

ESCO

European Skills/Competences, qualifications and Occupations



ESCO version 1.2.

ESCO Secretariat

Meeting agenda

- 1. Introduction to ESCO**
- 2. ESCO continuous improvement process**
- 3. How to access the data?**
- 4. Data science and continuous maintenance of ESCO**
- 5. Future of ESCO**
- 6. Q & A**

The European Classification of Skills, Competences and Occupations works as a dictionary, **describing, identifying and classifying** professional occupations, skills, and competences relevant for the EU labour market and education and training.

Search occupations

Search: 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

OCCUPATIONS PILLAR

3039 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

13939 Skills-Competences/Knowledge

Continuous improvement of ESCO

- A need to be aligned with the European labour market trends.
- Maintenance and creation of new content.
- Updates driven by data evidences.
- AI techniques to support content and quality improvements.

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

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2. **ESCO continuous improvement process**
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ESCO v1.2.

- New version of ESCO classification. Major content update.
- Creation of new content (occupations, skills and knowledge).
- Improvements of existing ESCO profiles.
- Obsolescence of outdated profiles.
- Translation into all ESCO languages.

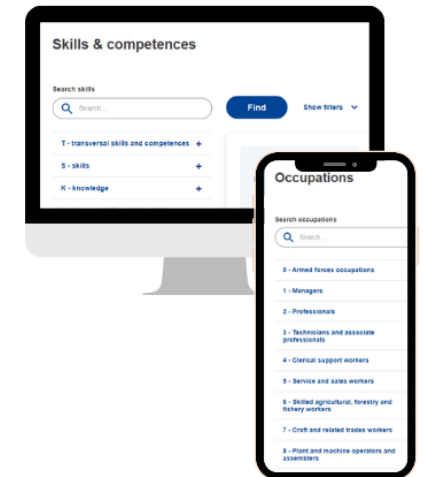
-
- Twin transition and emerging technologies.
 - Increased relevance of AI techniques within ESCO methodology.
 - Collaboration with sectoral experts.

ESCO v1.2

A new major version!

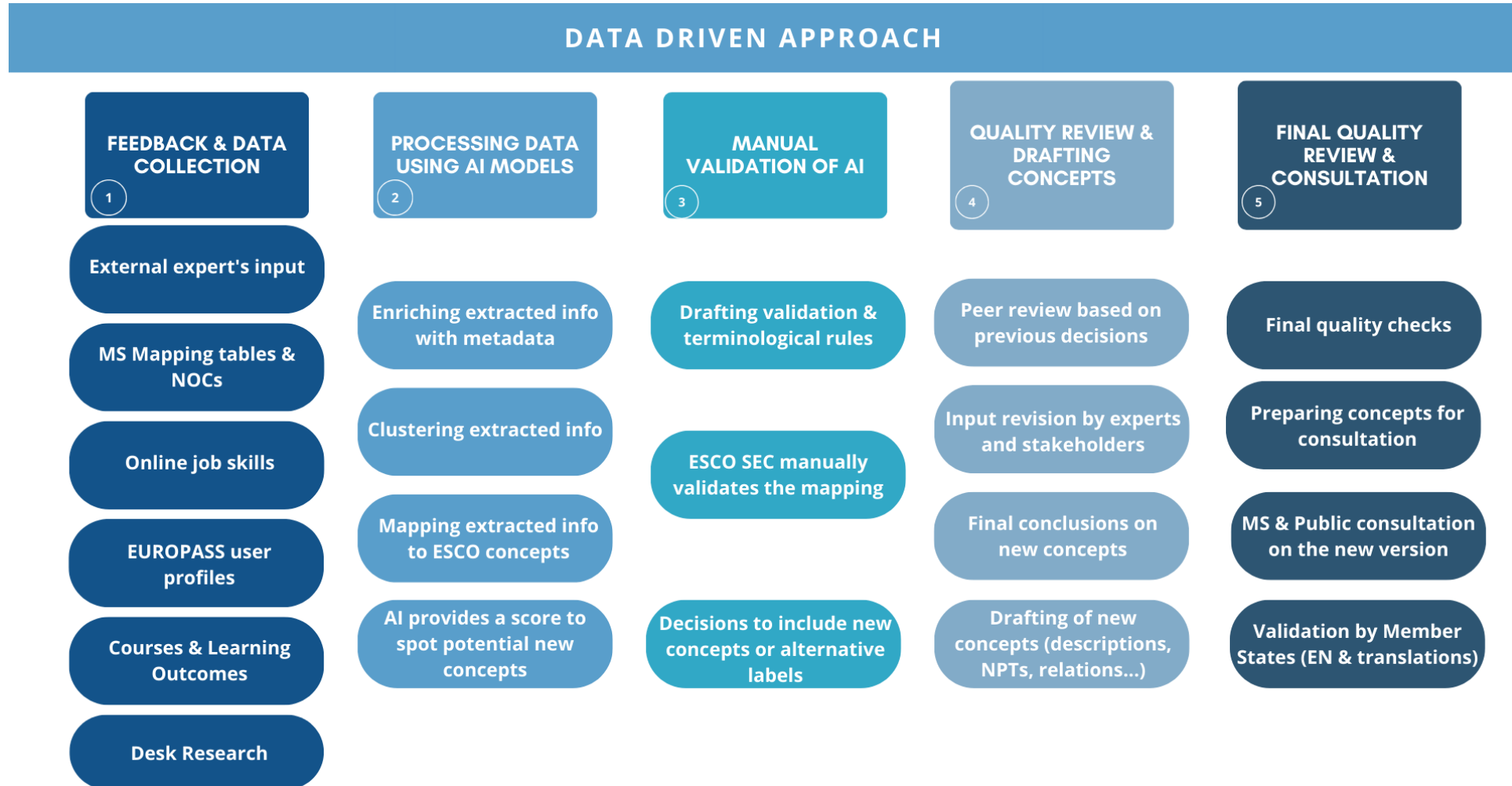
 *New occupations and skills*

 *Quality improvements*



ESCO v1.2. Methodology

A data driven approach



New content

- Creation of new content profiles.
- 16 key economic sectors represented.
- Profiles consulted and improved.
- Representation of the European labour market.

podcast producer

battery simulation engineer

evaluate blockchain architectures

conduct threat intelligence

ecopedagogy

sustainable building design

NEW CONCEPTS	ESCO V1.2.
NEW OCCUPATIONS	35
NEW SKILLS	42
NEW KNOWLEDGE	196
	273

Alternative Labels (NPTs)

ALTERNATIVE LABELS OF NEW CONCEPTS	ESCO V1.2. NEW NPTS
NEW OCCUPATIONS	229
NEW SKILLS	103
NEW KNOWLEDGE	345
	677

ALTERNATIVE LABELS OF EXISTING CONCEPTS	ESCO V1.2. NEW NPTS
EXISTING OCCUPATIONS	115
EXISTING SKILLS	60
EXISTING KNOWLEDGE	114
	289

battery simulation engineer

Alternative Labels

- battery calibration engineer
- battery modeling specialist
- battery simulation specialist
- battery simulation test expert
- battery test development engineer
- battery test validation engineer
- device test engineer
- electrical failure analysis engineer
- electronics product test engineer
- sustaining engineer

promote sustainability

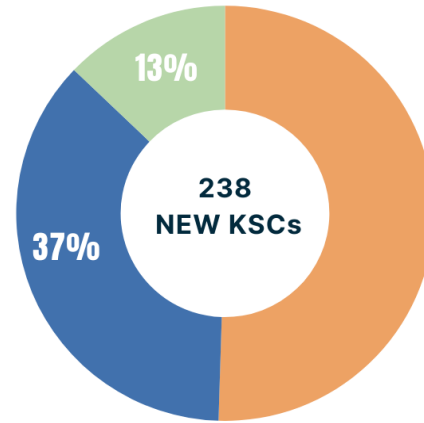
Alternative Labels

- advocate sustainability
- develop sustainability campaigns
- encourage sustainability
- implement sustainability marketing
- promote sustainability
- promoting sustainability

Twin Transition

ESCO V1.2. priority

- Green and Digital coverage



New Green Skills & Knowledges	31
New Digital Skills & Knowledges	87

REPRESENTATION OF TWIN TRANSITION	ESCO V1.2.
GREEN SKILLS AND KNOWLEDGE	591
DIGITAL SKILLS AND KNOWLEDGE	1284
	1875

Portal

Skills & competences

Select an ESCO version

ESCO dataset - v1.2.0

Search skills

Find

Hide filters ^

Filters

Concept type ⁱ*

Reusability level ⁱ

Status ⁱ

Labels ⁱ

Knowledge, Skill

Select

Select

DigComp, Green

Select all (3)

DigComp

Green

Research

Clear all

Close

T - transversal skills and competences +

S - skills -

S1 - communication, collaboration and creativity +

S2 - information skills +

skills

skills > skills

Description

Quality improvements

Quality review of ESCO knowledge pillar

Improvement of language concepts

Inclusion of national sign languages

Revision of COVID-related occupations

Removal of duplicate skills

Resolution of occupations with repeated essential & optional skills

Revision of existing knowledge concepts for digital software/tools

Removal of 11,211 exact matches between PT & NPTs

Correction of 350 PT/NPT labels by eliminating unnecessary commas

Implementation of feedback received by external stakeholders & Blueprint Projects

Labelling of new skills and knowledge as green or digital

Resolution of 65 concepts with conflicting related concept schemes

Improvement of 111 occupations with five or less essential skills

Improvements to occupations with less than 5 NPTs / to KSC without at least 1 NPT

Correction of 329 orphan skills

Improvements in the drafting of PTs and description

Reallocation of 273 skills in the hierarchy

Adjustment of skills with multiple broaders at hierarchical level

Correction of 329 orphan skills

build trust

Relationships

Broader concepts

developing professional relationships or networks

ESCO V1.1

build trust

Relationships

Broader concepts

developing professional relationships or networks

ESCO V1.2

Essential for

equality and inclusion manager public relations officer online community manager

labour relations officer human resources manager executive assistant

community development officer international relations officer psychologist

client relations manager embassy counsellor community development social worker

communication manager human resources officer chief executive officer

Optional for

nursery school head teacher headteacher

Exact matches between PT& NPT

co-pilot

Alternative Labels

aircraft co-pilot aircraft first officer co-pilot multi-crew pilot

ESCO V1.1

co-pilot

Alternative Labels

aircraft co-pilot aircraft first officer multi-crew pilot

ESCO V1.2

Removal of duplicate skills

maintain amusement park attractions

skills > constructing > building and repairing structures > installing wooden and metal components > maintain amusement park attractions

ESCO V1.2

Description

Maintain, control and repair rides and attractions, both mechanically and electronically. Keep an exhaustive inventory of equipment in amusement parks and venues.

