

WEBINAR

How to use open data for your research?

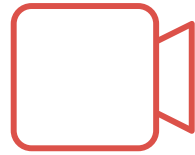
The logo for Data Europa Academy, featuring the text "data.europa academy" in white lowercase letters. The word "data" is on the top line, "europa" is on the second line, and "academy" is on the third line. Small yellow dots are placed above the 'a' in "data" and above the 'o' in "europa". The logo is set against a dark blue circular background.

data.
europa
academy

24 May 2024

10.00 – 11.30 CET

Rules of the game



The workshop will be recorded



Please reserve 3 min after the workshop to help us improve by filling in our feedback form



For questions, please use the ClickMeeting chat

Introduction



Flora Kopelou
Data.europa.eu
Publications Office of the EU



Hyo Mee Duerinck
Senior Consultant in Enterprise
Data & Analytics at Capgemini
Invent



Daniel Garijo
Researcher at Universidad
Politécnica de Madrid

Agenda

10.00 – 10.05	Opening and introduction – <i>Flora Kopelou</i>
10.05 – 10.20	Search data.europa.eu like a pro – <i>Flora Kopelou</i>
10.20 – 10.40	A case with open data from data.europa.eu – <i>Hyo Mee Duerinck</i>
10.40 – 11.00	Open Data and the FAIR principles: A use case in Citizen Science – <i>Daniel Garijo</i>
11.00 – 11.15	Q&A
11.15 – 11.20	Closing remarks – <i>Flora Kopelou</i>

Search data.europa.eu like a pro



What is open data



What is open data?

Data that can be **freely accessed, used, re-used, and shared** by anyone for any purpose, without restrictions from copyright, patents, or other mechanisms of control.



Availability
and access



Reuse and
distribution



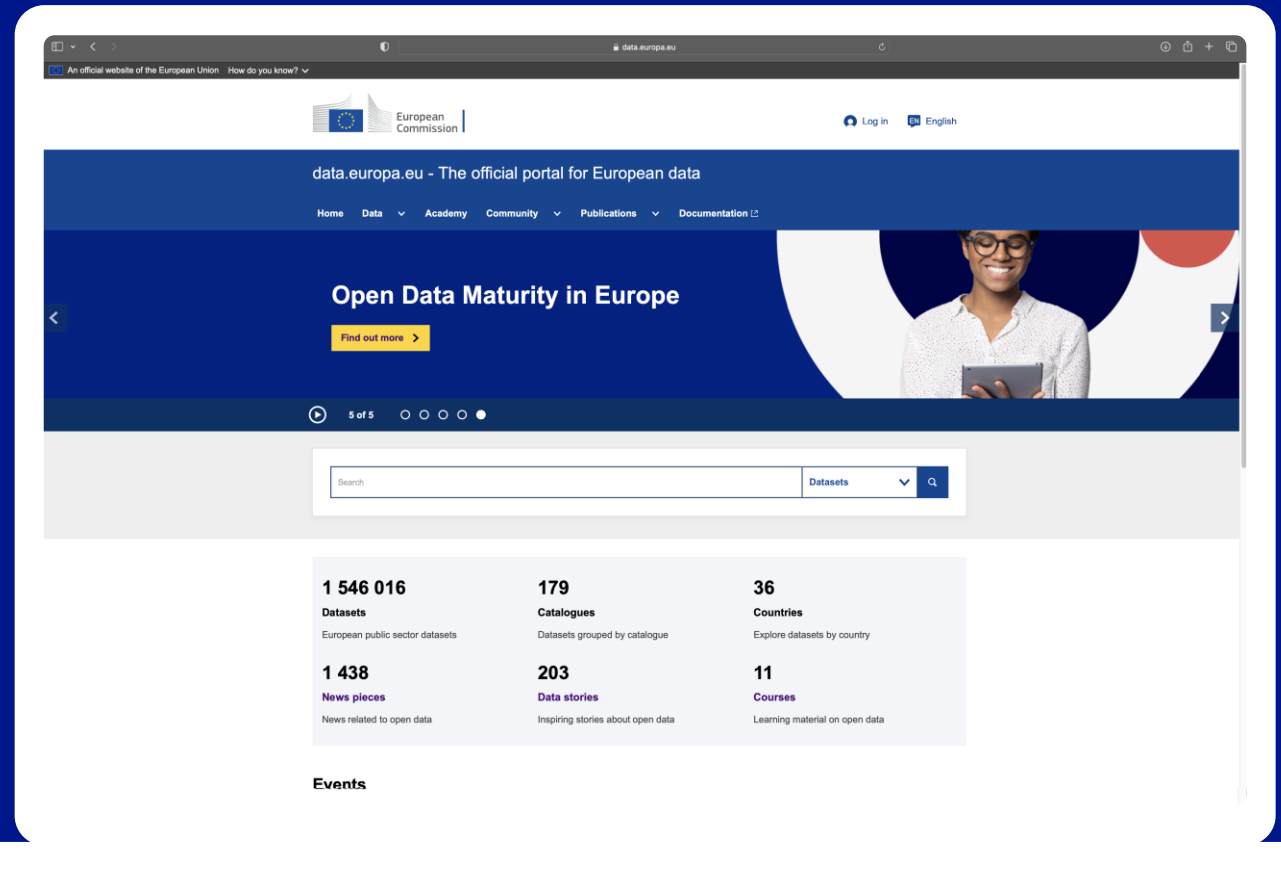
Universal
participation



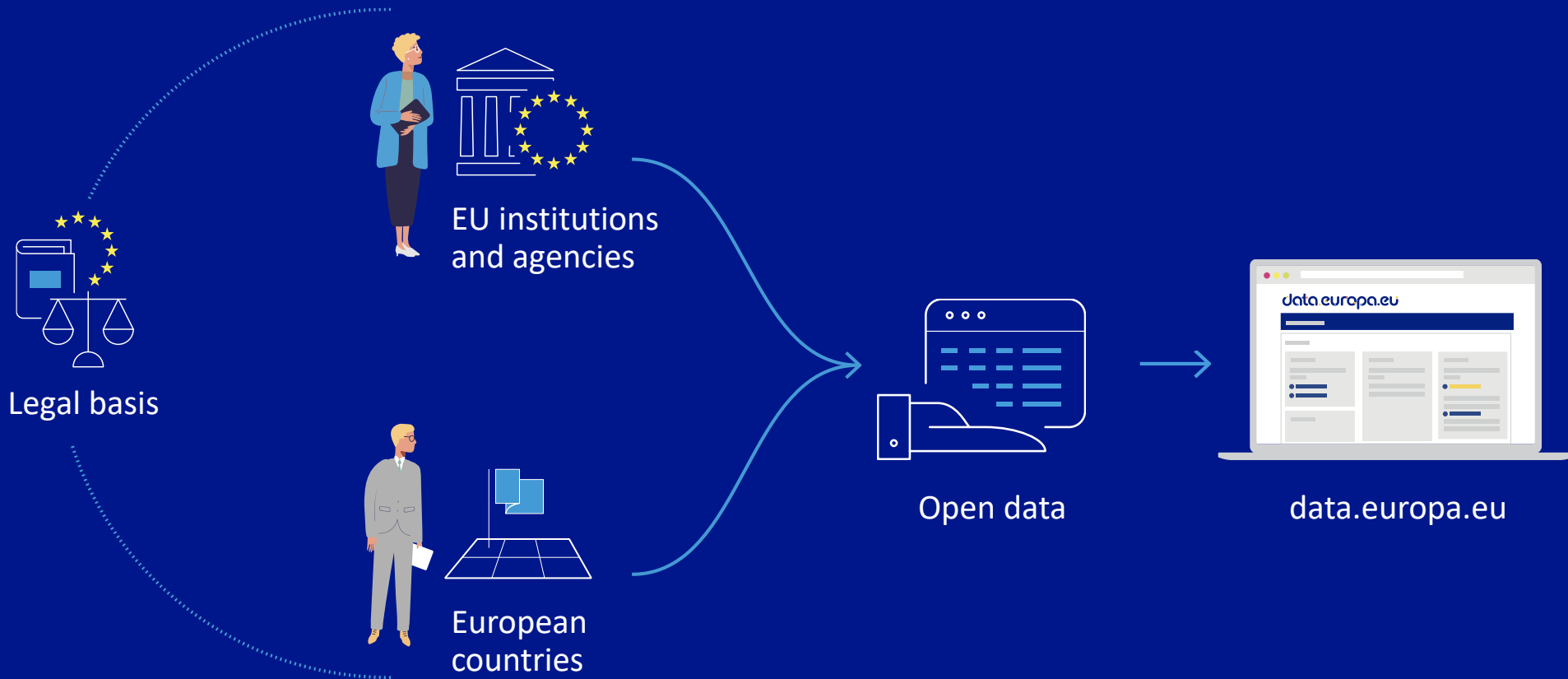
What is data.europa.eu



- The official portal for European data
- Managed by the Publications Office of the European Union, European Commission
- Supporting data supply and data reuse across Europe and beyond



data.europa.eu has been set up by the European Commission to implement EU open data and reuse policies under the legal acts adopted by the EU institutions and EU Member States.



