



Module II. Technical

6. Info graphic course


Topic 2. Realization of an infographic

Lesson 1. Effectiveness of infographics and data visualizations



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This lesson has been prepared to make students understand the **usefulness of visualizing data and information**, provided that they respect some rules that make information visualization **truly effective**.

In this lesson, we will learn:

The **usefulness** and the **effectiveness** of infographics and data visualizations in **facilitating understanding** and **engagement**.



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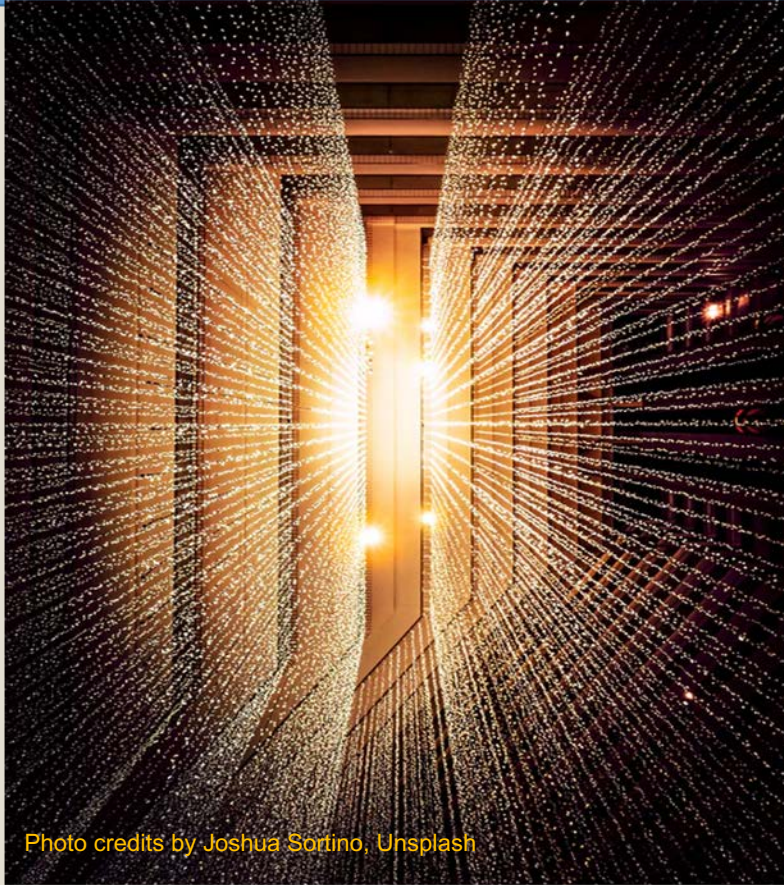


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Infographic and Data Visualization



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In this lesson, we will focus on two key visual tools for **supporting people in finding the information** they need in order to achieve their goal, for example completing a task (e.g. completing a visit in a natural area or a museum), or discovering more about a natural or cultural heritage in an engaging, pleasant, and accessible way:

infographics and data visualizations.

Both Infographics and data visualizations are **information visualizations**:

- The first ones present **data already giving an interpretation** of that dataset.
- The second ones generally give more freedom to the user in **analysing and managing the raw data**.