Alternative Labels

keep amusement park attractions in good condition

keep track of equipment in recreational parks keep up amusement park attractions

list all equipment in amusement park **maintain amusement park equipment**

maintain equipment in amusement park oversee amusement park attractions

Skill type

skill

Skill reusability level

sector specific skills and competences

maintain amusement park equipment

Description

Maintain exhaustive inventories of equipment in venues and amusement parks.

Alternative Labels

keep track of equipment in recreational parks list all equipment in amusement park

maintain equipment in amusement park

Skill type

skill

Skill reusability level

sector specific skills and competences

Concept URI

Concept Uri

<http://data.europa.eu/esco/skill/1008da30-7690-42c8-94c7-3f3bd8885c00>

Status

obsolete

Obsolete concepts

Classification up to date.

CONCEPTS TURNED OBSOLETE	ESCO V1.2.
OCCUPATIONS	3
SKILLS AND KNOWLEDGE	195
	198

Search skills

Find

Hide filters ^

Filters

Concept type ^{i*} Group, Knowledge, Skill |
 Reusability level ⁱ Select |
 Status ⁱ Obsolete |
 Labels ⁱ Select

| Select all (2) | Obsolete | Released

Apply

Hierarchy view ↵

Search result

- maintain amusement park equipment
- validate amusement park tickets
- clean ride units
- maintain ore processing equipment

maintain amusement park equipment Download

maintain amusement park equipment

Description

Description

Obsolete

Select all (2)

Obsolete

Released

Clear all | **Close**

Skills Relevance

Relevance of skill groups in ESCO Occupations

- Complement qualitative information.
- Essential and Optional skills representation.
- Graphical display of quantitative data.
- Skill groups share.
- Number of KSCs per each group.
- Intuitive pie chart as new section.
- Interactive tool.
- Downloadable from ESCO Portal.

metal drawing machine operator

Skills & Competences

Essential Skills and Competences

ensure equipment availability monitor automated machines monitor gauge
 monitor moving workpiece in a machine perform test run remove inadequate workpieces
 remove processed workpiece set up the controller of a machine supply machine
 troubleshoot

Essential Knowledge

cold drawing processes dies quality and cycle time optimisation quality standards
 types of metal

Optional Skills and Competences

advise on machinery malfunctions consult technical resources
 keep records of work progress mark processed workpiece monitor conveyor belt
 operate lifting equipment perform machine maintenance perform product testing
 record production data for quality control safely handle metal wire under tension
 tend bar drawing machine tend tube drawing machine tend wire drawing machine
 wear appropriate protective gear

Optional Knowledge

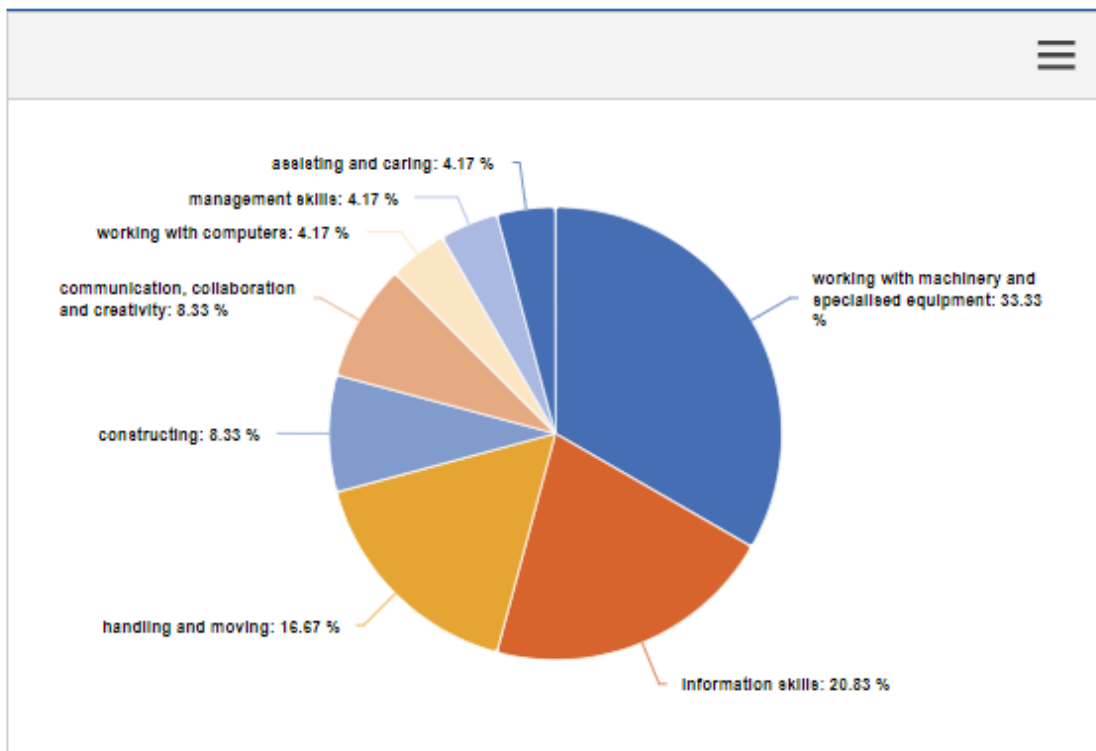
ferrous metal processing manufacture of small metal parts
 manufacturing of door furniture from metal manufacturing of metal assembly products
 manufacturing of weapons and ammunition metal drawing processes
 metal forming technologies non-ferrous metal processing precious metal processing
 types of metal manufacturing processes

Skills Relevance

Relevance of skill groups in ESCO Occupations

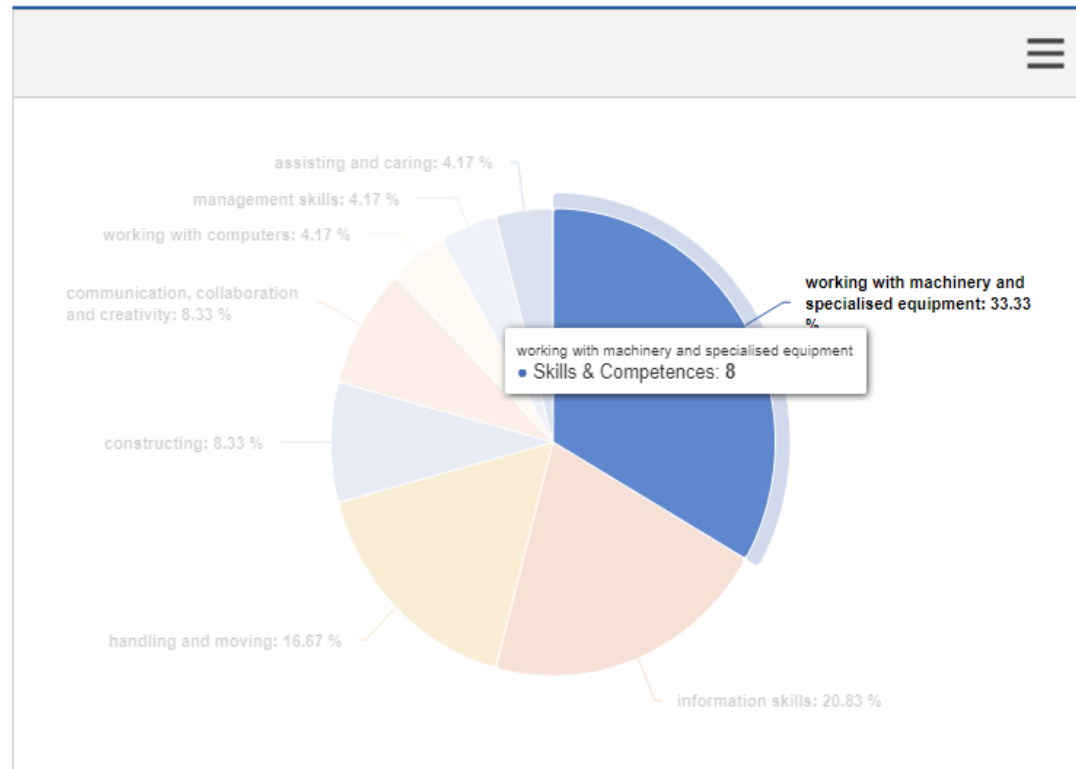
metal drawing machine operator

Skills & Competences



metal drawing machine operator

Skills & Competences



Translations ESCO v1.2.