The portal is a bridge between the data providers and data users

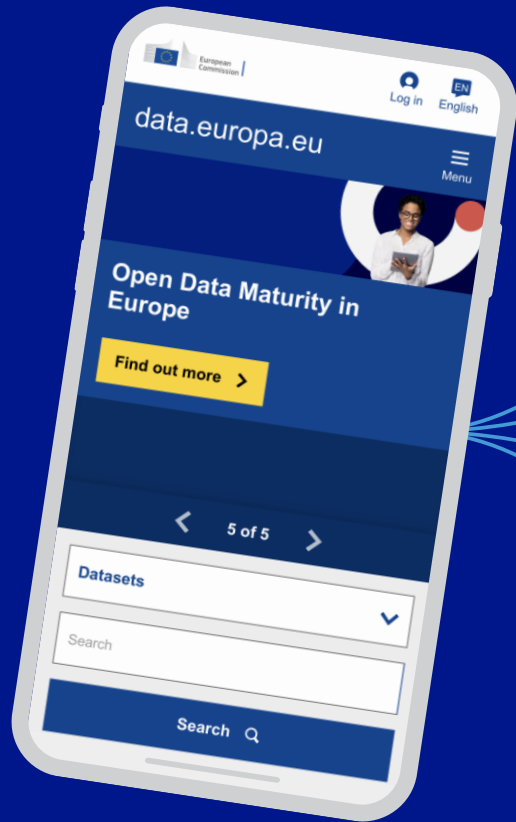
Data providers



Data users

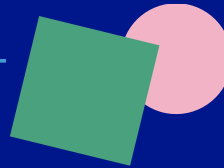


Our services in a nutshell



Data

Providing access to free public data resources across Europe via a single platform (the portal).



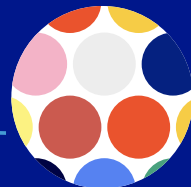
Academy

Improving data literacy with thematic courses designed according to users' needs.



Community

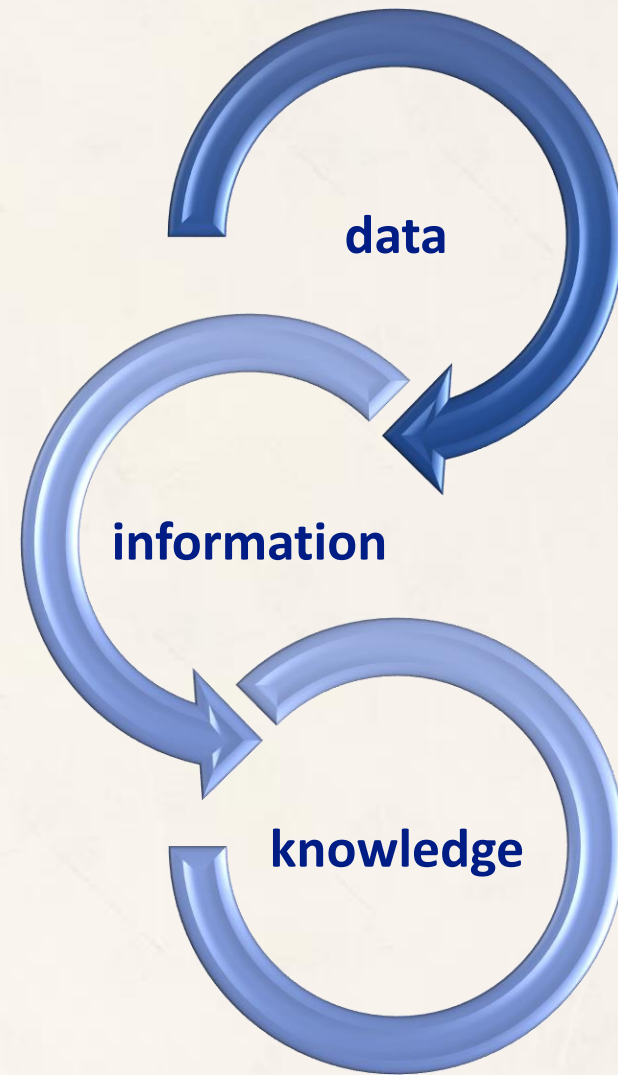
Organising conferences; communicating via social media and newsletters.



Publications

Assessing open data maturity in Europe; providing reports, studies and training via data.europa academy.

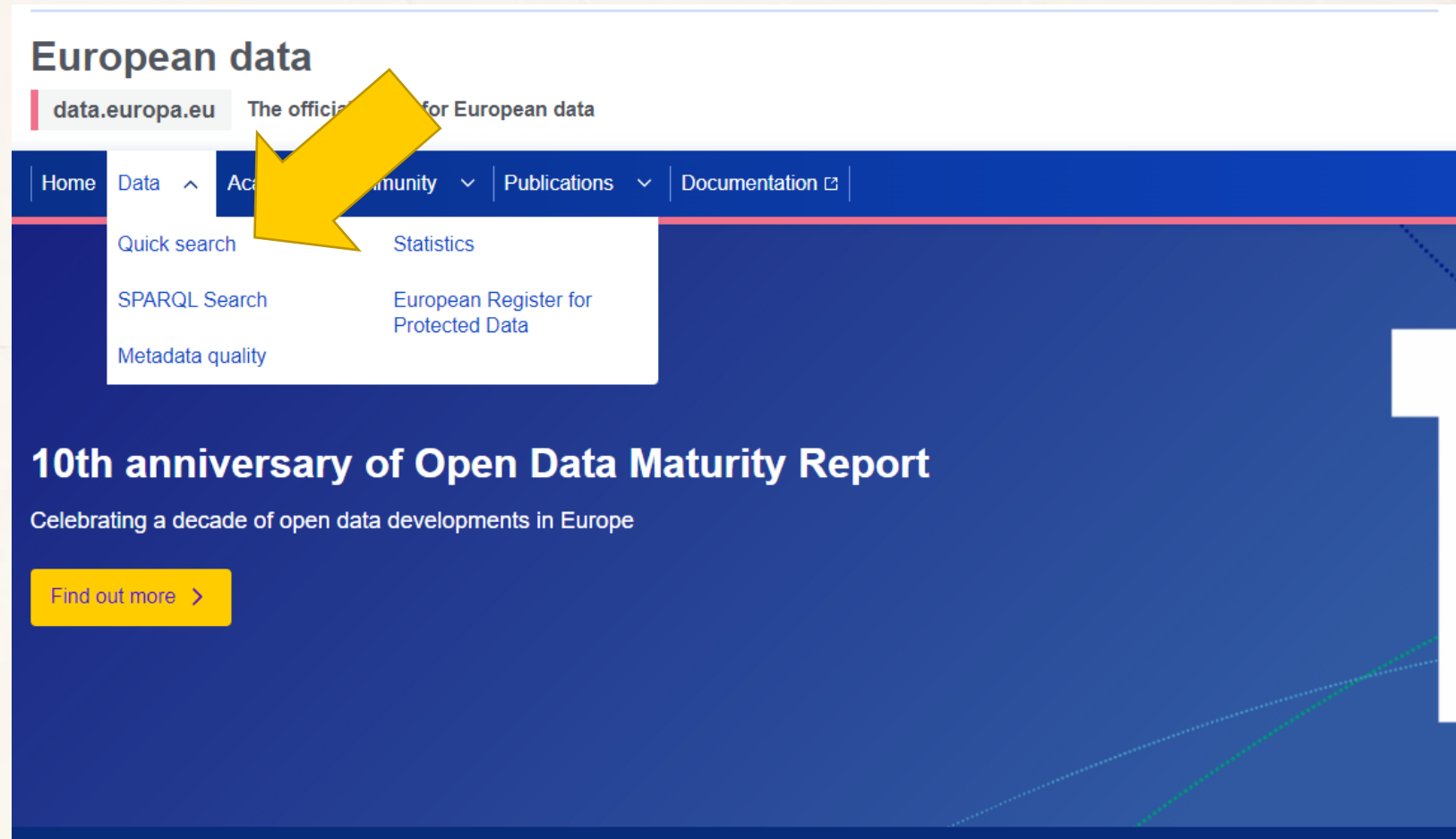
data.europa.eu connects:



Data.europa.eu as **data hub**



Data.europa.eu as data hub

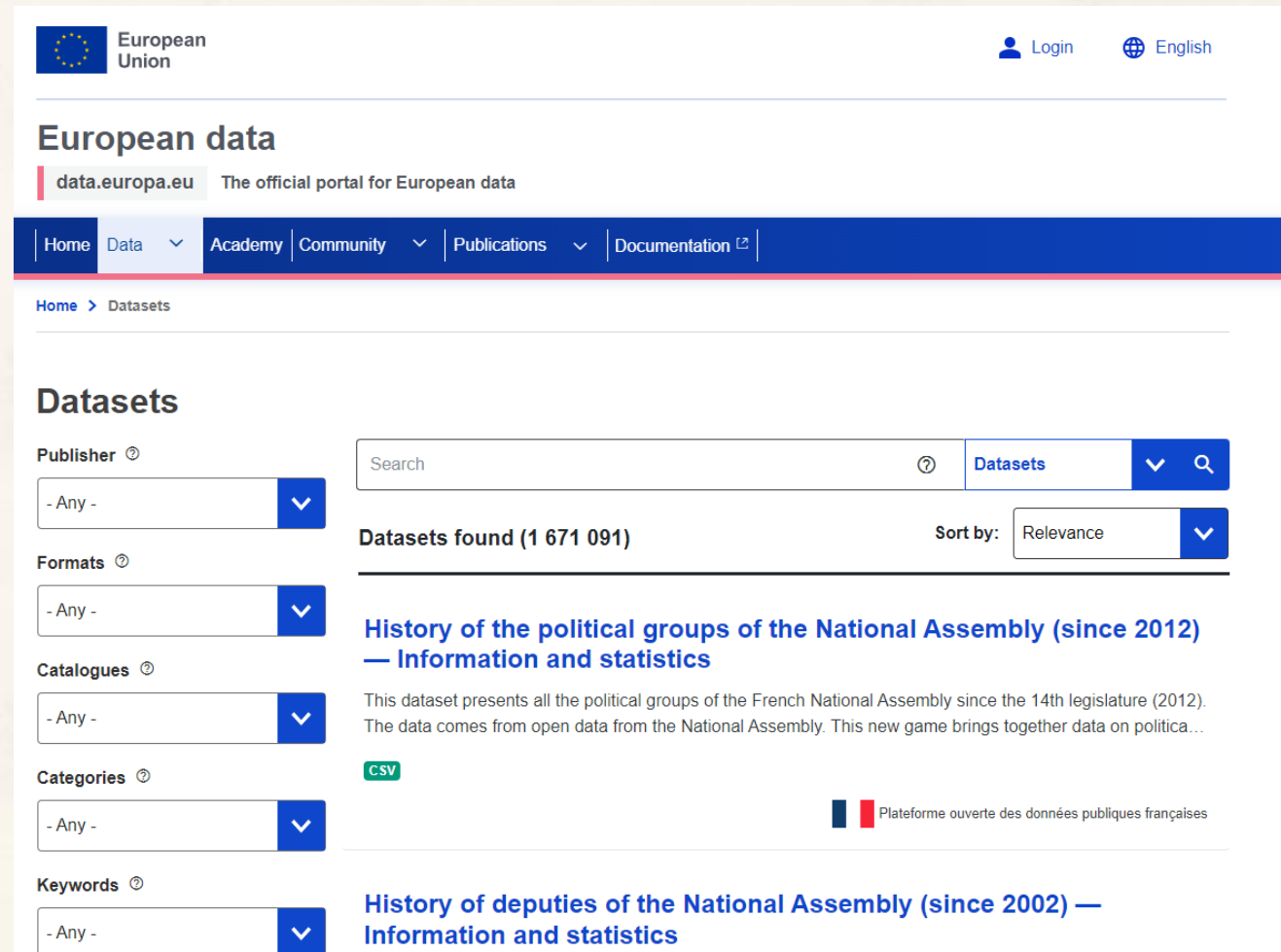


The screenshot shows the top navigation bar of the Data.europa.eu website. The main navigation menu includes: Home, Data (with a dropdown arrow), Access, Community (with a dropdown arrow), Publications (with a dropdown arrow), and Documentation (with an external link icon). A yellow arrow points to the 'Data' dropdown menu, which is open and contains the following items: Quick search, SPARQL Search, Metadata quality, Statistics, and European Register for Protected Data. Below the navigation bar, there is a banner for the '10th anniversary of Open Data Maturity Report' with a 'Find out more >' button.

You can search for datasets via the Data section

Data.europa.eu as data hub

- More than 1.7 million datasets, from 183 data providers
- Navigate or search to get to the data you are looking for
- Benefit from many filters
- Metadata translations in all EU languages
- Export citation in several formats



The screenshot shows the Data.europa.eu website interface. At the top, there is the European Union logo and the text "European Union". To the right, there are links for "Login" and "English". Below this, the main heading is "European data" with the URL "data.europa.eu" and the tagline "The official portal for European data". A navigation bar contains links for "Home", "Data", "Academy", "Community", "Publications", and "Documentation". The main content area is titled "Datasets" and features a search bar with the text "Search" and a "Datasets" button. Below the search bar, it displays "Datasets found (1 671 091)" and a "Sort by: Relevance" dropdown menu. On the left side, there are several filter dropdown menus: "Publisher", "Formats", "Catalogues", "Categories", and "Keywords", each with a "- Any -" selection. The first search result is titled "History of the political groups of the National Assembly (since 2022) — Information and statistics" and includes a "CSV" download button. A small French flag icon and the text "Plateforme ouverte des données publiques françaises" are visible at the bottom right of the results area.

Data.europa.eu as **information hub**



Information around open data

Data stories

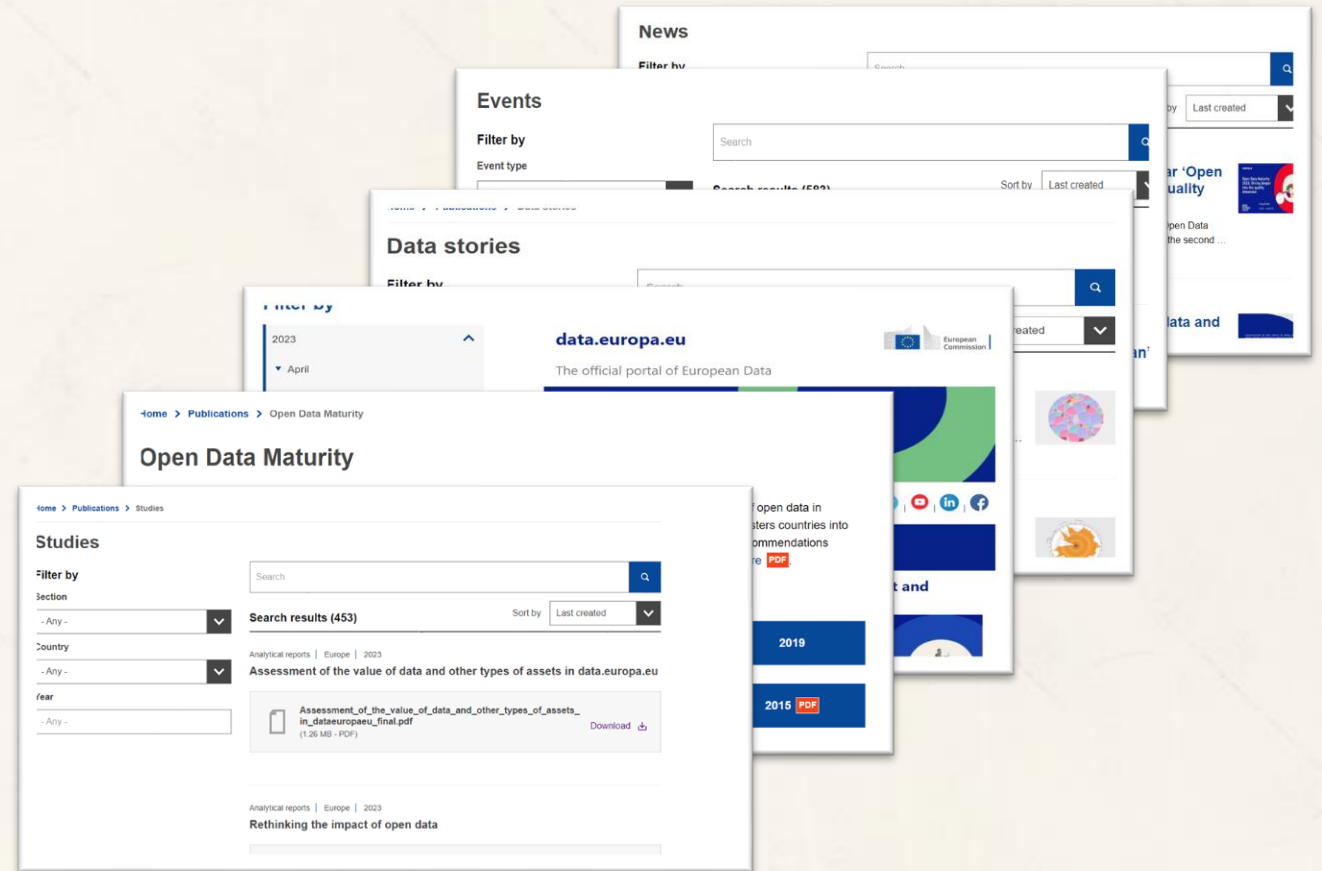
Podcasts

Studies

News

Newsletter

Events



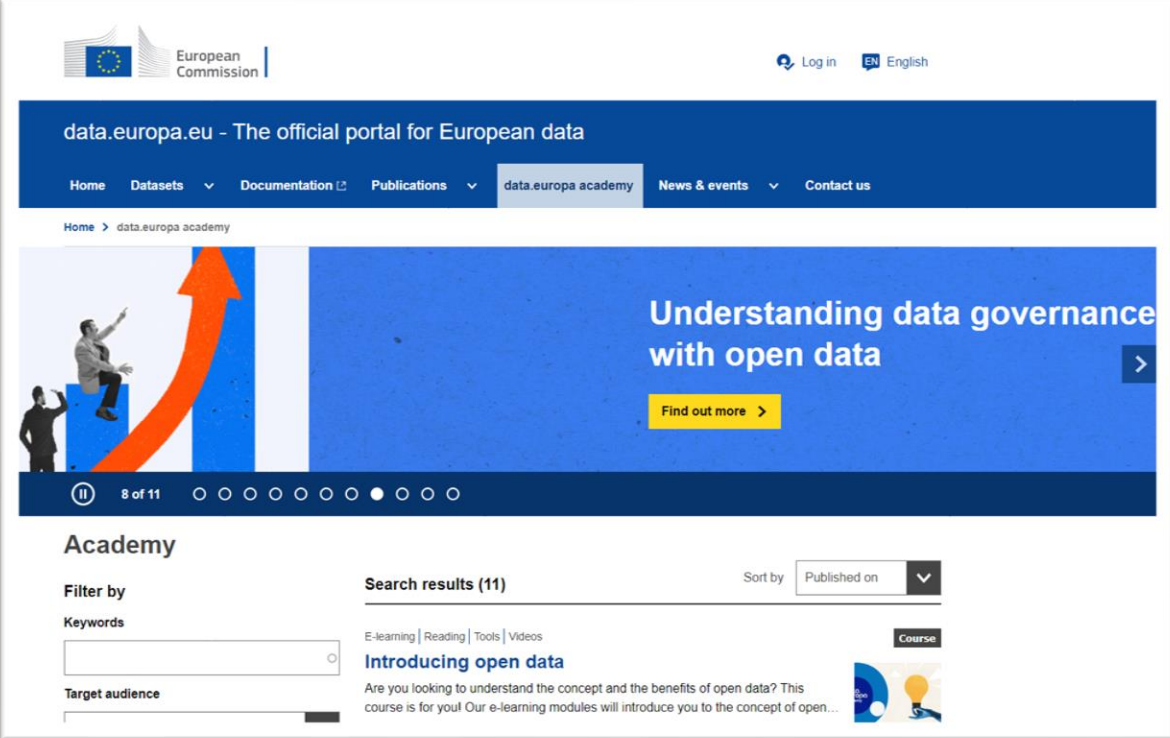
Data.europa.eu as **knowledge hub**



Data.europa academy

your open data knowledge hub

- Improving data literacy with 11 thematic courses (legal, technical, business, data visualisation...)
- Designing according to users' needs
- Offering training material for public sector, private companies, students, researchers, etc.



