCCUPATIONS



SKILLS



QUALIFICATIONS

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

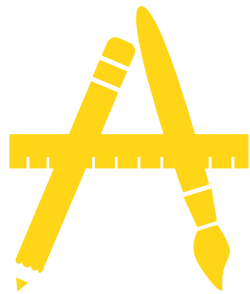
ESCO development process



Desk research

Sources:

- National classifications
 - Job vacancies
- Sector skills councils publications
- Occupational standards
 - Learning outcome descriptions
 - International classifications



Terminological guidelines

Dedicated terminological guidelines for the formulation of terms in the various languages.

Quality assurance



Review by stakeholders

Revision of ESCO concepts by sectorial experts, incorporating their feedback in the development process.



Validation by Member States

Consultation with Member States for the EN version and translations.

ESCO v1.1 (launched Febr.2022)

2nd ESCO major version



Green skills



Digital skills



Researchers skills



New model for transversal skills



Green Skills and Knowledge Concepts

The knowledge, abilities, values and attitudes needed to **live in, develop and support a society which reduces the impact of human activity on the environment**

Cedefop, 2012

381
SKILLS

185
KNOWLEDGE
concepts

5
TRANSVERSAL
SKILLS

Examples

Design biomass installations

Design the biomass energy system. Determine construction boundaries such as needed space and weight. Calculate indicators such as capacity, flow, and temperatures. Make detailed descriptions and drawings of the design.

Train staff to reduce food waste

Establish new trainings and staff development provisions to support staff knowledge in food waste prevention and food recycling practices. Ensure that staff understands methods of and tools for food recycling, e.g., separating waste.

Urban planning law

Investments and urban development agreements. Legislative developments regarding construction in terms of environmental, sustainability, social and financial matters.

Transversal skills & skills hierarchy

K - knowledge	+
L - language skills and knowledge	+
<u>S - skills</u>	-
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	-
T1 - core skills and competences	+
T2 - thinking skills and competences	+
T3 - self-management skills and competences	+
T4 - social and communication skills and competences	+
T5 - physical and manual skills and competences	+

13890

Skills

The ESCO skills pillar distinguishes between i) skill/competence concepts and ii) knowledge concepts by indicating the skill type. There is however no distinction between skills and competences. Each of these concepts comes with one preferred term and a number of non-preferred terms in each of the 28 ESCO languages. Every concept also includes an explanation in the form of description.

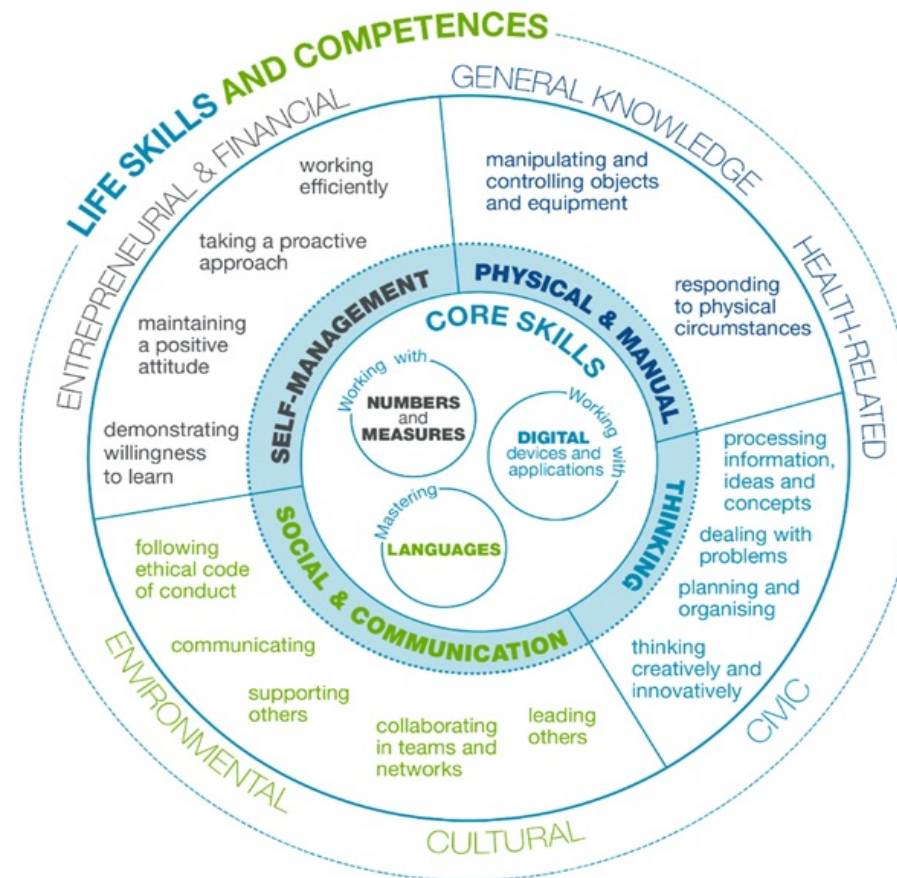
The skills pillar of ESCO contains 13,890 concepts structured in a hierarchy which contains four sub-classifications. Each sub-classification targets different types of knowledge and skill/competence concepts:

- Knowledge
- Skills
- Transversal skills
- Language skills and knowledge

In addition to the hierarchy, subsets of skills are included in the download packages:

- A transversal skill hierarchy
- A collection of languages
- A collection of green skills (only for v1.1)

The ESCO skill hierarchy is in a continuous process of improvement. Please share your feedback regarding the quality of the skills and skill groups through our contact page.



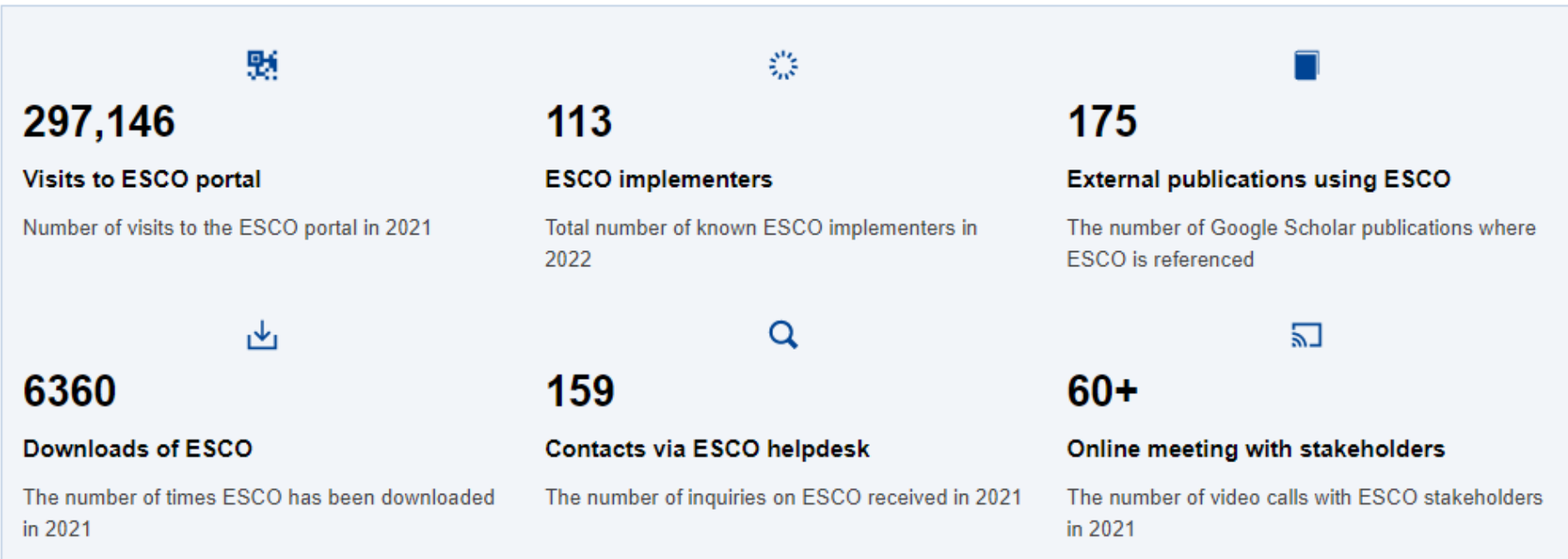
95 transversal skills

Copyright notice: The ESCO skill hierarchy is partially based on elements of the existing classification of O*Net and the Canadian skill and knowledge glossary. For more information click here.