ESCO languages

- Translation of ESCO v1.2. into 28 languages.
- Improvements of previous versions.
- 8 languages received quality suggestions.
- Inclusion of national sign languages.
- Collection of feedback for ESCO v1.2. is open.
- Quality review of ESCO v1.2. translations =

*ESCO minor version **ESCO v1.2.1***

- 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)

Meeting agenda

1. Introduction to ESCO
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3. **How to access the data?**
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How to access ESCO?

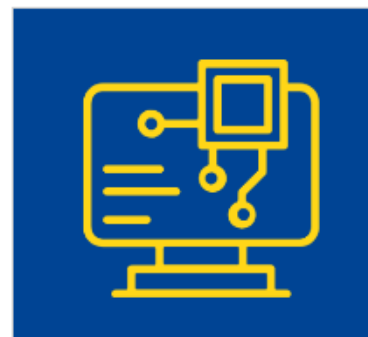
ESCO is published as Linked Open Data: data is openly available and interconnected, fostering collaboration and interoperability



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**

ESCO v1.2 is published in 28 languages (all official EU languages plus Icelandic, Norwegian, Ukrainian, and Arabic).

ESCO Download



You can download ESCO in various formats (*SKOS-RDF (ttl)*, *ODS*, and *CSV*) by accessing [ESCO download page](#) and applying specific filters. There is a possibility to download multiple package sets simultaneously! (i.e. in different languages or versions)

Version ⓘ

ESCO dataset - v1.2.0 ▼

Version of the API to download

Content ⓘ

classification ▼

Type of content to download

Language ⓘ

fr ▼

Language of the content to download.

File type ⓘ

csv ▼

File type to download

Add to your package

[*Structure of the files and how to connect them is explained here*](#)

Version: **ESCO dataset - v1.2.0**

Content: **Classification**

Language: **en**

File type: **csv** (41.4 MB)




Version: **ESCO dataset - v1.2.0**

Content: **Classification**

Language: **es**

File type: **ods** (7.71 MB)





















Version: **ESCO dataset - v1.2.0**

Content: **Classification**

Language: **fr**

File type: **csv** (37.51 MB)



- Name ^
-  broaderRelationsOccPillar_en
 -  broaderRelationsSkillPillar_en
 -  conceptSchemes_en
 -  digCompSkillsCollection_en
 -  digitalSkillsCollection_en
 -  greenSkillsCollection_en
 -  ISCOGroups_en
 -  languageSkillsCollection_en
 -  occupations_en
 -  occupationSkillRelations_en
 -  researchOccupationsCollection_en
 -  researchSkillsCollection_en
 -  skillGroups_en
 -  skills_en
 -  skillsHierarchy_en
 -  skillSkillRelations_en
 -  transversalSkillsCollection_en

ESCO API



Local API is in the Download section



Clear filters ✕

Version ⓘ

ESCO dataset - v1.2.0
▼

Version of the API to download

Content ⓘ

Local API
▼

Type of content to download

Language ⓘ

Language independent
▼

Language of the content to download.

File type ⓘ

zip
▼

File type to download

Add to your package

ESCO web-service API:

- the default version is v1.2
- Other versions can be selected by using a special parameter in the APIs i.e. *selectedVersion*



API SUMMARY
API METHODS - BULKOPERATION
getConceptByConceptScheme getConceptByUri getOccupationByConceptScheme getOccupationByUri getSkillByConceptScheme getSkillByUri getTaxonomyByUri resourceRelatedGet
API METHODS - HISTORY
conversionConceptGet conversionOccupationGet conversionSkillGet historyGet
API METHODS - SEARCH

ESCO REST API Docs

API and SDK Documentation

Version: 1.0.14

The ESCO REST API exposes ESCO as a simple, RESTful API.

ESCO Secretariat
 EMPL-ESCO-SECRETARIAT@ec.europa.eu
[ESCO API further documentation \(pdf\)](#)
[Open API v3 definition](#)

BulkOperation

getConceptByConceptScheme

Get concepts - by Concept Scheme

Get a collection of resources of class Concept by the universal

Transitioning from previous ESCO versions

The delta file can be accessed on the ESCO Portal in the Download section



Version ¹

ESCO dataset - v1.2.0
▼

Version of the API to download

Content ¹

delta
▼

Type of content to download

Language ¹

Language independent
▼

Language of the content to download.

File type ¹

csv
▼

File type to download

Add to your package

The delta file will list all differences between ESCO v1.2 and the latest previous minor version (v1.1.2)



	A	B	C	D	E	F	G
1	concept URI	concept prefLabel	field	old value	new value	action	language
2	http://data.europ	use intranet	altLabel	None	use intranet system	Added	en
3	http://data.europ	adolescent psychological development	description	None	Entwicklungsbedür	Added	de
4	http://data.europ	handle financial transactions	description	None	Управляти валюто	Added	uk
5	http://data.europ	manufacturing of metal containers	description	None	Виробництво резе	Added	uk
6	http://data.europ	radiation protection officer	description	None	Фахівці із радіацій	Added	uk
7	http://data.europ	design greeting cards	prefLabel	None	розробляти віталь	Added	uk
8	http://data.europ	cloud architect	description	None	Arhitekti rešitev v c	Added	sl
9	http://data.europ	data engineering	prefLabel	None	інженерія даних	Added	uk
10	http://data.europ	manufacturing of metal assembly products	prefLabel	None	виробництво мета	Added	uk
11	http://data.europ	disseminate general corporate information	prefLabel	None	поширювати загал	Added	uk
12	http://data.europ	web designer	description	None	Les concepteurs de	Added	fr
13	http://data.europ	create garden areas	prefLabel	None	створювати садові	Added	uk
14	http://data.europ	international business	description	None	Procesos relacionac	Added	es
15	http://data.europ	filament winding operator	description	None	Kuidunkelauskonee	Added	fi
16	http://data.europ	geometry	prefLabel	None	геометрія	Added	uk
17	http://data.europ	define roles of supporting team for community ar	description	None	Арібрѣžти kitų speci	Added	lt
18	http://data.europ	provide psychological interventions to chronically	description	None	Здійснювати психо	Added	uk
19	http://data.europ	educate patient's relations on care	status	released	obsolete	Updated	None
20	http://data.europ	clean vehicle exterior	description	None	Мити, чистити, пол	Added	uk
21	http://data.europ	develop company strategies	description	None	Передбачати, план	Added	uk
22	http://data.europ	telecom regulations	prefLabel	None	regolamenti tat-tel	Added	mt
23	http://data.europ	create beverage recipes with botanicals	isEssentialSkillFc	None	http://data.europa.	Added	None
24	http://data.europ	digital identity management	description	None	Le processus rescou	Added	fr
25	http://data.europ	develop working procedures	description	None	Створювати станда	Added	uk
26	http://data.europ	implement fire safety management plans	prefLabel	None	упроваджувати пл	Added	uk

Transitioning from previous ESCO versions

In ESCO-based services

1

Use of ESCO in user profiles and CVs



Option 1: update obsolete concepts (automatically or by user)



API search related skills

Option 2: update changed concepts (automatically or by the user)



Delta files, API conversion function

Option 3: remove obsolete skills and occupations

2

Use of ESCO for matching or search



Option 1: disregard obsolete or changed concepts



API search related skills

Option 2: update obsolete or changed concepts



Delta files, API conversion function

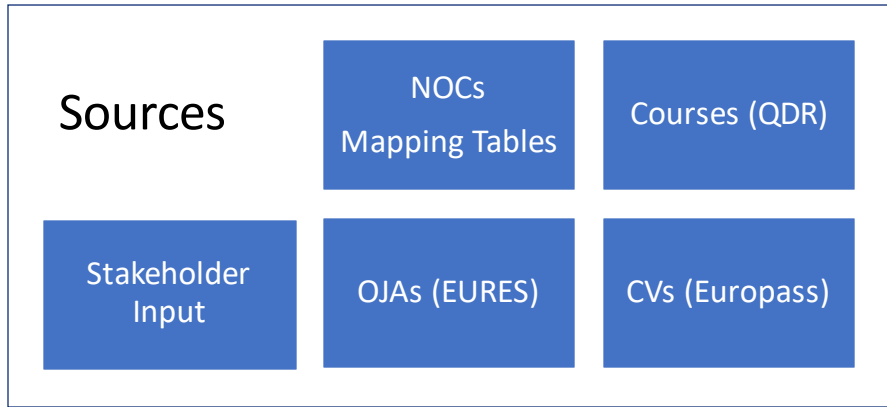
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Data science and continuous maintenance of ESCO

- Data science: evidence-based **quantitative** approach based on data
- Complement **qualitative** input from experts
- **Large-scale** data: labour market (supply/demand) + education
- Combined with traditional taxonomic work to reflect **reality** in ESCO:
 - Improve **quality** of ESCO taxonomy
 - Provide **additional information** through ESCO knowledge graph to implementers
 - Become more **efficient** in maintaining ESCO

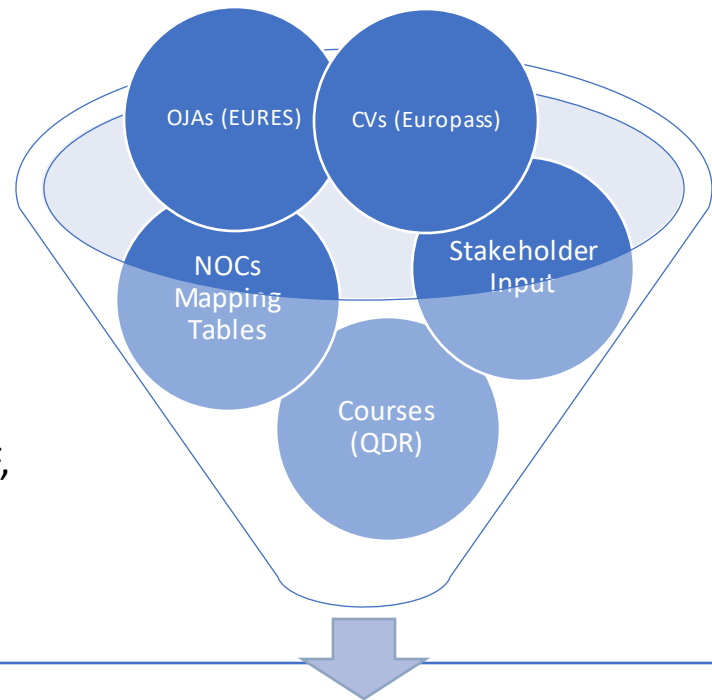
Towards an integrated approach



Extract information



Add structure (e.g. ISCED-F, NACE, country, ...)