The screenshot shows the Data.europa Academy website interface. At the top, there is the European Commission logo and navigation links for 'Log in' and 'English'. Below this is a dark blue header with the text 'data.europa.eu - The official portal for European data' and a navigation menu with items: Home, Datasets, Documentation, Publications, data.europa academy (selected), News & events, and Contact us. A breadcrumb trail shows 'Home > data.europa academy'. The main content area features a large blue banner with an image of people climbing a bar chart with an upward arrow. The banner text reads 'Understanding data governance with open data' and includes a 'Find out more' button. Below the banner is a progress indicator showing '8 of 11' items. The 'Academy' section includes a 'Filter by' section with 'Keywords' and 'Target audience' input fields. To the right, there are 'Search results (11)' and a 'Sort by' dropdown set to 'Published on'. A search result for 'Introducing open data' is displayed, with a 'Course' tag and a small thumbnail image.

Case with open data from data.europa.eu



Case study

Imagine yourself as part of a team of data analysts working closely with the EU to evaluate the midwife and nurse coverage in the EU. Your role is to utilize datasets from Eurostat, the official statistical office of the EU, to perform a thorough data analysis and provide actionable insights.

Task 1: Finding the dataset

Your first task will be to source the necessary dataset using data.europa.eu. Specifically, you need to locate the dataset that contains information on the inhabitants per Nursing and caring professionals, from the 80's until 2021. Use the access link to download the dataset in csv format. Then convert the csv to Excel.

Task 2: Understanding the data

Now that you have the dataset, let's see if it contains the data you expected for our analysis. To check this, you need to understand what data is inside the dataset and how you can interpret data. Use the landing page link to guide you to the source website to find metadata.

Task 3: Answering the questions

Now that you understand the data you have at hand, you have been given the task to answer three questions. Check if the dataset contains what you need to start your analysis for the following questions.

1. What are the top 3 and bottom 3 EU countries in terms of midwife coverage in 2020?
2. How did the midwife coverage in Belgium change over the last 40 years?
3. Can a similar trend be found for nurse coverage as was found for midwife coverage in Belgium?





3 minutes

Task 1: Find the dataset

1

European data
data.europa.eu The official portal for European data

Home Data Academy Community Publications Documentation

Home > Datasets

Datasets

Data scope
- Any -

Provenance
- Any -

Publisher
- Any -

Catalogues

Nursing and caring professionals

Datasets found (882 968) Sort by: Relevance

Nursing and caring professionals - historical data (1980-2021)

Nursing and caring professionals - historical data (1980-2021)

XML TSV HTML CSV

Eurostat

2

3

4

Dataset Nursing and caring professionals - historical data (1980-2021)

Eurostat Publisher: Eurostat Updated: 12.07.2022

Dataset Quality Similar datasets

Dataset feed Linked data Cite Embed

Nursing and caring professionals - historical data (1980-2021)

Created: 05.03.2014
Updated: 12.07.2022
Landing Page: https://ec.europa.eu/eurostat/databrowser/product/page/hlth_rs_prsns
Publisher: Name: Eurostat

Show More

Distributions (5)

Link to the data	Format	Updated	Actions
Download dataset in SDMX 2.1 format Show more	XML	UNKNOWN	Access Linked data Validate
Download dataset in SDMX-CSV format Show more	CSV	UNKNOWN	Preview Access Linked data Validate
Download dataset in TSV format Show more	TSV	UNKNOWN	Access Linked data Validate



How to extract a GZ file —> YouTube: [‘How to Extract tar.gz File In PC/Laptop Using 7zip \[EASY\]’](#)

How to convert a CSV file to Excel —> YouTube: [‘How to Convert CSV to Excel \(Simple and Quick\)’](#)



3 minutes

Task 2: Understand the data

Task 2: Understanding the Data

Now that you have the dataset, let's see if it contains the data you expected for our analysis. To check this, you need to understand what data is inside the dataset and how you can interpret data. Use the [landing page](#) link to guide you to the source website to find metadata.

Dataset Nursing and caring professionals - historical data (1980-2021)

Eurostat Publisher: Eurostat Updated: 12.07.2022

Dataset Quality Similar datasets

Dataset feed Linked data Cite Embed

Created: 05.03.2014
Updated: 12.07.2022

Landing Page: https://ec.europa.eu/eurostat/databrowser/product/page/hlth_rs_prsns

Publisher: Name: Eurostat

Show More

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Download dataset in SDMX 2.1 format Show more	XML	UNKNOWN	Access Linked data Validate
Download dataset in SDMX-CSV format Show more	CSV	UNKNOWN	Preview Access Linked data Validate
Download dataset in TSV format Show more	TSV	UNKNOWN	Access Linked data Validate

Task 2: Understand the data

Dataset Nursing and caring professionals - historical data (1980-2021)

Eurostat Publisher: Eurostat Updated: 12.07.2022

Dataset **Quality** **Similar datasets**

Dataset feed **Linked data** Cite Embed

Created: 05.03.2014
Updated: 12.07.2022

Landing Page: https://ec.europa.eu/eurostat/databrowser/product/page/hlth_rs_prsns

Publisher: Name: Eurostat

Show More

Distributions (5)

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Download dataset in SDMX 2.1 format Show more	XML	UNKNOWN	Access Linked data Validate
Download dataset in SDMX-CSV format Show more	CSV	UNKNOWN	Preview Access Linked data Validate
Download dataset in TSV format Show more	TSV	UNKNOWN	Access Linked data Validate

eurostat Data Browser

ALL DATA RECENTLY UPDATED DOWNLOADS

Is this your first visit to the 'Data browser'? Let us briefly introduce it and its functionalities to you. [View presentation](#) [Don't ask me again](#) [Ask me again at the next visit](#)

Nursing and caring professionals - historical data (1980-2021)

Online data code: hlth_rs_prsns
Source of data: Eurostat
Last data update: 12/07/2022 11:00 (1 year ago)
Last structure update: 03/01/2024 23:00
Overall data coverage: 1980 - 2021
Number of values: 34 986
Data navigation tree location: Population and social conditions > Health > Health care > Health care resources > Health care resources - historical data

DEFAULT FULL DATASET (hlth...

Search by code and label
Type to filter (special filter with ? or *)

Activity and employment status [wstatus] (3 / 3)	<input type="checkbox"/>	[0C222_322_5321_5322]	Nurses, midwives, health care assistants and home-based personal care workers
Geopolitical entity (reporting) [geo] (38 / 38)	<input type="checkbox"/>	[0C222_322]	Nurses and midwives
International Standard Classification ... [isco08] (9 / 9)	<input checked="" type="checkbox"/>	[0C222_3222]	Nursing professionals and midwives
Time [time] (42 / 42)	<input checked="" type="checkbox"/>	[0C2221_3221]	Nurses
Time frequency [freq] (1 / 1)	<input checked="" type="checkbox"/>	[0C2221]	Nursing professionals
Unit of measure [unit] (3 / 3)	<input checked="" type="checkbox"/>	[0C2222_3222]	Midwives
	<input checked="" type="checkbox"/>	[0C3221]	Nursing associate professionals
	<input checked="" type="checkbox"/>	[0C5321_5322]	Health care assistants and home-based personal care workers
	<input checked="" type="checkbox"/>	[0C5321]	Health care assistants



5 minutes

Task 3: Answer the questions

Based on the data provided in the attached Excel file, please determine if you can answer the following research statements. For each statement, indicate whether the information in the Excel file is sufficient to answer the question.

Statement 1: I have the information to identify the top 3 and bottom 3 EU countries in terms of midwife coverage in 2020.

- Yes, I have the information to answer this question
- No, I do not have the information to answer this question

Statement 2: I have the information to research how midwife coverage in Belgium has changed between 1980 and 2021.

