Module 2: AI and the impact on Labour Market and Education

Session 2

New dimensions and dashboards for skills analysis developed in 2023: analysis of Digital and Green Skills Analysis; remote work; the difficulty to fill index.

Speaker: Anna Clara Gatti

16/02/2024
New angles of analysis based on OJV databases:

- Demand for digital skill
- Demand for green skills
- Demand for remote work
- Difficulty to fill index
Beyond "traditional" variables

- How widespread is the demand for Digital Skills?
- How Green Economy is evolving in the countries of interest?
- How much Remote Work is present in each Labour Market?
- How difficult is it to find a professional? Or a skill?

New analytical questions:

- Occupation
- Education level
- Sector / industry
- Knowledge, skills, attitudes
- Contract type
- Experience
- Place
- New dimensions

 ETF
 European Training Foundation

[Image of ETF logo]
Demand for digital skills
Demand for digital skills

How widespread is the demand for Digital Skills?  
Demand for Digital Skill in online job vacancies  
Which taxonomy to use?

ESCO Skill Taxonomy v1.1.1 introduced digital skills

ESCO Digital Skills and Knowledge Concepts

The work on digital skills in ESCO started with the integration of the European Digital Competence Framework for Citizens (DigComp) in the skills pillar in ESCO v1.0.0.

DigComp framework represents a complete summary of the skills needed in the digital environment.
ESCO Digital Skills and Knowledge Concepts

DigComp framework does not have the granularity of ESCO skills. For this reason, the DigComp definition of digital skills was adopted by the ESCO team to distinguish and label the digital concepts among the almost 14,000 ESCO knowledge and skills.

Digital competence involves the confident, critical and responsible use of, and engagement with, digital technologies for learning, at work, and for participation in society. It includes information and data literacy, communication and collaboration, media literacy, digital content creation (including programming), safety (including digital well-being and competences related to cybersecurity), intellectual property related questions, problem solving and critical thinking. (Council Recommendation on Key Competences for Lifelong Learning, 22 May 2018, ST 9009 2018 INIT).

Following this definition during 2022, 1,201 ESCO skills and knowledge concepts was labelled as digital and released in ESCO v1.1.1 and are available in 28 languages.
Skills extraction

ESCO Digital Skills

Information extraction -> Identification of online job vacancy language

Search for ESCO Skills and Knowledge

Identification of Digital Skills
Terms extraction - example

**Job Opportunity: IT Manager**

We are currently seeking an experienced IT Manager to lead our dynamic team.

**Key Responsibilities:**

- Utilize Microsoft Office, Microsoft Access, and SQL for effective data management and system operations.
- Lead and motivate a team of skilled IT professionals.
- Collaborate seamlessly through digital technologies to enhance communication and workflow efficiency.
- Develop staff through training and mentorship programs.
- Adapt to change in a rapidly evolving technological landscape.
- Tolerate stress and pressure while maintaining a calm and focused demeanour.
- Demonstrate effective project management skills to ensure successful execution of IT initiatives.

**Why Join Us:**

- Opportunity to lead and contribute to cutting-edge IT projects.
- A collaborative and innovative work environment.
- Professional development opportunities.
- Competitive compensation and benefits package.

If you are a seasoned IT professional with a proven track record in utilizing Microsoft Office, WordPress, Microsoft Access, and SQL and you possess the leadership skills to motivate and develop a team, we invite you to apply. Please submit your resume and a cover letter outlining your relevant experience.
Results: “Digital skills” is a new dimension
Results: Digital skill dashboard

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Demand for green skills
Demand for green skills

How Green Economy is evolving in the countries of interest? → Demand for Green Skill in online job vacancies → Which taxonomy to use?

ESCO Skill Taxonomy was no longer enough → Need for a design phase → What reference framework?

The “European Green Deal”

Ensuring coherence with the "policy areas" in which the "European Green Deal" is articulated, we defined seven declinations of green skills for this project.
ETF Green Skill families

- **Environment and sustainable tourism**: the skills related to the management of forests and maritime areas, environmental protection, and management of loss of species and ecosystems as well as their exploitation through sustainable forms of tourism.

- **Sustainable agriculture**: the skills necessary for the development of sustainable agriculture for producers, consumers, and the environment.

- **Sustainable construction**: the skills to initiate a process of renovation and new construction that improves the energy efficiency of buildings and brings building design in line with the circular economy.
ETF Green Skill families

- **Sustainable economy**: the skills related to the concept of circular economy.
- **Sustainable energy**: the skills needed to change energy production by replacing current energy sources with renewable energy sources.
- **Sustainable production**: the skills needed to modify current production styles by reducing the environmental impact of companies.
- **Sustainable transport**: the skills related to the reduction of emissions caused by transport both with the use of innovative fuels less polluting and with forms of mobility sharing.
Terms set definition

Framework reference the “European Green Deal” → Definition of seven Green Families → What are the key words to search for?