Process data

- Clean, translate, cluster extracted candidate concepts
- Map candidates to ESCO concepts

Statistics

- Aggregate candidate concepts across sources
- Summarise aggregates with metadata (e.g. geographical, sectoral, temporal coverage)

Expert

- Integrated content validation (concept + relations)
- ESCO concept drafting



Member State taxonomy delta analysis

Goal: Identify new candidate concepts by having a continuous overview of concepts that MS add to their taxonomies

- Methodology:**
1. Obtain MS taxonomy change logs or compare different versions in time
 2. Extract newly added skills or occupations
 3. Map to ESCO using machine learning model to filter out what is already included
 4. Manual validation of remaining occupation candidates

Input Occupation	Input Occupation Translated	Suggestion Score	Suggested ESCO Occupation (PT)
Berater/in - Smart City	Consultant - smart city	0.71	business consultant
Agiler Coach / Scrum Master	Agile coach / scrum master	0.74	ICT project manager
Fachkraft - Industrie 4.0	Specialist - industry 4.0	0.75	industrial engineer
Data Engineer	Data engineer	0.79	data scientist
Fachwirt/in - E-Commerce	Specialist - e-commerce	0.80	online marketer
Entwickler/in - Drohnen	Developer – drones	0.84	embedded systems software developer
Embedded-Systems-Entwickler/in	Embedded systems developer	0.96	embedded systems software developer
Bildjournalist/in	Photojournalist	0.96	photojournalist
Vorarbeiter/in - Bodenverlegung	Foreman - floor laying	0.96	terrazzo setter supervisor
Optometrist/in	Optometrist	0.96	optometrist

Member State mapping table analysis

Goal: Identify new candidate concepts by inspection of *'no relation'* mappings to ESCO from MS mapping tables

- Methodology:**
1. Extract MS skills with *'no relation'* mapping to ESCO
 2. Map to ESCO using machine learning model to filter out what is already included
 3. Manual validation of remaining skill candidates

Input Skill	Input Skill Translated	Suggestion Score	Suggested ESCO Skill (PT)
Kryptowährung	cryptocurrency	0.59	coining
Digitale Zwillingstechnologie	digital twin technology	0.62	collaborate through digital technologies
Thailändische Küche	Thai cuisine	0.62	cultural customs on food preparation
Kissenherstellung	pillow making	0.64	upholstery fillings
Glaskleben	glass bonding	0.76	manipulate glass
E-Ticketing	e-ticketing	0.81	use ICT ticketing system
Reederei	shipping company	0.96	shipping industry
Prothetik	prosthetics	0.97	prosthetic devices
Distributed Ledger Technology	distributed ledger technology	0.99	principles of distributed ledger technology
Augmented Reality	augmented reality	1.00	augmented reality
Ladegutbehandeln	cargo handling	1.00	handle cargo

Combined analysis of online job advertisements and courses

Goal: Identify new candidate skills by looking for content present in millions of online job advertisements (OJAs) AND courses

- Methodology:**
1. Extract terminology from OJA descriptions and course titles/descriptions
 2. Compute metadata (e.g. frequency in OJA descriptions, course titles, course descriptions) to prioritise
 3. Map to ESCO using machine learning model to filter out what is already included
 4. Manual validation of remaining terms for extracting skill candidates

Input	Score	Suggested ESCO Skill (PT)	OJA Freq	Course Freq	NACE (entropy)
Marketing	0.98	marketing principles	598723	14347	G (3.10)
Leadership	1.00	leading and motivating	822892	10927	G (3.23)
Data science	0.89	statistics	14120	4373	J (2.44)
Digital marketing	0.98	digital marketing techniques	43700	2724	J (2.15)
Business analytics	0.87	use analytics for commercial purposes	3150	1734	J (2.82)
Bioinformatics	0.69	biotechnology	3111	1098	P (2.23)
Econometrics	0.71	economics	742	1036	J (2.72)
Machine translation	1.00	machine translation	79	57	P (2.32)

Input	Score	Suggested ESCO Skill (PT)	OJA Freq	Course Freq	NACE (entropy)
Speech synthesis	0.76	speech techniques	9	17	P (0.65)
Natural language understanding	0.84	natural language processing	123	3	P (1.41)
Speech processing	0.87	speech recognition	30	32	P (0.72)
Question answering	0.75	respond to enquiries	19	3	I (2.19)
Information extraction	1.00	information extraction	35	15	M (1.86)
Natural language processing	1.00	natural language processing	830	241	J (2.29)
Semantic analysis	0.84	semantics	12	10	M (1.91)
Semantic search	0.77	search engines	11	0	J (1.90)

Identify related terminology

Europass digital skills analysis

Goal: Identify new digital skill candidates by analysing Europass user profiles

Methodology:

Digital skills
List your digital skills here and group them.

Digital skills

Tensorflow,Keras,Pytorch,MXnet, Chainer, Theano

Mxnet

MXNet

python pandas seaborn sklearn cvxpy mxnet

PyTorch,Chainer,MXNet

Pytorch, Tensorflow, Keras, Horovod, ONNX, TensorRt, MXNet.

MxNet

Add to your digital skills from the list below. Click on the skill and drag it to the left.

Microsoft Word
+
⊖

Microsoft Excel
+
⊖

Microsoft Office
+
⊖

Microsoft Powerpoint
+
⊖

Outlook
+
⊖

Google Drive
+
⊖

1. Extract from the Europass user profiles all skills from the digital skill section
2. Apply basic clean-up process on the extracted skills
3. Compute statistics for the skills and sort in terms of number of users and geographical coverage
4. Map to ESCO using machine learning model to filter out what is already included
5. Manual validation of most frequent remaining skill candidates

Skill	Frequency	Geographical Coverage
Microsoft Office	1286882	27
Social Media	609830	27
Android	218766	27
Git	37678	27
JavaScript	36234	27
CSS	30420	27
InDesign	5389	27
Linux	32866	26
MySQL	27912	26
PHP	18816	26
LaTeX	15667	26
Angular	4735	25
Unit Testing	2804	24

Analyse differences between occupations

- Use evidence from labour market to improve preferred terms and alternative labels
- Quantitative approach to compare occupations
- Example: Should '*data engineer*' and '*data scientist*' be different occupations?

data scientist

Download ▾

[Professionals](#) >
[Information and communications technology professionals](#) >
[Software and applications developers and analysts](#) > [Systems analysts](#) > [data scientist](#) >

Description

Code

2511.4

Description

Data scientists find and interpret rich data sources, manage large amounts of data, merge data sources, ensure consistency of data-sets, and create visualisations to aid in understanding data. They build mathematical models using data, present and communicate data insights and findings to specialists and scientists in their team and if required, to a non-expert audience, and recommend ways to apply the data.

Scope note

Excludes people performing engineering and programming activities. Excludes people performing managerial and general focus research activities.