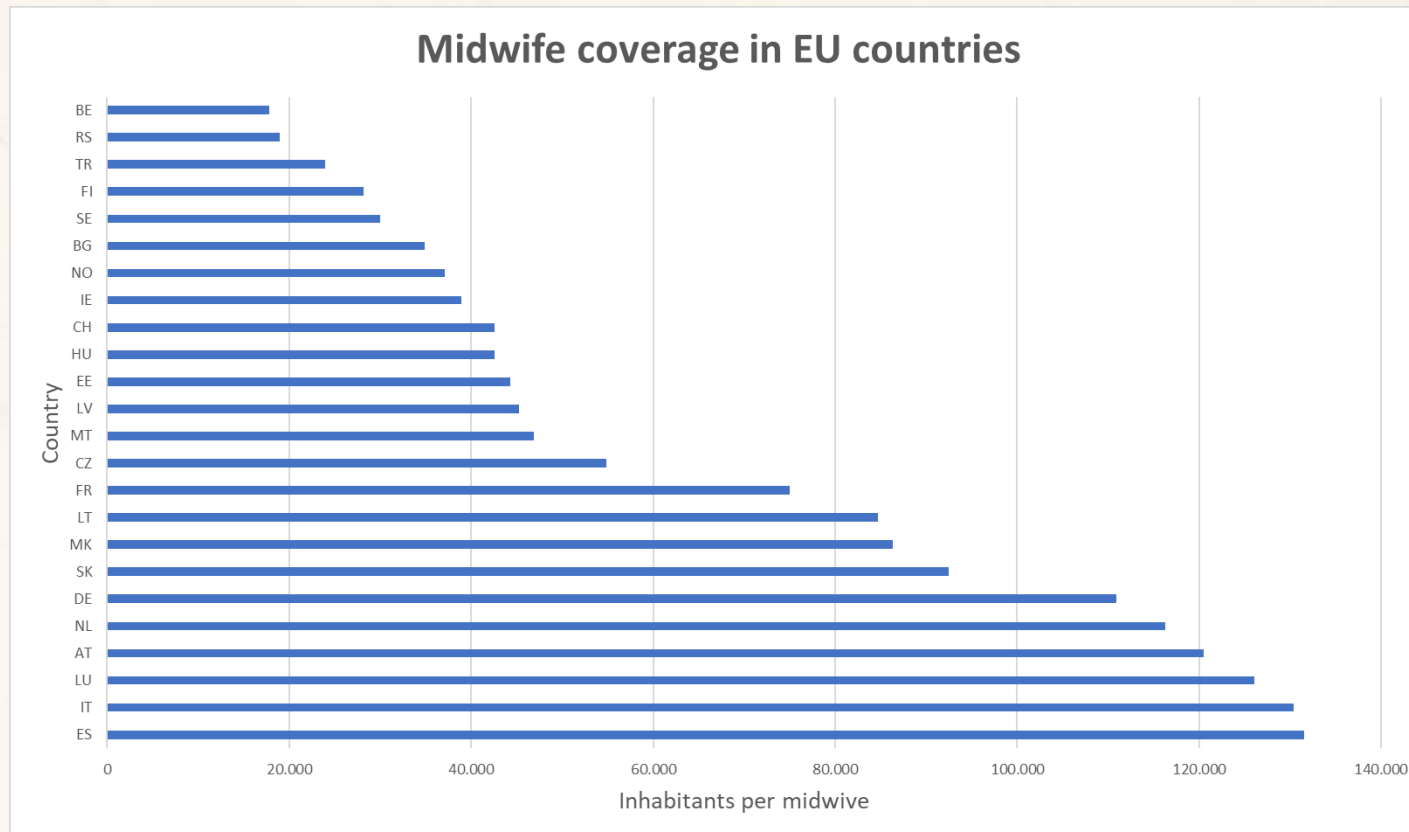
- Yes, I have the information to answer this question
- No, I do not have the information to answer this question

Statement 3: I can research whether a similar trend is found for nurse coverage as was found for midwife coverage in Belgium.

- Yes, I have the information to answer this question
- No, I do not have the information to answer this question

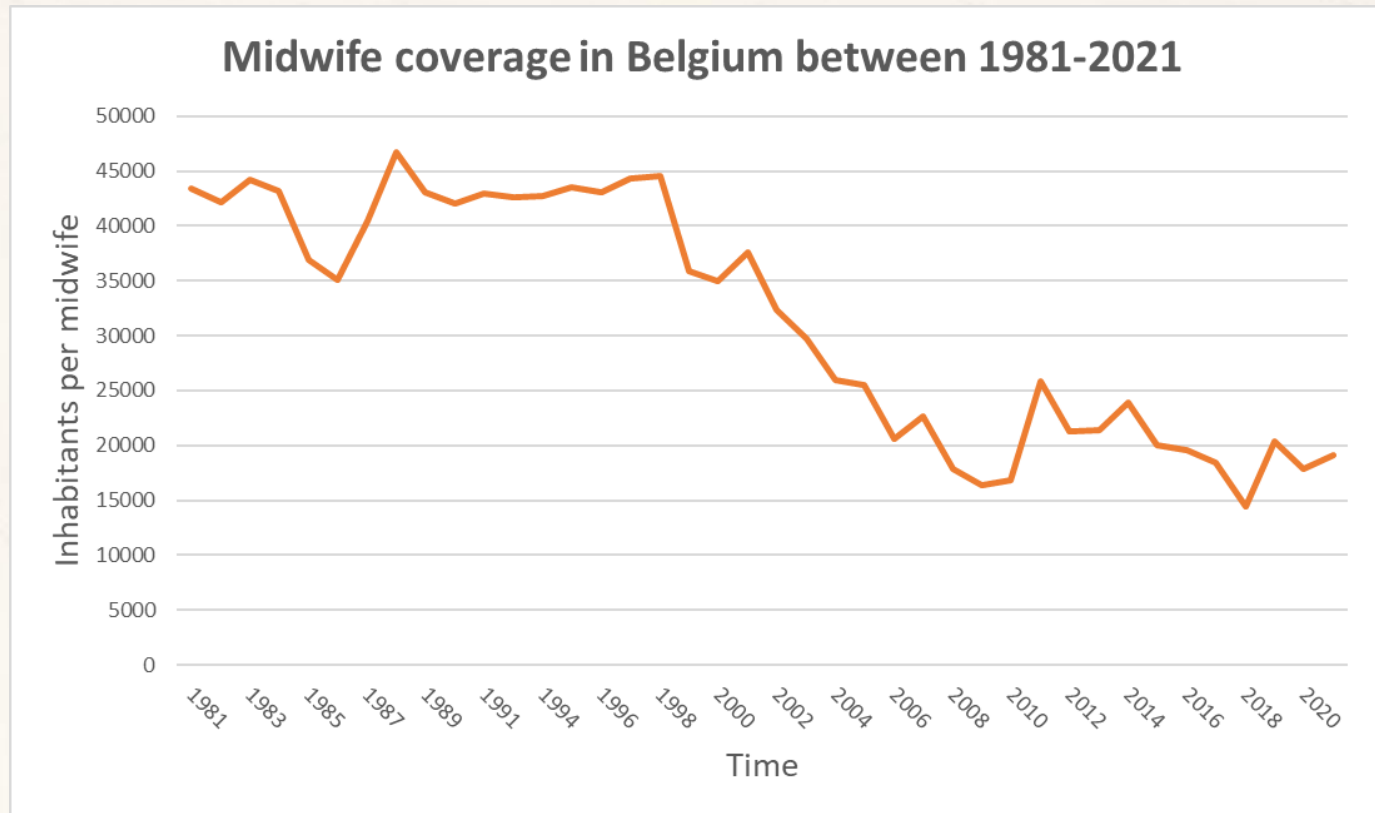
Please review the data carefully and provide your answers based on the information available in the Excel file.

What are the top 3 and bottom 3 EU countries in terms of midwife coverage in 2020?



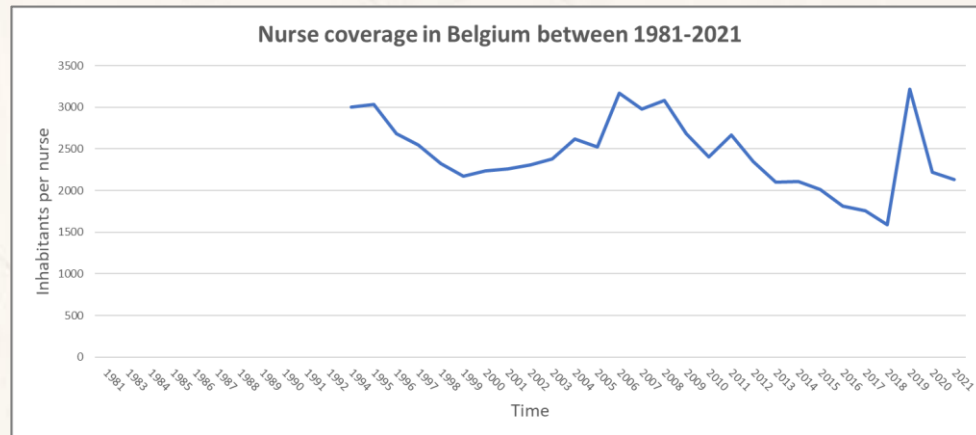
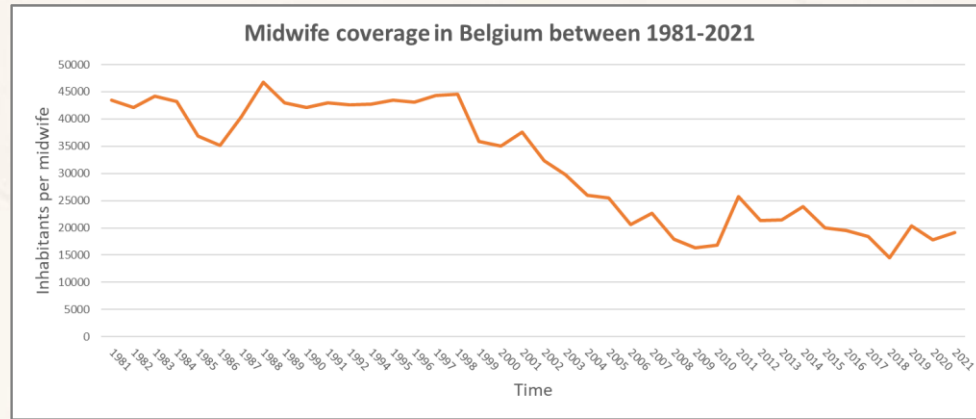
- Belgium, Serbia and Turkey has the highest midwife coverage
- Spain, Italy and Luxembourg has the lowest coverage
- The top 3 countries have about 6 time less inhabitants per midwife than to bottom 3 countries

How did the midwife coverage in Belgium change over the last 40 years?