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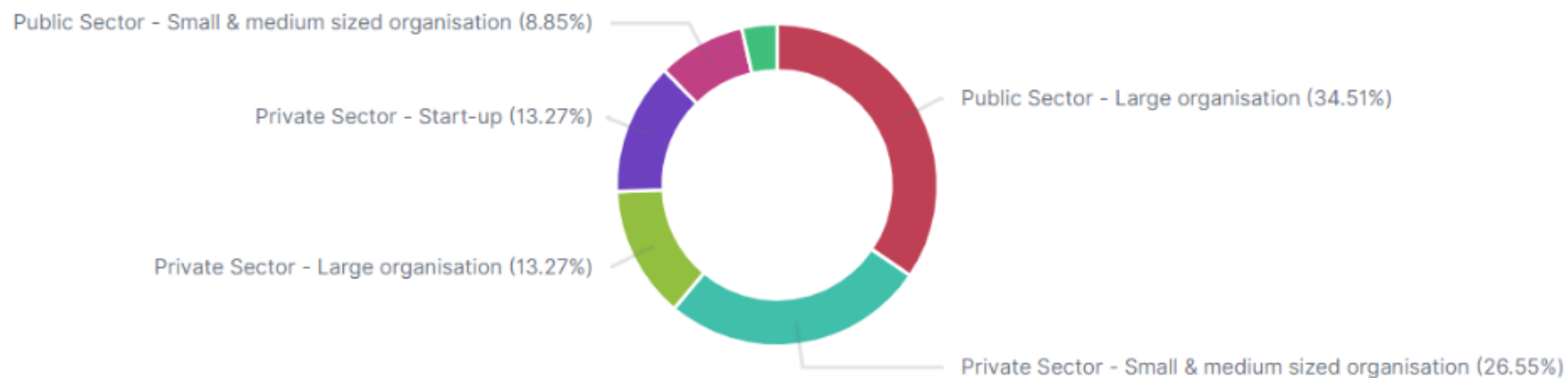
ESCO uptake

ESCO uptake by stakeholders

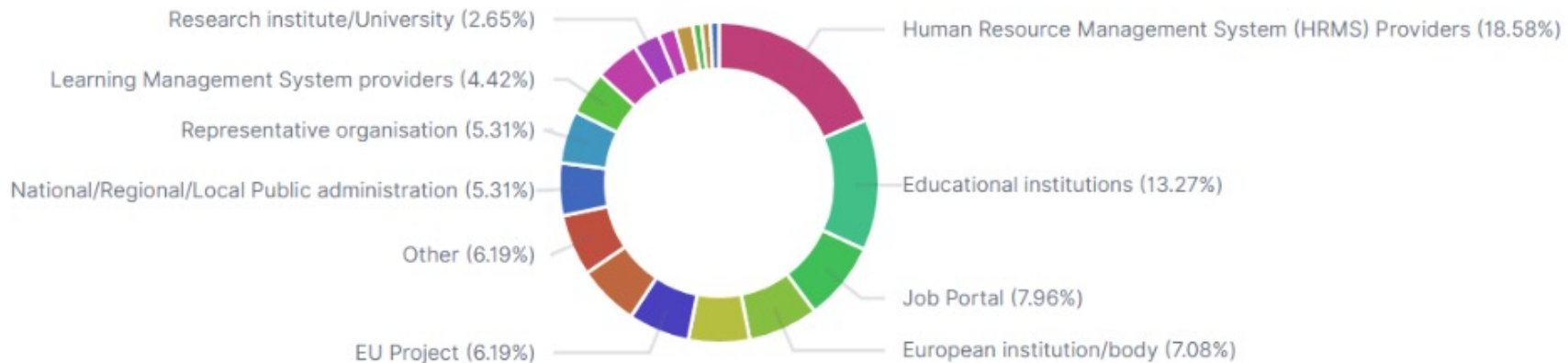


ESCO uptake

The distribution of ESCO implementers per sector:



The distribution of ESCO implementers by organisation type:



Use cases

Job-matching & searching

Compare vacancies and CVs and suggest best matches

Curricula reform

Based on LM evidence, adapt the learning outcomes of qualifications and training provided

Big data analysis of labour market

Detect demand of skills and occupations from online job advertisements

Validation of informal/non-formal learning

Identify, assess and certify knowledge & skills acquired outside of formal learning

Graduate tracking

Assess skills mismatches over time

How to use ESCO for qualifications/training?