Alternative Labels

data engineer data expert data research scientist data scientist

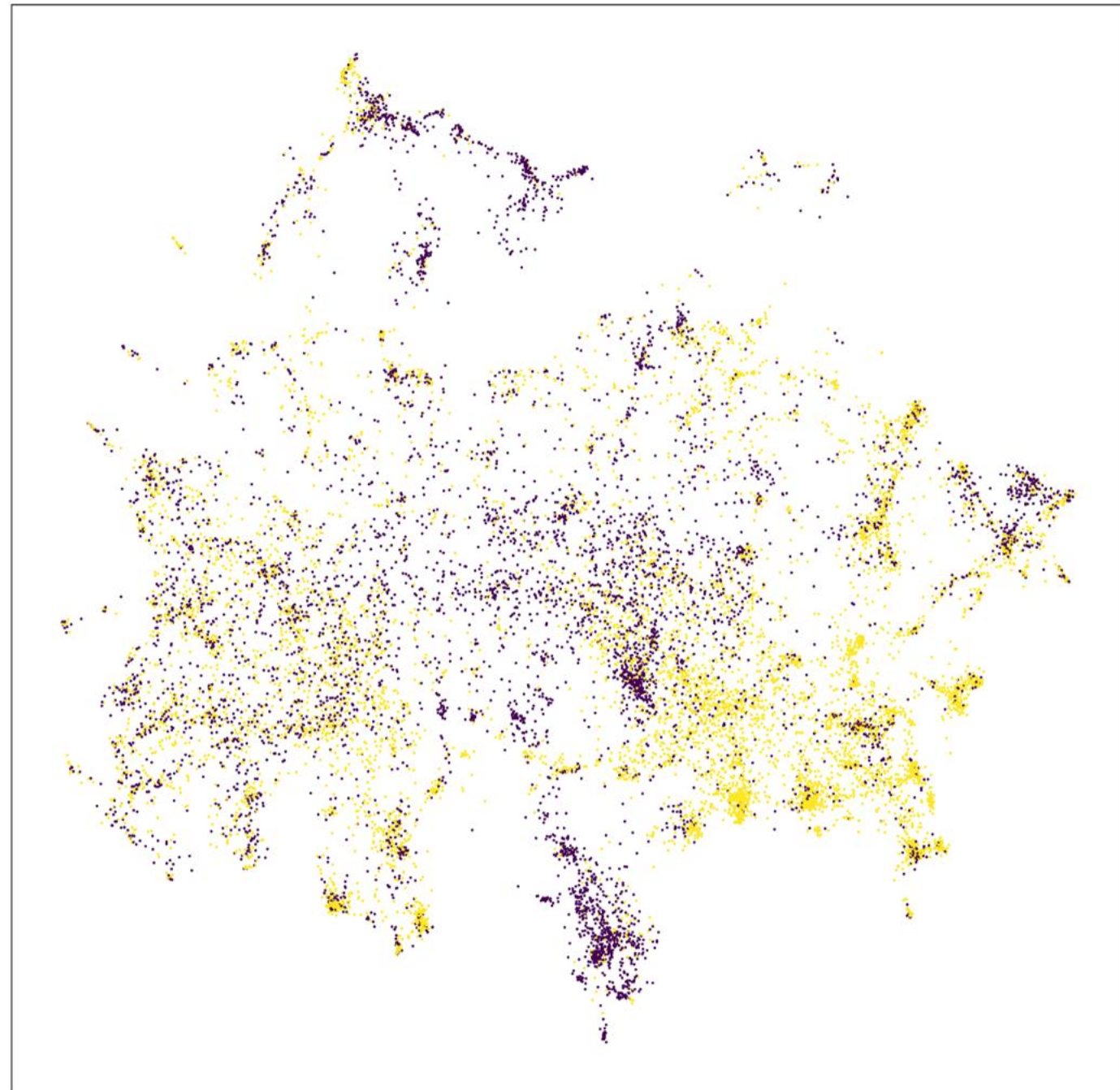
research data scientist

Analyse +17,000 phrases that contain

- skills
- knowledge

for data scientist and data engineer

Where are the differences situated?



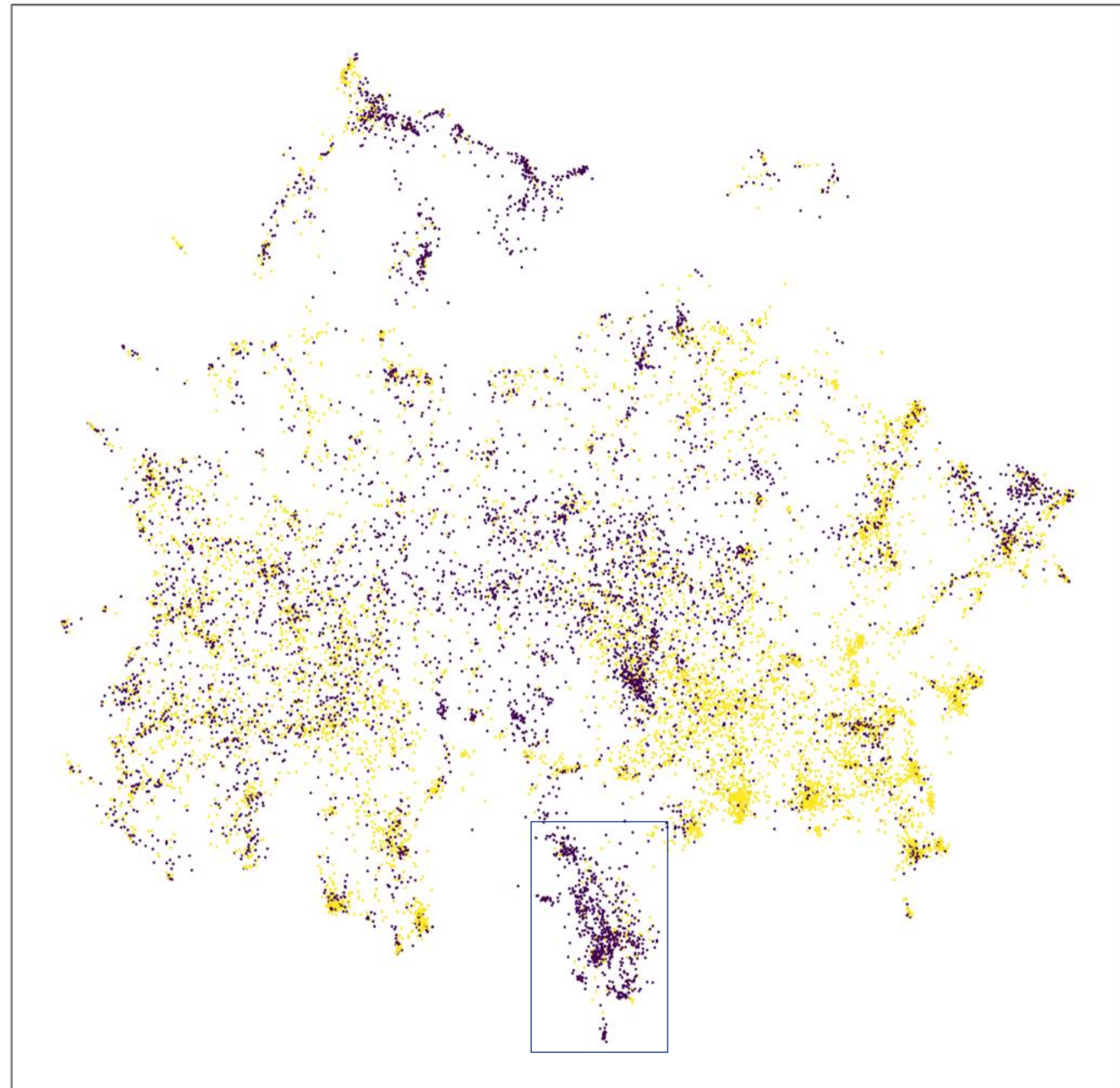
■ Data scientist
■ Data engineer

Analyse +17,000 phrases that contain

- skills
- knowledge

for data scientist and data engineer

Where are the differences situated?



■ Data scientist
■ Data engineer

Data scientist

ESCO: Utilise machine learning

- *Demonstrate machine learning experience in past projects*
- *Demonstrable machine learning experience (supervised/unsupervised)*
- *Some knowledge/experience of machine learning*

ESCO: Algorithms

- *Prototype, simulate and benchmark accuracy of algorithms*
- *Ability to develop new algorithms when an innovative solution is needed is a fundamental skill*
- *Stay curious and enthusiastic about using algorithms to solve problems and enthuse others to see the benefit of your work*
- *Analysing algorithm performance bottlenecks and proposing solutions for improvements*
- *Implement and assess algorithms in R, Python, SAS*

ESCO: Build predictive models

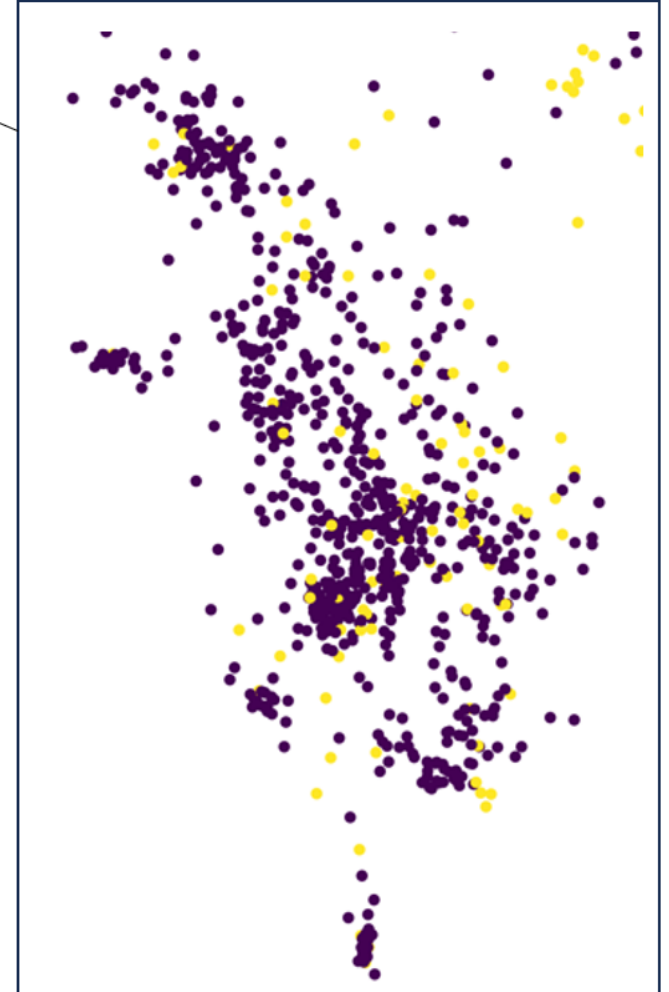
- *Knowledge of predictive models*
- *Experience working with predictive modelling*
- *Develop uncertainty quantification modules to highlight the uncertainty in the prediction*