Two step approach → Selection by Domain Expert → Validation and integration by Country Experts
Terms set definition - example

- Environment and sustainable tourism:
  - environmental protection
  - green tourism
  - habitat restoration
  - sustainable tourism

- Sustainable agriculture:
  - climate smart agriculture
  - conservation agriculture
  - aquaponics
  - precision agriculture

- Sustainable energy:
  - carbon neutral fuel
  - energy conservation
  - solar power
  - wind generator

• The set does not need to be limited to skills-like terms, but can include general terms that can be found in postings’ text and can be linked to green economy (e.g., Solar power)
• The set of terms is language dependent: each language has its own terms, localized and reflecting specific terminology and culture
Terms extraction

- Definition of seven Green Families
- Definition of Green Terms
- Information extraction
- Identification of online job vacancy language
- Search for Green Terms
- Association with Green Family
Terms extraction - example

**Electrical Engineer**

Brilliant opportunity to work as an Electrical Engineer for a leading global cleantech integrator and renewable energy asset developer, owner and operator.

This company is one of the leading renewable energy and energy efficiency companies with over 70 offices worldwide.

This will suit Electrical Engineers with a background in renewable systems looking to work in the renewable industry on exciting clean technology projects.

**Key Responsibilities**

- Electrical Engineer is responsible for working on assignments covering all aspects of industrial and commercial energy usage, energy savings, energy storage, utility plant redevelopment and CO2 emission reduction
- Conceptual design of energy related projects
- Formulate, evaluate and prepare designs and specifications of industrial and commercial schemes during feasibility studies, scheme detailed design and project implementation
- Design covering combined heat and power, refrigeration, Air Source and Ground Source Heat pumps, HVAC, boilers, compressed air, Solar PV, Wind Generation, Industrial control schemes.

**Background Required**

Experienced Electrical Engineer with minimum 3 years

Experienced with

- Battery storage,
- Solar PV,
- Power systems
Results: “Green skills” is a new dimension
Results: Green skill dashboard

Select Release Date
01 October 2022 to December 2023

Green Share

1.02%

Select the Green skill family that you want to Analyze (then select it ageing to reset your choose)

Sustainable energy
Sustainable economy
Environment and sustaina
Sustainable agriculture
Sustainable production
Sustainable transport
Sustainable construction

Share of green skill by region

Share of green skill by occupation

Share of green skill by industry

Most requested Green Skill

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https://solutions.lightcast.io
Demand for remote work
Full Job Description

We are hiring UKRAINIAN - ENGLISH INTERPRETERS!

We are looking for experienced interpreters who want to join an international company and be a great help to the community.

Do you have one year of experience working as an interpreter/translator? Do you enjoy what you do? Would you like to be part of a dynamic team with solid possibilities of professional growth? While making extra cash in your spare time? If so, we want to hear from you!

Job Overview:

The Interpreter provides interpretation for Limited English Proficient (LEP) patients, their families, providers, and staff. The Interpreter advocates for LEP patients’ access to the full range of health care services providing intercultural mediation to assist providers in delivering culturally sensitive patient care. A commitment to provide exceptional customer experience, patient privacy & safety, and teamwork spirit is required for this position.
Software developer - UK Data Service

Remote

- Salary: From £33,000 per annum negotiable depending on experience.
- We are a small team who provide access to census and international data, and evidence and...

Is a job location?

Flexibility?

Software developer - UK Data Service
Jisc ★★★☆☆ 5 reviews
Remote • Remote
£33,000 a year - Full-time, Permanent
You must create an Indeed account before continuing to the company website to apply
Apply on company site

Pulled from the full job description
Cycle to work scheme  Employee discount  Paid volunteer time
Work from home

Full Job Description
More details
Software Developer - UK Data Service
Salary: From £33,000 per annum negotiable depending on experience
Contract: Permanent
Location: Hybrid - flexibility to work from home or at any of our main hubs (London, Bristol, Manchester and Harwell)

Jisc is the UK higher, further education and skills sectors' not-for-profit organisation for digital services and solutions. We believe education and research improves lives, and technology improves education and research.

Our vision is for the UK to be a world leader in technology for education and research and
Demand for remote work

How much Remote Work is present in each Labour Market? → Presence of remote working mentions in online job vacancies → What are the key words to search for?

Two step approach → Selection by Domain Expert → Validation and integration by Country Experts
Terms set definition - example

- English:
  - home based
  - work from home
  - remote work
  - home office

- Ukrainian:
  - працювати вдома
  - дистанційна робота
  - робота з дому
  - телеробота

- Italian:
  - smartworking
  - telelavoro
  - lavoro da remoto
  - lavoro agile

- English, Ukrainian, Italian, Polish, Czech, Estonian, French, German, Latvian, Lithuanian, Slovak, Spanish and Russian taxonomies were defined.
- The set of terms is language dependent: each language has its own terms, localized and reflecting specific terminology and culture.
Terms extraction

Definition Remote Work related Terms

Information extraction → Identification of online job vacancy language

Search for Remote Work related Terms
Terms extraction - example

Software Developer
South East • Remote
£40,000 a year - Full-time, Permanent

We are looking for Software Developer to be a part of a team in THEIA. This role can be home based anywhere in UK.