- Use the occupational profiles as a starting point
- Get inspiration from the skills and competencies described in ESCO
- Make use of the IT tool (soon to be provided publicly) on referencing learning outcomes of qualifications to ESCO skills
- Use ESCO skills for developing skills intelligence (skills in high demand) & use the results to inform curricula reform

0 - Armed forces occupations	+
1 - Managers	+
2 - Professionals	+
3 - Technicians and associate professionals	-
31 - Science and engineering associate professionals	-
311 - Physical and engineering science technicians	+
312 - Mining, manufacturing and construction supervisors	-
3121 - Mining supervisors	+
3122 - Manufacturing supervisors	-
3122.1 - dairy processing technician	
3122.2 - food production planner	
3122.3 - industrial assembly supervisor	+
3122.4 - production supervisor	+
3122.5 - waste management supervisor	
3123 - Construction supervisors	+

industrial assembly supervisor

Discuss in the forum

Download

Technicians and associate professionals >
 Science and engineering associate professionals > Mining, manufacturing and construction supervisors >
 Manufacturing supervisors > industrial assembly supervisor >

Description

Code

3122.3

Description

Industrial assembly supervisors are in charge of organizing, planning and coordinating assembly operations. They keep track of all the work activities and manage the process for efficient functioning in order to tackle problems such as production loss. They answer to the industrial production and the manufacturing manager.

Alternative Labels

- production assembly supervisor
- assembly forewoman
- assembly foreman
- assembly controller
- assembly line supervisor
- goods compliance supervisor
- assembly chargehand
- assembly co-ordinator
- quality control supervisor
- assembly planner
- assembly overseer
- goods production supervisor
- assembly team leader
- quality supervisor
- industrial assembly supervisor

Skills & Competences

Essential Skills and Competences

- manage budgets
- oversee assembly operations
- manage health and safety standards
- adjust production schedule
- create manufacturing guidelines
- provide department schedule for staff
- meet deadlines
- develop manufacturing policies
- create solutions to problems
- report on production results
- wear appropriate protective gear
- liaise with managers
- train employees
- plan shifts of employees
- follow production schedule
- manage resources
- read standard blueprints
- oversee quality control
- optimise production
- supervise work
- manage staff
- control production
- cope with manufacturing deadlines pressure
- analyse production processes for improvement
- define manufacturing quality criteria
- oversee production requirements
- keep records of work progress
- communicate production plan
- meet productivity targets

Essential Knowledge

- manufacturing processes
- industrial software
- industrial engineering
- quality standards
- industrial design
- production processes

Optional Skills and Competences

- perform data analysis
- follow manufacturing work schedule
- manage manufacturing documentation
- disaggregate the production plan
- arrange equipment repairs
- adapt production levels
- advise on machinery malfunctions
- evaluate employees work
- apply control process statistical methods
- monitor manufacturing quality standards
- ensure finished product meet requirements
- communicate problems to senior colleagues
- analyse the need for technical resources
- recruit personnel
- plan manufacturing processes
- check material resources
- liaise with quality assurance
- motivate employees
- use CAM software



European Commission

Why is ESCO relevant for qualifications?

ESCO is a common reference language that supports:

- transparency
- comparison,
- identification and
- analysis of the content of a qualification.

**Describe & understand
Learning outcomes of
qualifications**

Skills & knowledge as
common factor

**Enhance personalised
career guidance services**

Recommend personalised
career paths & learning

**Support validation of
informal/non-formal
learning**

Digital badges/micro-
credentials

Curricula reform use case

Australia's leading digital research network, CSIRO 61 uses [ESCO](#) to reskill and upskill the workforce

AIM:

Use ESCO to evaluate the currency of vocational education and training courses.

Compare content of training courses to understand relevance of skills vs ESCO.

HOW:

MACHINE LEARNING CLASSIFIER

Identify phrases in course descriptions that are similar to the ESCO skills descriptions

Train AI model for thousands of courses.

RESULTS:

GAPS & UPDATES

Flag skills gap in the courses provided for Australian occupations

Inform training providers of results to review their offerings and update curricula.