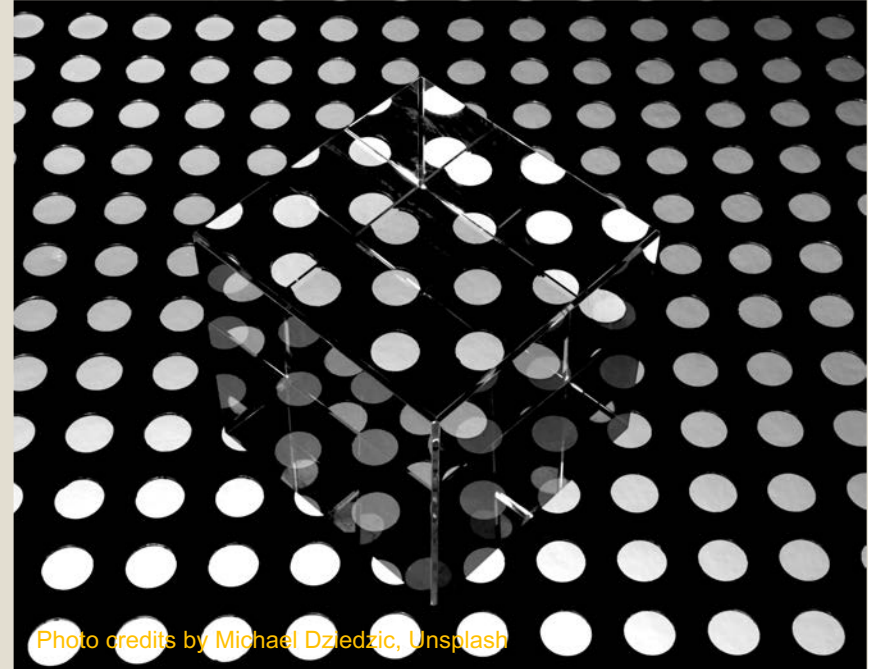
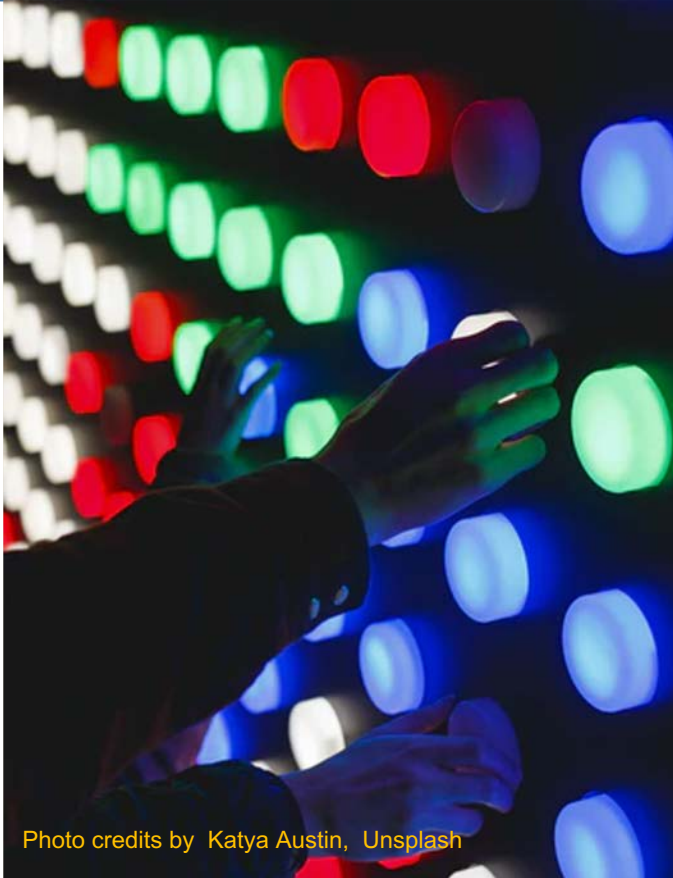