- The coverage more than doubled over the last 40 years
- The doubling in coverage happened in the 10 years between 1998-2008

Can a similar trend be found for nurse coverage as was found for midwife coverage in Belgium?



- Nurse coverage doubled in 10 years over 2008 and 2018
- In 2019 nurse coverage data shows a halving in one year
- Availability of data on nurses does not go back in time as far as the midwife data



Open Data and the FAIR principles: A use case in Citizen Science

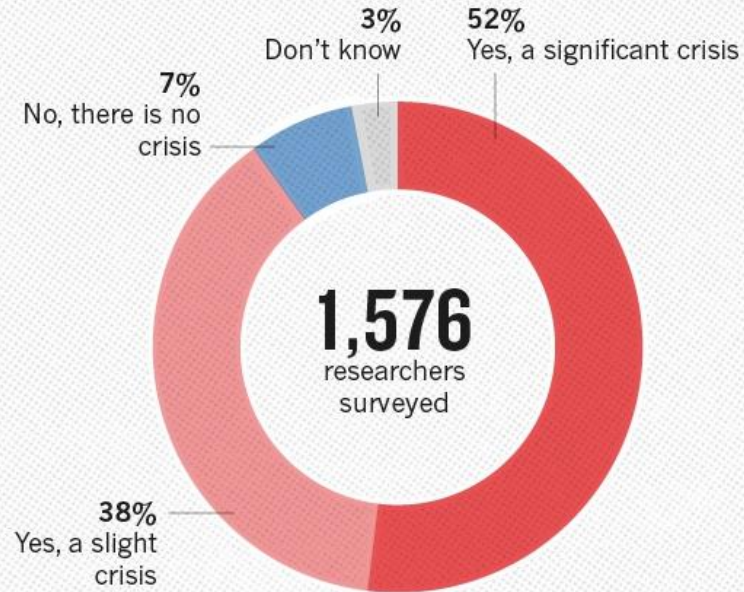
Esteban González (OEG - UPM)
Daniel Garijo (OEG - UPM)
daniel.garijo@upm.es
@dgarijov

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 - Attribution — You must attribute the work by inserting
 - “[source <http://www.oeg-upm.net/>]” at the footer of each reused slide
 - a credits slide stating: “These slides are partially based on “Open Data and the FAIR principles: A use case in Citizen Science” By Esteban Gonzalez and Daniel Garijo
 - Share-Alike



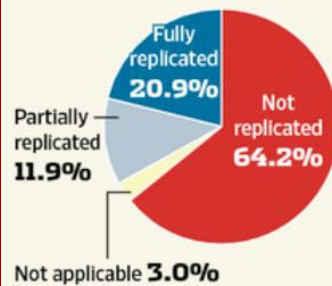
The importance of Open Data in Science

IS THERE A REPRODUCIBILITY CRISIS?



No Cure

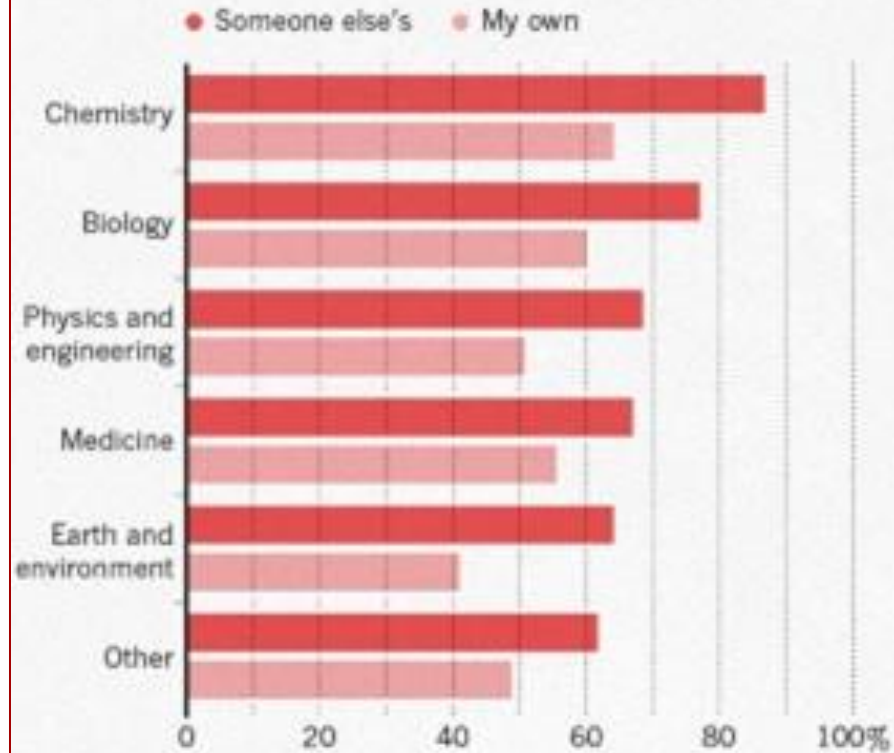
When Bayer tried to replicate results of 67 studies published in academic journals, nearly two-thirds failed.



Source: Nature Reviews Drug Discovery

HAVE YOU FAILED TO REPRODUCE AN EXPERIMENT?

Most scientists have experienced failure to reproduce results.



Retraction Watch

Tracking retractions as a window into the scientific process

Scientific publications are changing

Traditional Published Articles

Text:
Narrative of method,
the data is in tables,
figures/plots,
the software used is
mentioned

Modern Published Articles

Text:
Narrative of method,
the data is in tables,
figures/plots,
the software used is
mentioned

Data:
Supplementary materials,
pointers to data repositories

Reproducible Articles

Text: Narrative of method,
the data is in tables,
figures/plots,
and software mentioned

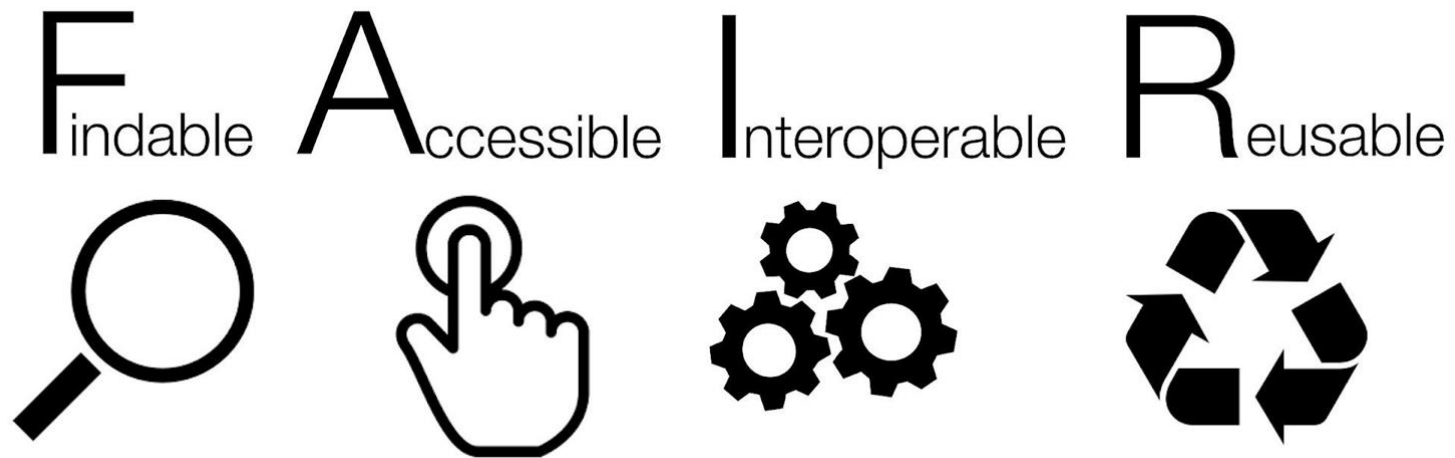
Data:
Supplementary materials,
pointers to data
repositories

Software: Data
preparation, data analysis,
and visualization

Provenance and methods:
Workflow/scripts describing
dataflow, codes, and
parameters

Source: The Scientific Paper of the Future. Yolanda Gil et. al.
<http://dx.doi.org/10.5281/zenodo.159206>

Ever heard about FAIR?