Curricula reform use case

Public administration of Emilia-Romagna region, Italy

AIM:

Use ESCO to assess the skills and occupations relevant for the big data sector in order to adapt the curricula on offer in the region

HOW:

Quantitative & qualitative analysis

Identify occupations & skills from the sector based on ESCO via analysis of job vacancies

Survey to employers, education providers and teachers (universities + VET)

Focus groups on most important skills

RESULTS:

Understand the regional skills landscape

Validate the occupations & skills required by the labour market & supplied by universities

Work towards public-private partnership on skills development

Provide digital badges



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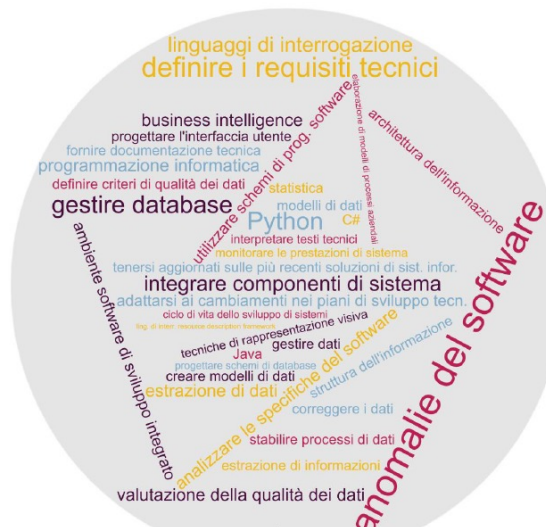
In practice:

Le Skills

Imprese



Docenti



Competenze chiave

Figura 3.5. Le 17 Abilità/Competenze chiave per lo sviluppo dei Big Data



- Understand the skills demanded by employers and skills supplied by education providers and where the mismatch is
- Work with education providers to update their curricula accordingly in the big data sector

Curricula reform use case

Politecnico di Milano, Italy
European credit clearinghouse for opening up
education ([ECCOE](#)) project

AIM:

Use ESCO to describe or tag learning outcomes of Massive online courses (MOOCs)

Compare content of training courses to ESCO skills

Make the link explicit

HOW:

Manual process by education staff

Use the ESCO portal to look at skills, use search & browsing function

RESULTS:

Annotation & new LO

Annotate MOOCs with ESCO skills to facilitate interoperability

Facilitate the work of training providers when creating Learning outcomes

In practice:

- *Tagging courses content with ESCO skills results in references to an EU common standard*
- *It facilitates interoperability of learning opportunities among stakeholders.*
- Supports the recognition of online learning opportunities



Ethics of Artificial Intelligence

INTENDED LEARNING OUTCOMES

By actively participating in this MOOC, you will achieve different intended learning outcomes (ILOs).

1. Week 1:

- Describe the reasons for an ethical analysis applied to AI.
- Recognize how the notion of responsibility is challenged when designing and using AI tools.

2. Week 2:

- Identify the ethical and social impacts and implications of AI.
- Recognize and analyze ethical and social issues inherent in AI by means of examples and case-studies analyzed with the use of the main ethical frameworks.

3. Week 3:

- Learn how to analyze problems through an ethical lens.
ESCO: address problems critically
- Use critical skills in clarifying and ethically analyzing AI in different domains of life.
ESCO: think analytically

4. Week 4:

- Critically analyze the current policies for AI.
- Use ethical and socially responsible principles in your professional life.
ESCO: follow ethical code of conduct ESCO: adhere to organisational code of ethics ESCO: values