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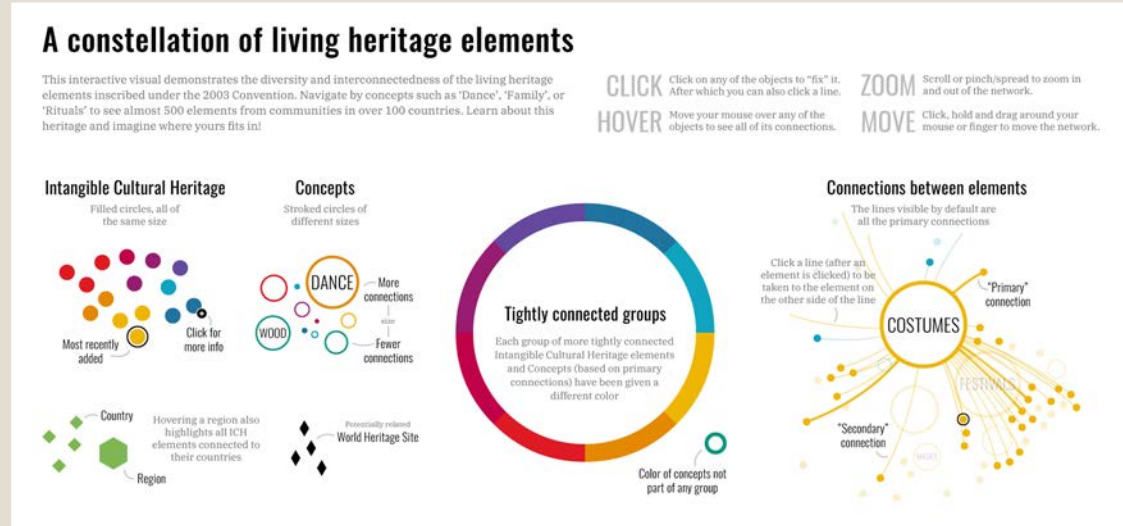
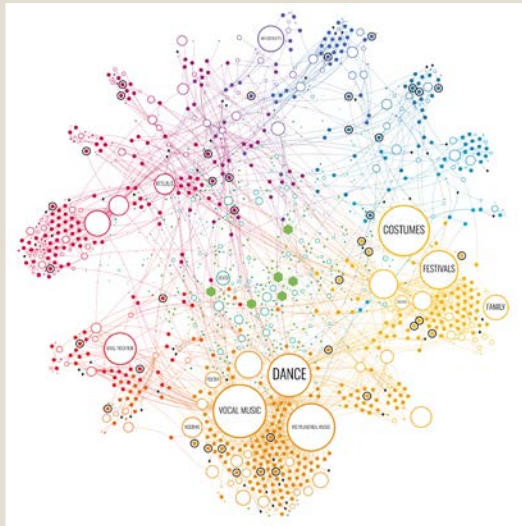
Although usually data visualizations are more powerful tools in exploring and dealing with data, all kinds of information visualisations can make them **more readable and easily understandable.**



Infographics and data visualizations can be **static or interactive** representations of information and data.

In the latter case, they need a **user interface allowing people to interact** with data and information.

For example, in the following figures, you can see the **“Dive into Intangible Cultural Heritage” project**, an interactive visualization using web-semantics and graphic visualization to show and navigate through the elements inscribed on UNESCO’s Lists.



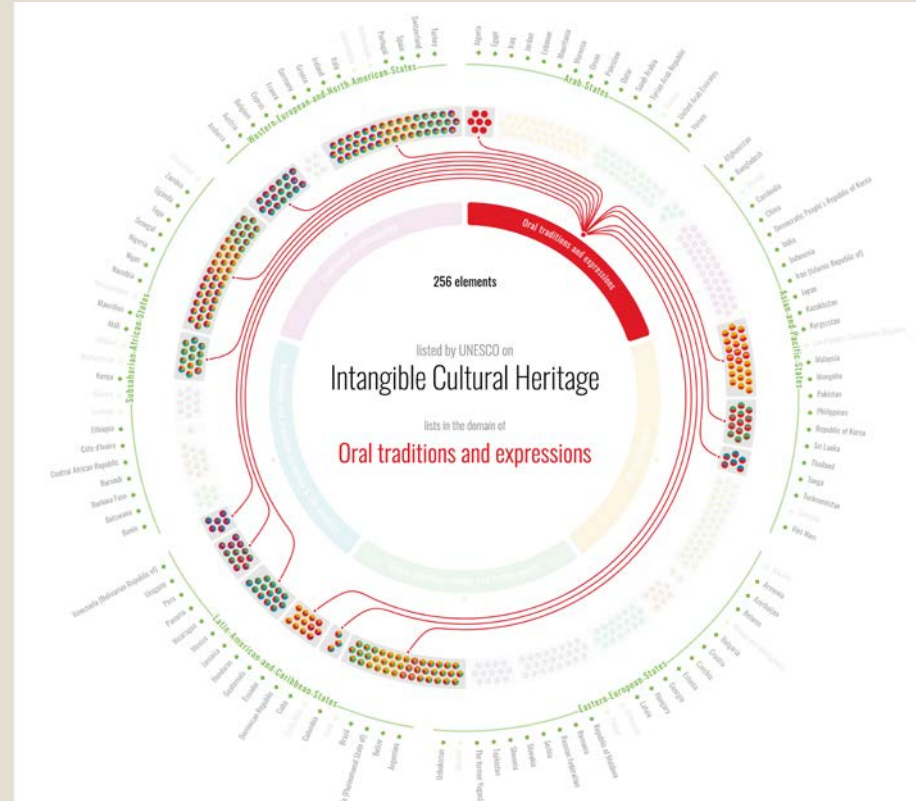
Sources Fig.1: <https://www.visualcinnamon.com/portfolio/intangible-cultural-heritage/> Sources Fig.2: <https://ich.unesco.org/dive/constellation>

Since this is an **interactive information visualization**, visit the website for a more enjoyable experience:

<https://ich.unesco.org/dive/constellation>

You can interact with the visualized data and also change type of data visualization using the functionalities of the User Interface.