Wilkinson, M., Dumontier, M., Aalbersberg, I. *et al.* The FAIR Guiding Principles for scientific data management and stewardship. *Sci Data* **3**, 160018 (2016). <https://doi.org/10.1038/sdata.2016.18>

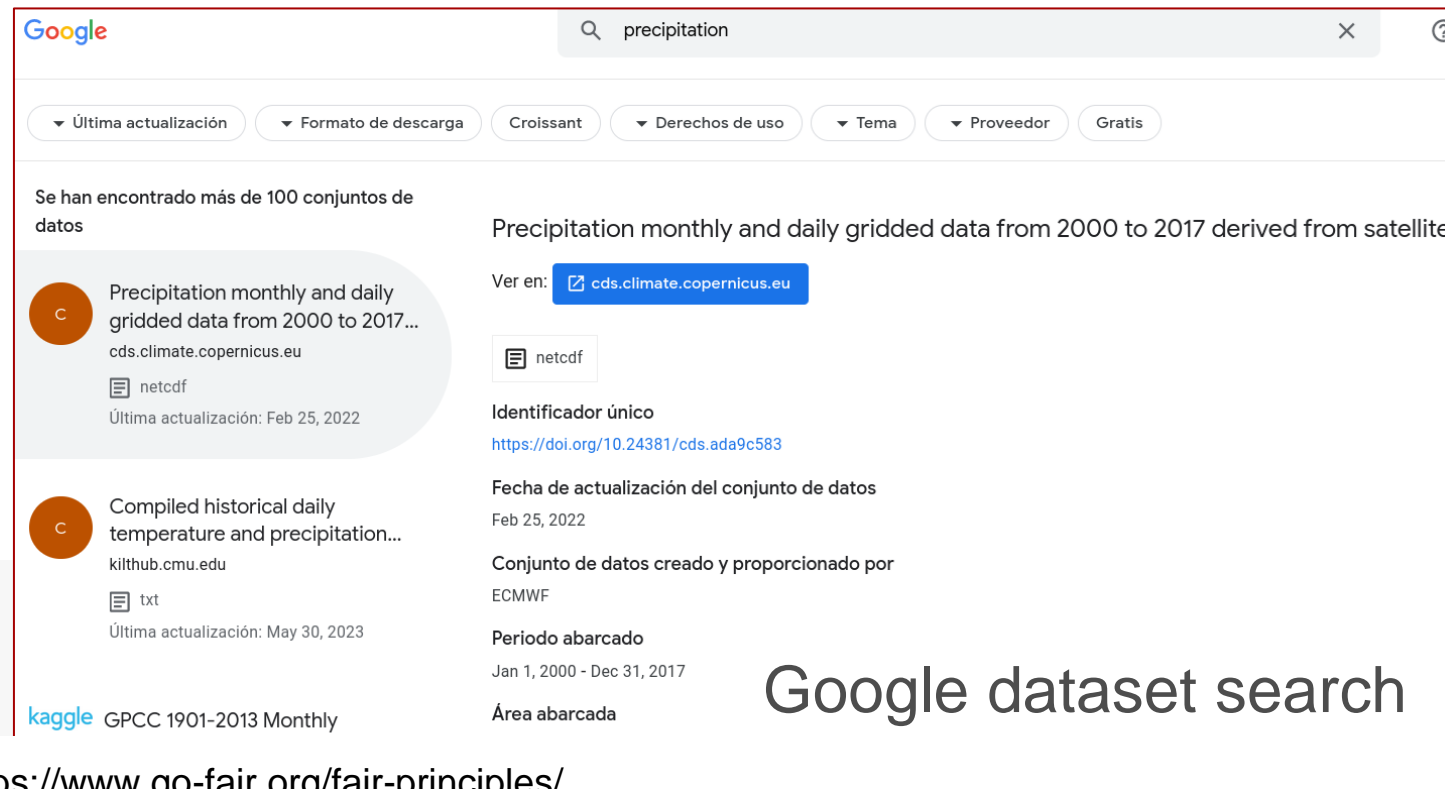
FINDABLE

F1: Global PIDs

F2: Use rich metadata

F3: Metadata include data identifier

F4: Metadata indexed in a searchable engine



The screenshot shows a Google search for "precipitation". The search results include:

- Search filters:** Última actualización, Formato de descarga, Croissant, Derechos de uso, Tema, Proveedor, Gratis.
- Search results:**
 - Result 1:** Precipitation monthly and daily gridded data from 2000 to 2017...
 - Source: cds.climate.copernicus.eu
 - Format: netcdf
 - Last updated: Feb 25, 2022
 - Ver en: cds.climate.copernicus.eu
 - Identificador único: <https://doi.org/10.24381/cds.ada9c583>
 - Fecha de actualización del conjunto de datos: Feb 25, 2022
 - Conjunto de datos creado y proporcionado por: ECMWF
 - Periodo abarcado: Jan 1, 2000 - Dec 31, 2017
 - Área abarcada
 - Result 2:** Compiled historical daily temperature and precipitation...
 - Source: kilthub.cmu.edu
 - Format: txt
 - Last updated: May 30, 2023
 - Result 3:** kaggle GPCP 1901-2013 Monthly

Google dataset search

Source: <https://www.go-fair.org/fair-principles/>

FINDABLE

- F1: Global PIDs
- F2: Use rich metadata
- F3: Metadata include data identifier
- F4: Metadata indexed in a searchable engine

ACCESSIBLE

- A1: Standardize communications protocol
 - A1.1: Open protocol
 - A1.2: Protocol with authentication procedure
- A2: Metadata accessible

```
Terminal Archivo Editar Ver Buscar Terminal Ayuda
jimmy@KEVIN:~$ curl -I http://192.168.1.60
HTTP/1.1 200 OK
Server: nginx/1.14.0 (Ubuntu)
Date: Fri, 13 Jul 2018 16:28:23 GMT
Content-Type: text/html
Content-Length: 612
Last-Modified: Fri, 13 Jul 2018 15:17:19 GMT
Connection: keep-alive
ETag: "5b48c27f-264"
Accept-Ranges: bytes
```

https + content
negotiation

Source: <https://www.go-fair.org/fair-principles/>

FINDABLE

- F1: Global PIDs
- F2: Use rich metadata
- F3: Metadata include data identifier
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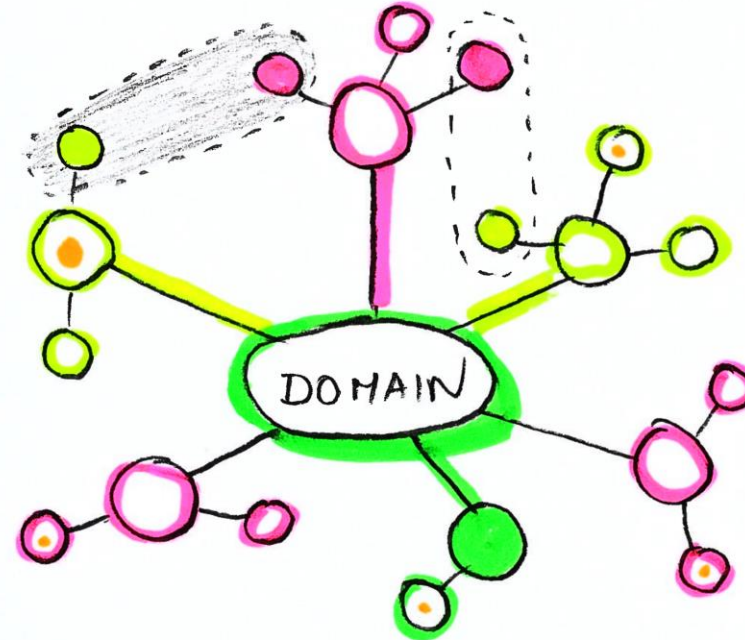
ACCESSIBLE

- A1: Standardize communications protocol
 - A1.1: Open protocol
 - A1.2: Protocol with authentication procedure
- A2: Metadata accessible

INTEROPERABLE

- I1: Meta(data) use a formal language for knowledge representation
- I2: Meta(data) use vocabularies that follow FAIR principles
- I3: Meta(data) include references to other metadata

Source: <https://www.go-fair.org/fair-principles/>



FINDABLE

- F1: Global PIDs
- F2: Use rich metadata
- F3: Metadata include data identifier
- F4: Metadata indexed in a searchable engine

ACCESSIBLE

- A1: Standardize communications protocol
 - A1.1: Open protocol
 - A1.2: Protocol with authentication procedure
- A2: Metadata accessible

INTEROPERABLE

- I1: Meta(data) use a formal language for knowledge representation
- I2: Meta(data) use vocabularies that follow FAIR principles
- I3: Meta(data) include references to other metadata

Source: <https://www.go-fair.org/fair-principles/>

REUSABLE

- R1: Meta(data) are richly described**
 - R1.1: Meta(data) use a clear and accessible license**
 - R1.2: Meta(data) include detailed provenance**
 - R1.3: Meta(data) meet domain-relevant community standards**

How data.europa.eu adopts the FAIR principles?

Example: <https://data.europa.eu/data/datasets/244310-16?locale=en>

The screenshot shows the 'European data' portal. The header includes the logo and tagline 'The official portal for European data'. A navigation bar contains 'Home', 'Data', 'Academy', 'Community', 'Publications', and 'Documentation'. The breadcrumb trail is 'Home > Datasets > % 25-49 years old'. The main content area features a 'Dataset' button, the title '% 25-49 years old', the publisher 'data.gov.be' (Waals Instituut voor Evaluatie, Prospectie en Statistiek (IWEPS)), and the update date '04.07.2023'. At the bottom, there are buttons for 'Dataset', 'Quality', and 'Similar datasets', along with links for 'Dataset feed', 'Linked data', and 'Cite'.

Metadata quality

The Metadata Quality Assurance is intended to help data providers understand on which metrics we use for indicator measurements, please refer to the documentation.

Accessibility

Download URL	100%	Most frequent a...
--------------	------	--------------------

Reusability

Access restrictions	true	License information
---------------------	------	---------------------

Publisher	true
-----------	------

Careful: FAIR is not always a proxy for high quality!
But quality data must be **FAIR**



Open Data and Citizen Science:

Why is FAIR needed?