ESCO: Principles of artificial intelligence

- *Understanding of and experience with trust and bias detection for AI solutions*

ESCO: Machine learning

- *Evaluate ML training using tools such as precision-recall metrics, ROC curves, and confusion matrices*



**More
indicative for
data scientist**

- Utilise machine learning
- Data analytics
- Statistics
- Machine learning
- Perform data analysis
- Deliver visual presentation of data
- Build predictive models
- Apply statistical analysis techniques
- Use specific data analysis software
- Python (computer programming)
- Use analytics for commercial purposes
- Deep learning
- Algorithms
- Communicate analytical insights
- Develop statistical software

**Comparable
between data
scientist and
data engineer**

- Think analytically
- Analyse big data
- Communicate with stakeholders
- Working in teams
- Communicating
- Apply technical communication skills
- Business intelligence
- Computer science
- Create data models
- Create data sets
- NoSQL
- SQL

Data scientist

Data engineer

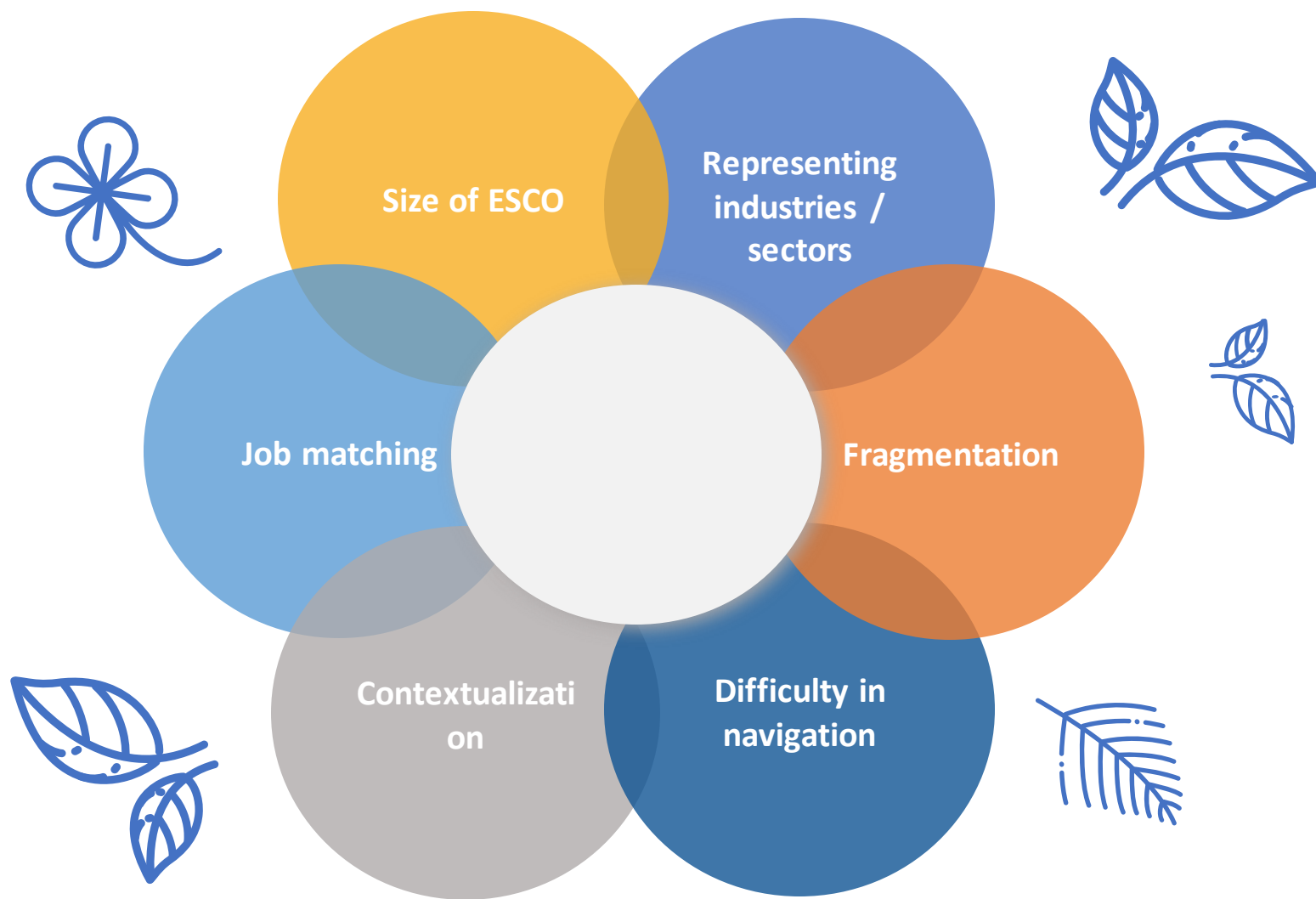
**More
indicative for
data engineer**

- Migrate existing data
- Data storage
- Operate relational database management system
- Use databases
- Analyse pipeline database information
- Design database in the cloud
- Data models
- Agile development
- DevOps
- Develop data processing applications
- Manage cloud data and storage
- Implement data warehousing techniques
- SQL Server
- Integrate ICT data
- Manage ICT data architecture
- Establish data processes
- Data warehouse
- Data extraction, transformation and loading tools
- Cloud technologies
- Manage data

Meeting agenda

1. Introduction to ESCO
2. ESCO continuous improvement process
3. How to access the data?
4. Data science and continuous maintenance of ESCO
5. **Future of ESCO**
6. Q & A

Challenges with the use of ESCO



Areas of focus for strategy

Ontology relations

Linking concepts from within the skills pillar

Consistency

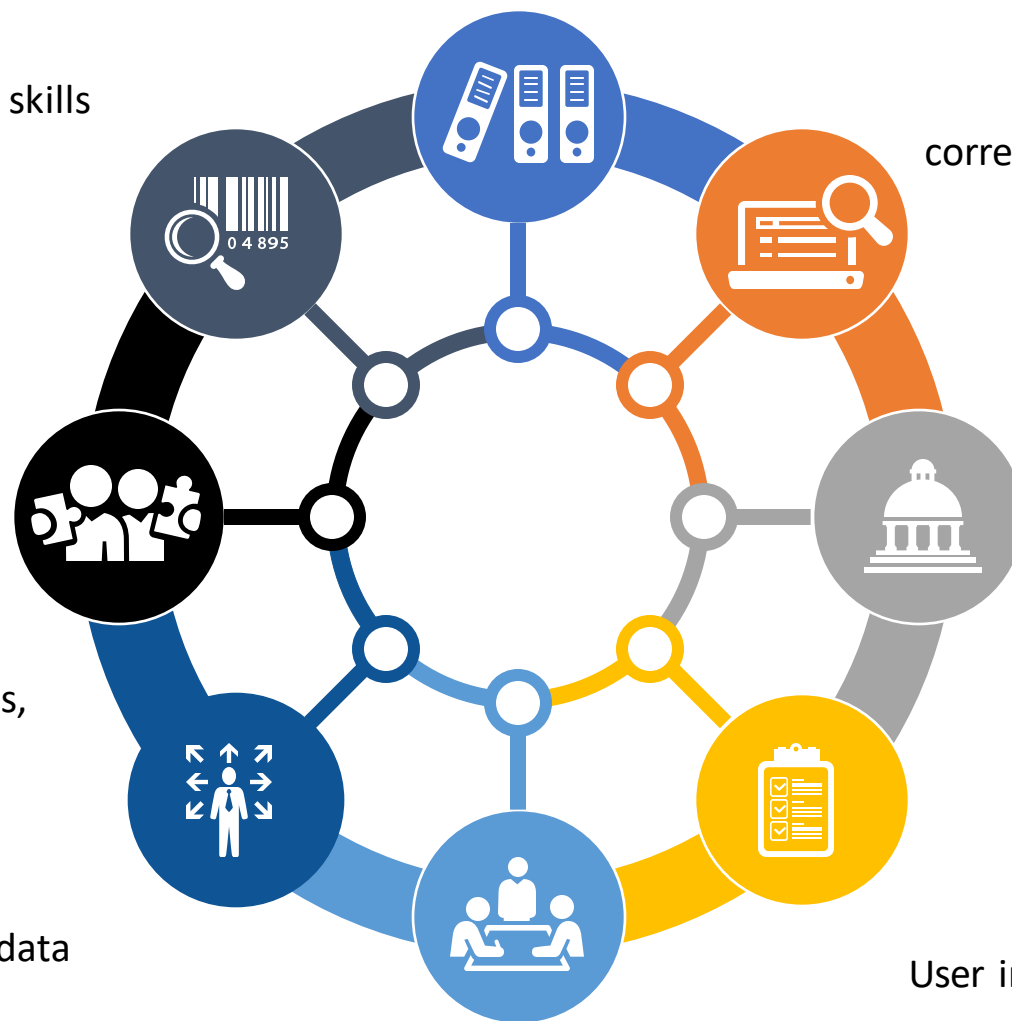
Improve consistency of concepts across skills and knowledge tree

Linking skills to occupations

Improve quality of essential and optional skills links to occupations, prioritizing green and digital

Data model

Review suitability of the current data model to users needs



Design principles

Realism in representing industries, correctness, simplicity, user friendliness

Granularity

How granular does ESCO need to be? How to represent granular concepts?