THEIA is a cloud-based integrity management solution, developed by Penspen. It has been designed to provide timely and critical information, initially for the safe and efficient running of pipelines.

Main Purpose of Role:
This role will form part of a team responsible for developing engineering assessments which will predominantly be written using python programming language.

The engineering assessments developed by the team will be implemented within our cloud-based architecture, in many cases this will require development of new methodologies for solving the engineering challenges faced by energy infrastructure as identified by Penspen's global business.
Results: “Remote work” is a new dimension

- Occupation
- Education level
- Sector / industry
- Knowledge, skills, attitudes
- Contract type
- Experience
- Place
- Remote Work
Results: Remote work dashboard

Select Release Date
- From April 2020 to December 2023

Remote Work Share: 5.41%
Number of remote work OJVs: 161,210

Select the Occupation that you want to Analyze (then select it again to reset your choose)
- Mathematicians, actuaries
- Trade brokers
- Data entry clerks
- Contact centre staff
- Information and communicators
- Visual artists
- Database and network prs.
- Information and communicators
- Software developers
- Managing directors and c.
- Film, stage and related dir.
- Mining engineers, metallurgists
- Web and multimedia developers
- Journalists
- Authors and related writers
- Application programmers
- Information technology tr.
- Contact centre salespeople
- Well drillers and boring anc.
- Medical and pathology lab.
- Clearing and forwarding
- Travel consultants and cler.
- Typists and word processors
- Electrical engineers

Share of remote work by region

Share of remote work by industry
- Information and communicators
- Financial and insurance
- Professional, scientific and tech.
- Public administration and suppo.
- Administrative and support
- Arts, entertainment and r.
- Education
- Real estate activities
- Wholesale and retail trad.
- Electricity, gas, steam anc.
- Other service activities
- Transportation and storage
- Manufacturing
- Construction
- Mining and quarrying
- Human health and social

Share of remote work by release date

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Difficulty to fill index
Difficulty to fill index

How difficult is it to find a professional? Or a skill?

Difficulty to fill index

How can we measure this indicator?

Using proxy variables

Duration of the publication

Advertised salary
Choosing the proxy variables

The Difficulty to Fill (DTF) methodology involves two proxy variables, Duration of the publication and Advertised salary.

With these two variables we estimate the time to fill (TTF) a job position and the salary premium of this job position due to the occupation demanded or the requirement of a particular skill.

The idea behind choosing these two variables to measure the difficulty to fill is that an increase in the time it takes to find the right candidate and an increase in the salary premium for the job position go hand in hand with an increase in the difficulty of finding a professional or a skill.
Calculation of the difficulty to fill index

1. **Time to Fill (TTF):**
   - Compute the duration of job postings online by occupation or skill.
   - Normalize the duration using max/min scaling. This step ensures that the TTF values are within a standardized range.

2. **Salary Premium:**
   - Calculate the salary premium by finding the difference between the average salary for a particular occupation or skill and the average salary in the area during the same period.
   - Normalize the salary premium using max/min scaling. This step ensures that the salary premium values are within a standardized range.
Calculation of the difficulty to fill index

3. Difficulty to Fill (DTF):
   • Multiply the normalized salary premium by the normalized time to fill.
   • This step gives a combined metric for each job position or skill, representing both the salary aspect and the time it takes to fill the position.

4. Percentile Rank Distribution:
   • Distribute the DTF values based on a percentile rank distribution.
   • This step categorizes the DTF values into percentiles, providing a relative ranking of job positions or skills in terms of difficulty to fill.
Results: “Difficulty to fill” is a new index

- Occupation
- Education level
- Sector / industry
- Knowledge, skills, attitudes
- Contract type
- Experience
- Place
- Difficulty to fill (DTF)
Results: Difficulty to fill Index - Occupation (Ukraine)

Most in-demand occupations

- Business services agents not elsewhere classified
- Accounting associate professionals
- Stock clerks
- Sales and marketing managers
- Special needs teachers
- Systems analysts
- Commercial sales representatives
- Software developers
- Shop sales assistants
- Motor vehicle mechanics and repairers

Most difficult to fill occupations

- Telecommunications engineers
- Agricultural and forestry production managers
- Town and traffic planners
- Financial and investment advisers
- Human resource managers
- Aged care services managers
- Financial and insurance services branch managers
- Sales and marketing managers
- Early childhood educators
- Manufacturing managers
- Civil and natural resources engineers
- Special needs teachers
- Secondary education teachers
- Translators, interpreters and other linguists
- Biologists, botanists, zoologists and related professionals
- Services managers not elsewhere classified
- Military professionals
Challenges and Considerations

1. **Data Quality and Availability:**
   - The accuracy of the methodology depends on the availability and quality of data related to job postings, salary information, and time-to-fill metrics.

2. **Normalization Techniques:**
   - The choice of normalization techniques (in this case, max/min scaling) can impact the results but permit us to compare results.

3. **Interpretability:**
   - Interpreting the significance of the normalized DTF values is not straightforward. To facilitate understanding, we can use a quadrant approach, combining the DTF with other variables.
Quadrant approach (Italy - Cyber Security, skills analysis)