Participation of citizens in the research lifecycle

- Producing data
- Data Analysis

Observations are done by **amateur citizens**, not domain experts

- **More data**, but **less quality**

How does **quality** vary across use cases?

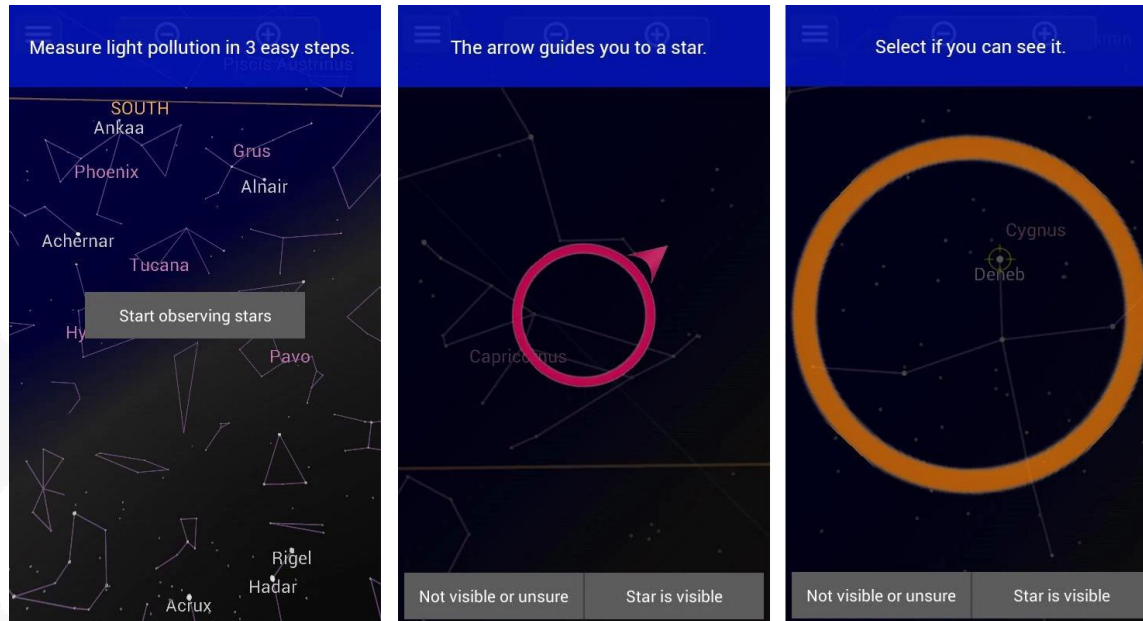
Human-based observations: Globe At Night

The screenshot shows the 'Globe at Night' observation form. It is divided into four numbered sections:

- 1 When did you make your observations?** Includes fields for 'Observation Date' (2019/10/29) and 'Observation Time' (16:04). A link to 'Switch to Nighttime version' is present.
- 2 Where did you make your observations?** Features a map interface with 'Mapa', 'Satélite', and 'Red' views. It shows a world map with a location pin and a 'Map It!' button. Below the map are fields for 'Latitude', 'Longitude', 'Elevation: meters', and 'Country: PRESS TO SELECT'. A 'Location comments' section provides a template for user input.
- 3 How dark was the sky that night?** Displays a star chart for the constellation Pegasus, showing stars like Igeol, Pleiades, Mira, Enif, Fomalhaut, and Altair. A magnitude scale '< 3.50 mag' is shown. Below the chart are five small thumbnail images representing different sky conditions.
- 4 What were sky conditions like that night?** Contains four radio button options: 'Clear', '1/4 of the sky', '1/2 of the sky', and 'More than 1/2 of the sky'. A 'Sky condition comments' field is provided for additional notes.

- Objective: raise **public awareness** of the impact of light pollution by inviting citizen-scientists to measure their night sky brightness and submit their observations
- Citizens need **astronomical expertise** to identify the stars.
- More than **180,000 measurements** have been contributed from people in 180 countries over the last 12 years
- Open Data & Open Access

Hybrid observations: Loss of the Night



- Loss of the Night App challenges citizen scientists **to identify as many stars** as they can in order to measure light pollution.
- Uses **software to guide annotating** stars
- Evolution of Globe At Night initiative
- Open data and Open Access

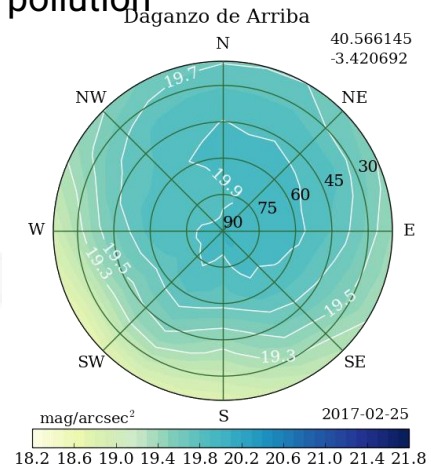
Semi-automated observations: Dark Sky Meter



- Contributes to a global map of nighttime light pollution **using the iPhone's camera.**
- Uses an external weather forecast service.
- Open data is available in Globe At Night initiative.
- Paid application

Fully automated observations: Nixnox

Objective: Build a celestial map of light pollution



Manual Process. Duration: 30 minutes (experts) and results with mistakes



Automatic process: 1 - 2 minutes



<https://tess.stars4all.eu>

Credits: Nixnox Project

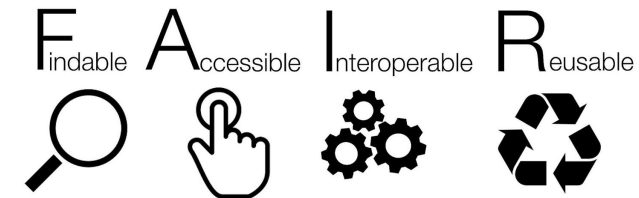
Thank you to an amateur initiative. Based on collaboration!

Citizen Science Photometer Network



FAIR:

- Each dataset has its own persistent identifier
- Data follow standard specifications
- Quality **metadata** (provenance)
 - Key for integration!



Citizen Science

- Gathering data
 - How to improve **data quality**
- Data analysis

FAIR + Citizen Science = Reproducible Science!

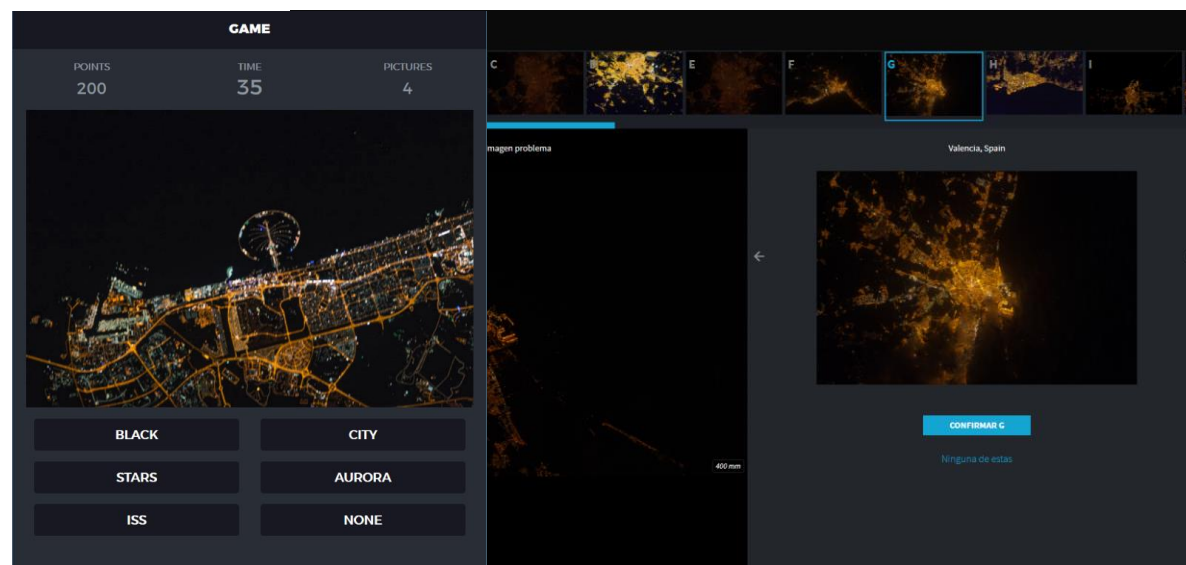
Side effects of FAIR and Open Data: Cities At Night



Astronauts from the ISS have produced thousand of images.

Credits: NASA & Cities At Night Project

Objective: Citizens participation to classify images



Results were used in a thesis! and published in **Zenodo**



Open Data and the FAIR principles: A use case in Citizen Science

Daniel Garijo (OEG - UPM)
Esteban González (OEG - UPM)

Q&A



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The logo for Data Europa Academy is located in the bottom-left corner. It consists of the words "data.", "europa", and "academy" stacked vertically in a white, lowercase, sans-serif font. The word "data." has a small yellow dot above the 'a'. The word "europa" has a small yellow dot above the 'o'. The word "academy" has a small yellow dot above the 'a'. The logo is set against a dark blue circular background that is part of a larger graphic design of overlapping circles in various shades of blue and white.

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14 June 2024
10.00 – 11.30 CET

Webinar

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21 June 2024
10.00 – 11.30 CET

Webinar

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28 June 2024
10.00 – 11.30 CET

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Thank you