https://www.pok.polimi.it/courses/course-v1:Polimi+AI102+2022_M3/about



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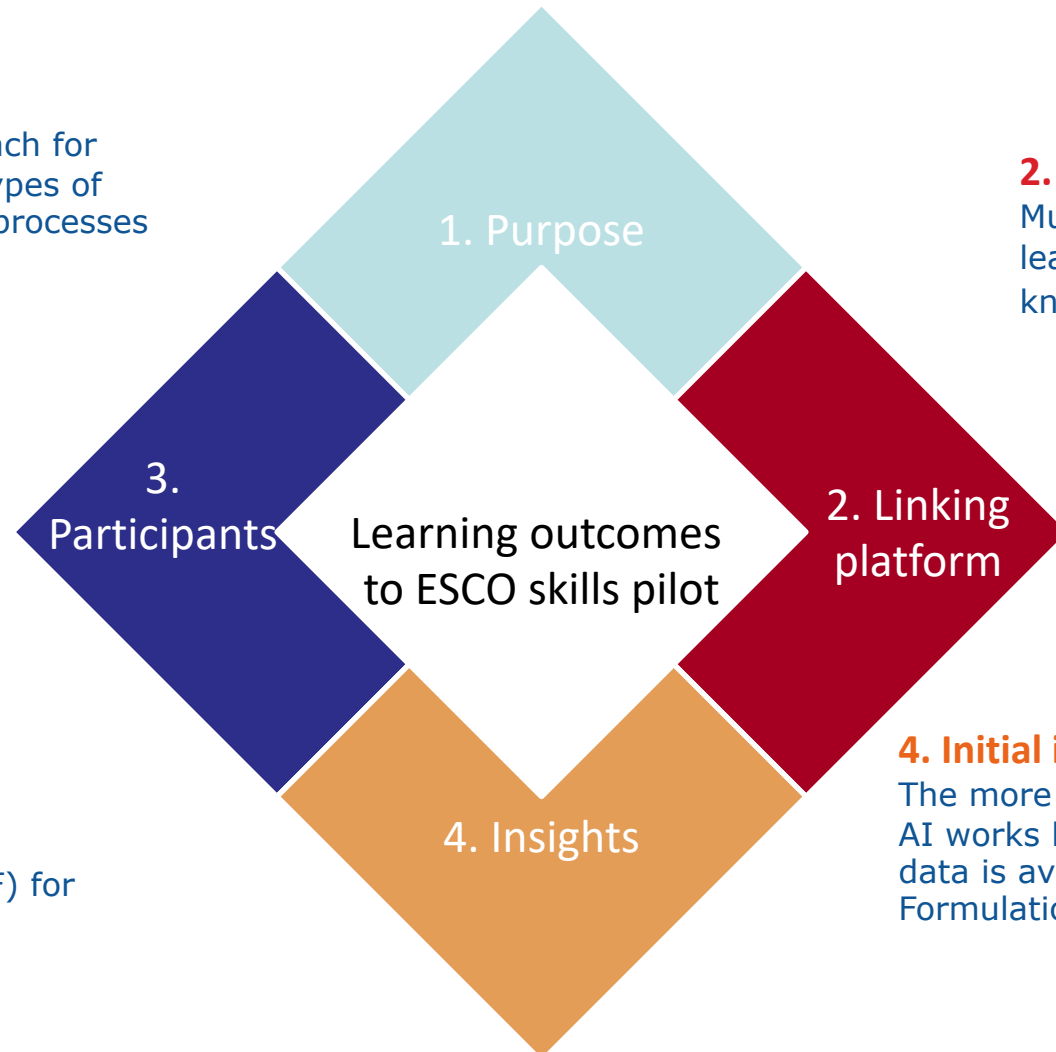
ESCO qualifications pilot using Artificial intelligence

1. Purpose

Test the suitability of the linking approach for different actors/institutions, different types of qualifications and different publication processes across Member States.

2. Linking platform service tool

Multilingual algorithm based on machine learning for suggesting relevant skills and knowledge concepts.



3. Participants

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

4. Initial insights

The more data, the better matching
AI works better in those languages where more data is available
Formulation of learning outcome is key

ESCO qualifications pilot

Available on the [ESCO website](#) as an open tool by end of 2022

The screenshot shows the 'Learning Outcome - Linking' tool interface. The top navigation bar includes the European Commission logo, the title 'Learning Outcome - Linking', and progress indicators for 'ECCOEEN EN Qualifications' (0/15) and 'ESCO skills' (0/13891). The main content area is titled 'Sustainable Urban Water Systems' and includes a concept identifier 'b687368a-bd9d-41f7-b961-5ecdc927a836'. A description section highlights the focus on stormwater management and water supply strategies. Below this, a 'Learning Outcome Entities' section lists related skills such as 'manage water flows and catchments', 'water policies', 'conserve water resource', 'develop flood remediation strategies', and 'water consumption'. The interface also features a sidebar with a list of learning outcomes and a bottom navigation bar with options like 'Browse', 'API search', 'ML suggestions', and 'Occupation browsing'.

How to get started with ESCO?

DOWNLOAD From the ESCO Portal

<https://esco.ec.europa.eu/en/use-esco/download>

Clear filters

Version	Content
<input type="text" value="ESCO dataset - v1.1.0"/>	<input type="text" value="classification"/>
<small>Version of the API to download</small>	<small>Type of content to download</small>
Language	File type
<input type="text" value="ro"/>	<input type="text" value="Select an option"/>
<small>Language of the content to download.</small>	<small>File type to download</small>

[Export your dataset](#)

UPON REQUEST ESCO Secretariat

EMPL-ESCO-
SECRETARIAT@ec.europa.eu

Technical support on how to use ESCO

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 and use our hashtag #ESCO_EU