Source: <https://www.visualcinnamon.com/portfolio/intangible-cultural-heritage/>

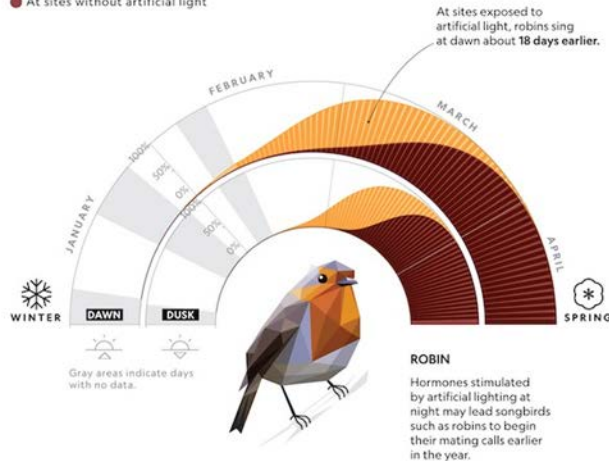


WHEN THE TOO-EARLY BIRD SINGS

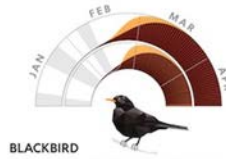
In spring songbirds greet the rising and setting sun with a cacophony of chirps meant to entice mates and claim territory. But artificial light has made the night sky brighter and disrupted the seasonal rhythms of birds that use day length as a cue to sing. Of six songbird species that scientists studied in Germany, four started singing earlier in the year because of night lighting. The long-term effects of light pollution on birds' ecosystems, and their survival, remain unclear.

LIKELIHOOD OF SINGING

- At sites with artificial light
- At sites without artificial light



MÓNICA SERRANO AND RYAN T. WILLIAMS, NGM STAFF
SOURCES: ARNAUD DA SILVA, MIHAI VALCU, AND BART KEMPENAEERS,
MAX PLANCK INSTITUTE FOR ORNITHOLOGY



It is possible to realize amazing infographics with data analysis and representation.

They can be effectively used in infographics for telling a story by presenting data in a structured way about a specific topic, as the image shows.

Source:

<https://www.nationalgeographic.com/magazine/2018/05/infographic-bird-song-artificial-light-pollution/>



Photo credits by Tim Gouw, Unsplash

Data visualizations usually require **some expertise**, since they can be really demanding in making sense of data. So, it is useful to have a **basic knowledge about how to deal with data** in order to create effective information visualizations.



Photo credits by Martin Sanchez, Unsplash

Data Analysis and Representation

Here a few **basic considerations** about analysis and representation of data.

Of course, this is not an exhaustive dissertation about a **complex and evolving field of science**. However, it is **enough** for coming **to create an infographic** at the end of this course.





Photo credits by David Travis, Unsplash

Data visualization is **visually presenting structured or unstructured data by using graphical techniques.**

Why is Data Visualization important?

- It helps people in **understanding** data and information **faster.**
- It helps **finding connections**, i.e. insight and key patterns, between tons of information.
- It is suitable to **engage** people.

How can data be represented?

- **Simple forms** and shapes, i.e. simple visual representation of data of only two dimensions (charts and graphs, or animated visualizations).
- **Static images or dynamic**, such as interactive visualizations, that can change with the actions of the user, and videos.
- **Historical data**, i.e. referred to past events, or in **real time**, i.e. referred to ongoing events.





Photo credits by Good Good Good, Unsplash

Importance of information visualization

Information visualization **makes knowledge more accessible** by **simplifying large dataset** and offering an **interpretation** of rather complex issues (or simply of issues better conveyed by images) **through an intuitive story** and a catchy design.