Contextualization

Linking transversal skills to knowledge and non-transversal skills in a user-friendly way

ESCO Portal

User improvement changes in the portal

Strategy: ontology relations

1

Pilot project for solving ESCO quality issues with a fundamental approach

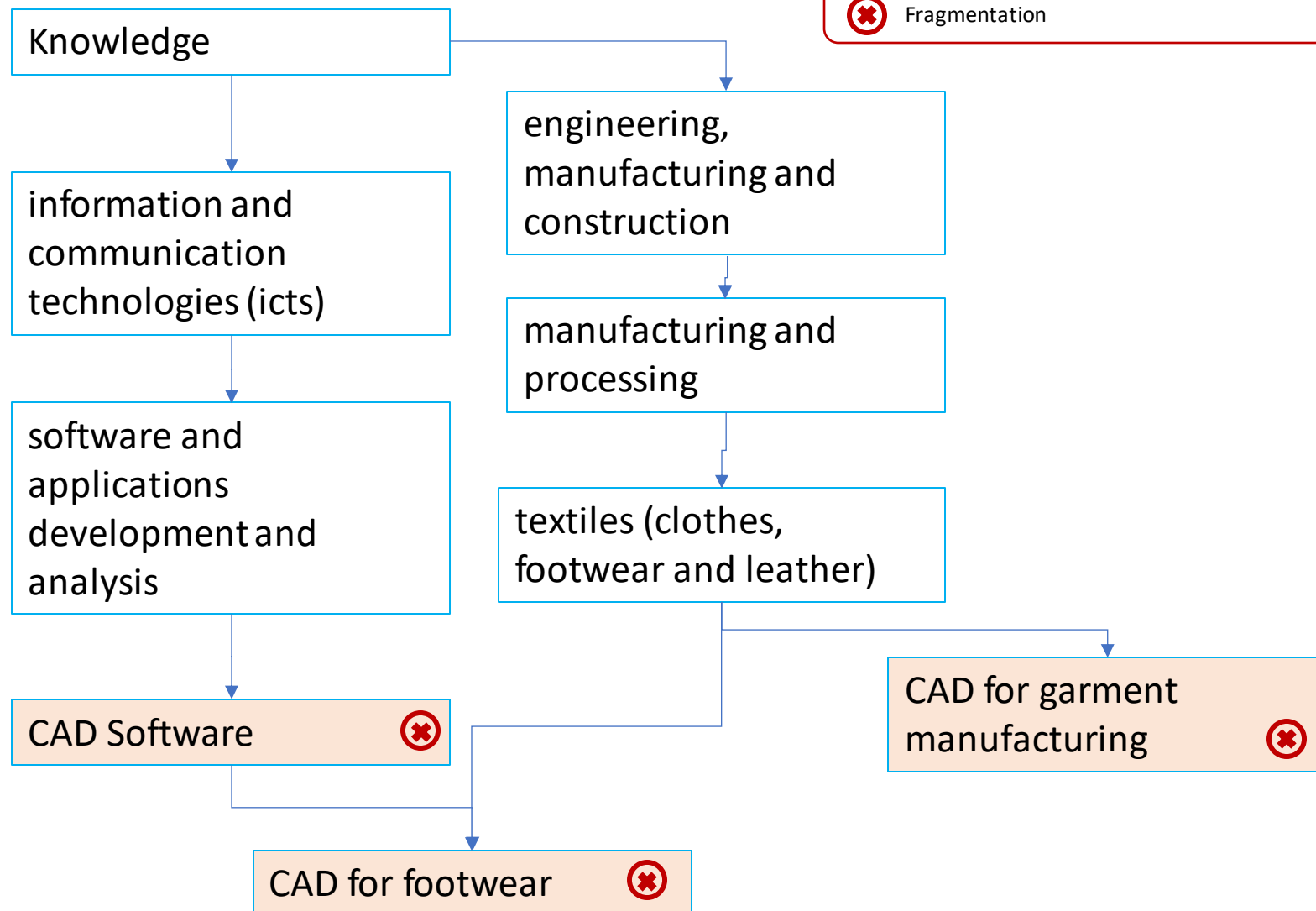
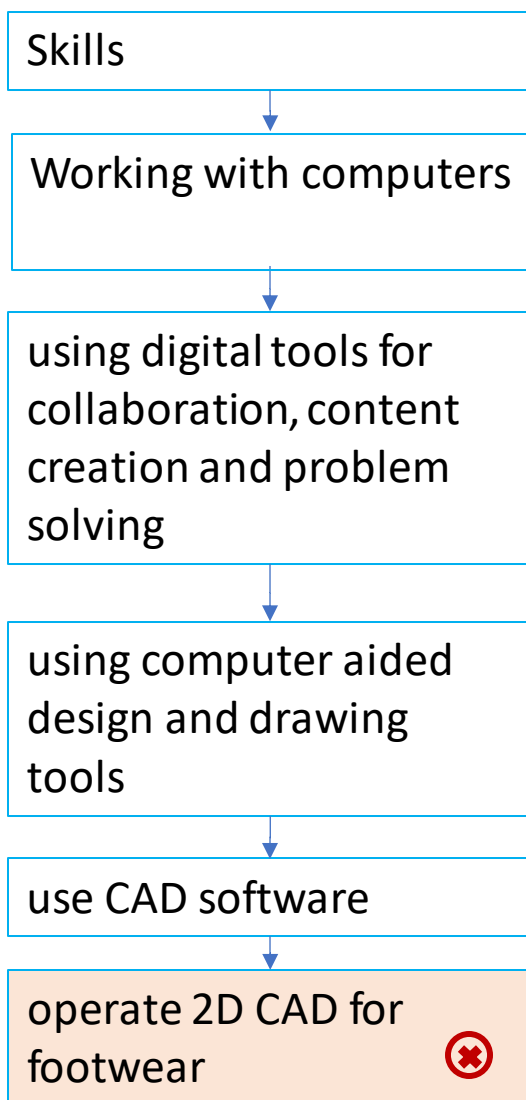
2

Moving ESCO from classification to **intelligent ontology** and **knowledge graph**



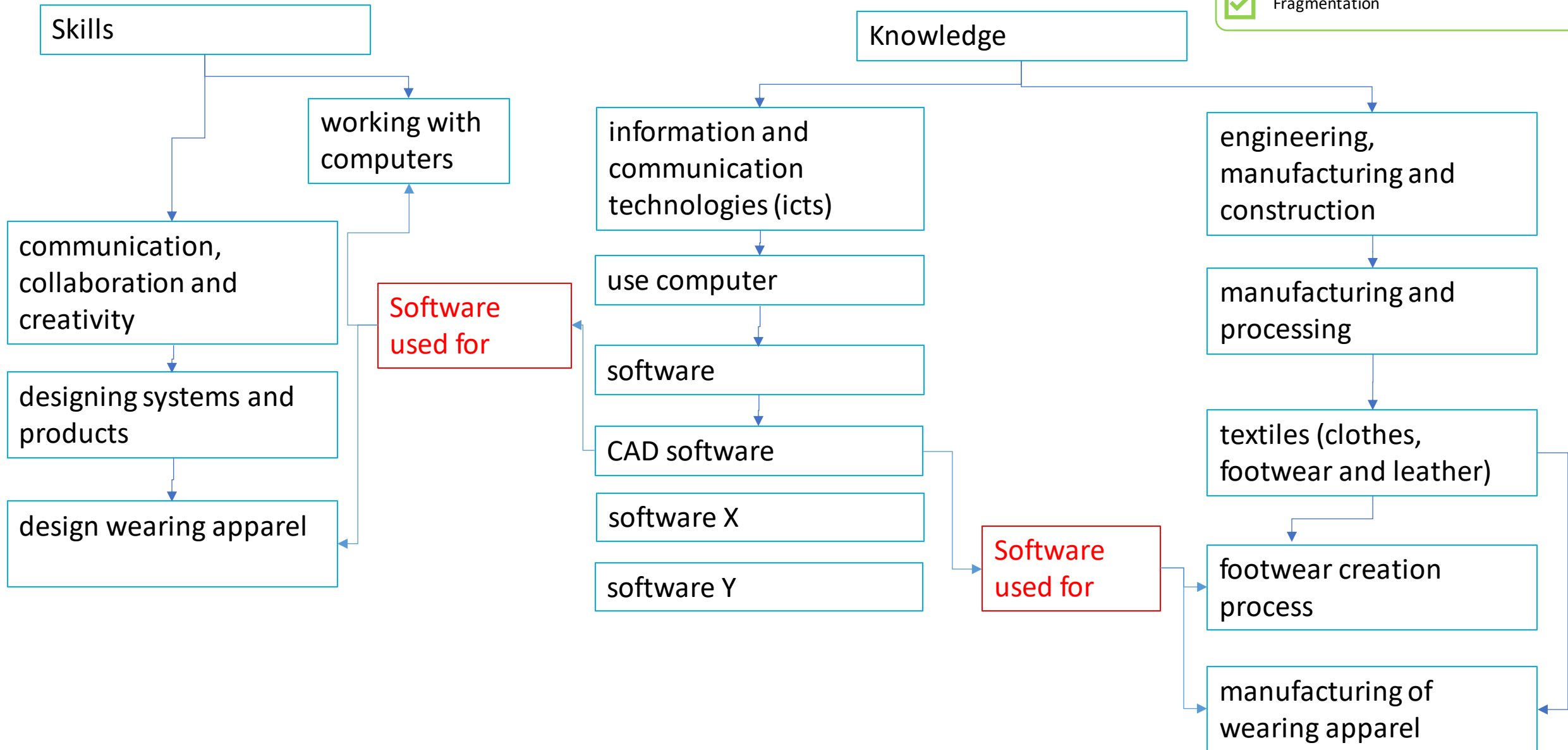
'ontological' relations form the backbone of future of ESCO

Example: CAD software




Example: CAD software: ontological relations

- ✔ Relation between concepts is not machine readable
- ✔ Repetition of similar concepts
- ✔ Incomplete
- ✔ Fragmentation



Ontology relations: CAD software

Search skills

[Find](#)[Show filters](#) [Hierarchy view](#) 

Search result

- CAD software

- use CAD software
- use CAD for lasts
- design circuits using CAD
- use CADD software
- operate 2D CAD for footwear
- CAD for footwear
- create CAD drawings
- use CAD for soles
- use CAD for heels
- CAD for garment manufacturing

[See more results](#)

CAD software

knowledge > information and communication technologies (icts) > information and communication technologies (icts) > software and applications development and analysis > CAD software

Description

Description

The computer-aided design (CAD) software for creating, modifying, analysing or optimising a design.

Scope note

CAD software should be differentiated from computer-aided design and drafting (CADD) software. CADD systems are CAD systems with additional drafting features. For example, CADD systems enable an engineer or architect to insert size annotations and other notes into a design.

Software used for

draw blueprints, design control systems, design wearing apparel, design footwear, develop audio system designs

Skill type


knowledge

Ontology relations: CAD software

Search skills

Find

Show filters 

Hierarchy view 

Search result

- draw blueprints

- blueprints

- read standard blueprints

- identify construction materials from blueprints

- draw up choreography

- draw prop sketches

- draw stage layouts

- draw design sketches


- draw off wash water

- draw up lighting plan

- draw make-up sketches

See more results

draw blueprints

Download 

skills > working with computers > using digital tools for collaboration, content creation and problem solving > using computer aided design and drawing tools > use technical drawing software > draw blueprints > draw blueprints

Description

Description

Draw layout specifications for machinery, equipment and building structures. Specify which materials should be used and the size of the components. Show different angles and views of the product.

make use of software

CAD software, specialised design software, design wearing apparel, design footwear, develop audio systems designs

Skill type

skill

Advantages of using ontology relations



Improves navigability



Increase consistency between Knowledge and Skills trees



Inferring new knowledge



Decreasing size

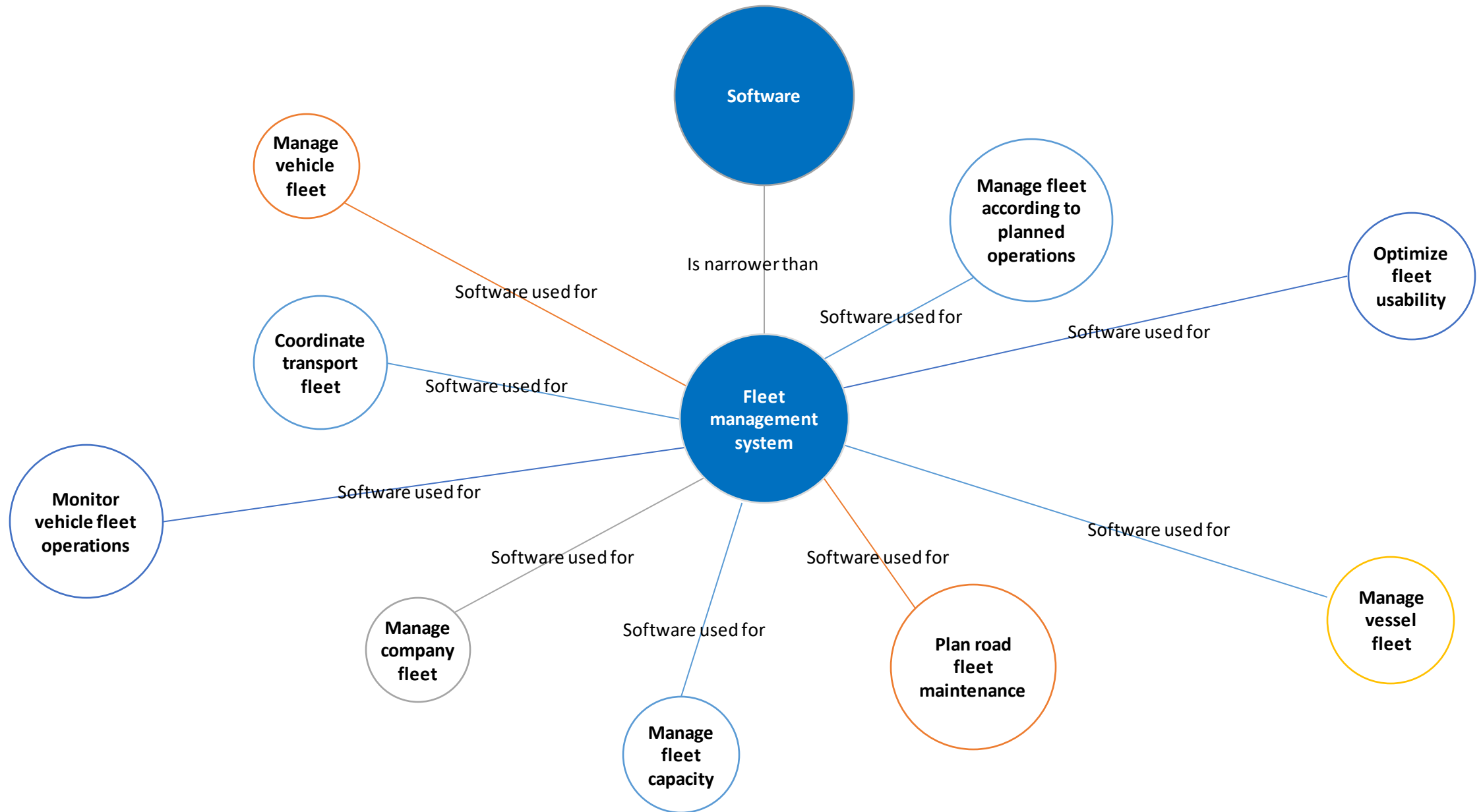


Capacity to answer the questions ESCO is trying to respond



Completeness: links software to **all** other relevant concepts

Ontology relations: fleet management system



Ontology relations: fleet management system

Search skills



use fleet management system

Find

Show filters 

Hierarchy view 

Search result

- use fleet management system

- use a warehouse management system

- use content management system software

- use electronic health records management system

- manage company fleet

- treasury management system

- manage vehicle inventory

- manage vessel fleet


- use thermal management

- manage environmental management system

- implement a management system

See more results

use fleet management system

Download 

skills > working with computers > using digital tools for collaboration, content creation and problem solving > using digital tools for collaboration and productivity > use fleet management system

Description

Description

Use a fleet management software to coordinate and organise the company vehicles from a central point. The software includes several functions such as driver management, vehicle maintenance, vehicle tracking and diagnostics, vehicle financing, speed management, fuel and fitness management, and safety management.

software used for

coordinate transport fleet, monitor vehicle fleet operations, manage company fleet, manage vessel fleet, optimise fleet usability

Skill type

skill

Ontology relations: fleet management system

Hierarchy view ↔

Search result

- manage company fleet
- manage vessel fleet
- manage fleet capacity
- manage vehicle inventory
- manage stocked company material
- manage company transport strategy
- keep company
- promote company
- company policies
- manage financial aspects of a company
- manage the fleet according to planned operations

See more results

manage company fleet

Download ▾

transversal skills and competences > social and communication skills and competences > leading others
> lead others > manage company fleet

skills > management skills > organising, planning and scheduling work and activities > managing
transport and logistics activities > manage company fleet

Description

Description

Manage and maintain company fleet by selecting equipment, dispatching units, performing maintenance, and managing costs.

Alternative Labels

administer company fleet

carry out fleet management activities

direct company fleet

execute company fleet management

manage fleet

manage fleet of a company

makes use of software

fleet management system

Skill type

skill

Ontology relations: psychiatry

Hierarchy view ↔

Search result

- psychiatry

- child psychiatry

- forensic psychiatry

- neuropsychiatry

- psychiatric diagnostics

- carry out psychiatric assessment of child

0912 - medicine

- psychiatric disorders

- diagnose psychiatric symptoms

- prioritise youths' psychiatric care needs

- psychomotor therapy

See more results

psychiatry

knowledge > health and welfare > health > medicine > psychiatry

Description

Description

Psychiatry is a medical specialty mentioned in the EU Directive 2005/36/EC.

benefits

autism

has object

diagnosis of mental health issues, psychiatric diagnostics

Skill type

knowledge

Skill reusability level

cross-sector skills and competences

Ontology relations: mental health

Search skills



Find

Show filters 

Hierarchy view 

Search result

- diagnosis of mental health issues

- identify mental health issues

- provide health psychological diagnosis

- promote mental health

- advise on mental health

- perform oral health diagnosis

- diagnose mental disorders

- address public health issues

- psychiatry

- methods of differential diagnosis

- performance diagnosis

See more results

diagnosis of mental health issues

knowledge > health and welfare > health > therapy and rehabilitation > diagnosis of mental health issues

Description

Description

The diagnosis of mental health issues such as disorders or illnesses, and psychological factors in other diseases within different issues and different age groups.

has object

psychiatry, psychology

benefits

mental disorders, autism

Skill type

knowledge

Skill reusability level

sector specific skills and competences



Q & A Session



Please add your questions in the chat!

ESCO

European Skills/Competences, qualifications and Occupations



**Thank
you!**

*For more information contact:
empl-esco-secretariat@ec.europa.eu*