They **capture attention**, **make understandable** hard-to-grasp concepts, provide a clear picture about the interest topic, and create **engagement**.

Indeed, infographic and data visualization are a **form of communication**.

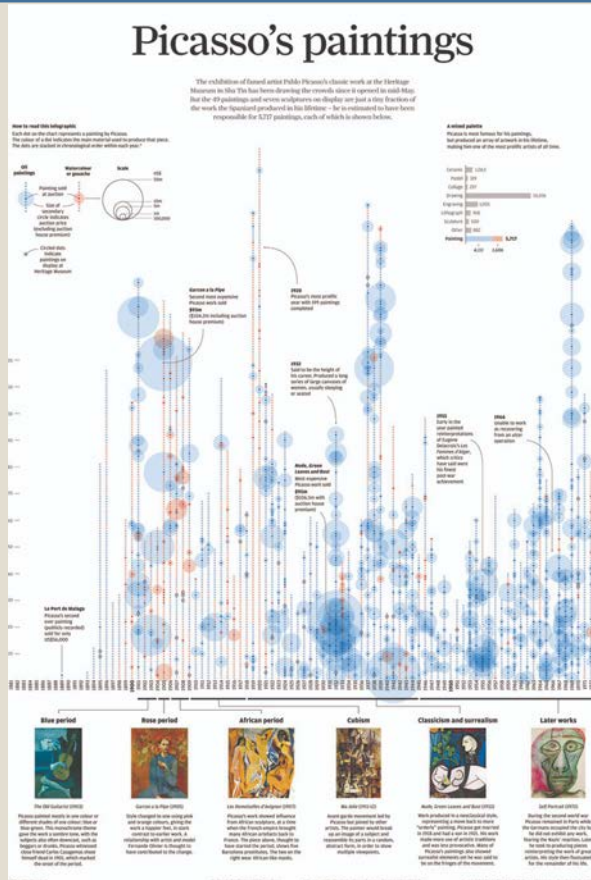
Applied to natural and cultural heritage, information visualization can be a **useful tool for engaging people** and making them aware of unknown resources or peculiarities.

It also can favour a **better relationship** with the organization delivering the information.



Photo credits by Michal Parzuchowski, Unsplash

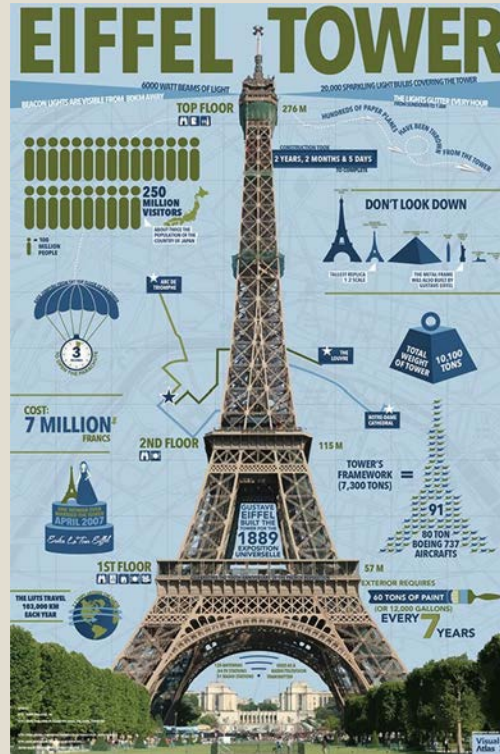
For example, the infographic designer Simon Scarr realized this infographic to show the prolific career of Pablo Picasso in more detail. The information visualization was created since **there was an exhibition** at the museum showing just a tiny fraction of all the work the painter produced in his lifetime.



Indication (key) about how to read the infographic.

Source:
<http://www.simonscarr.com/picasso>

Infographics and data visualizations can also be less elaborated, but they remain an opportunity to promote heritage in an easy-to-access and widespread way, as these examples show.



Source: <https://www.behance.net/gallery/16226213/Infographic-Travel-Posters>



Source: <https://www.spot.ph/entertainment/57493/infographic-the-rizal-monument>



Source: <https://visitgranada.net/facts-about-alhambra>

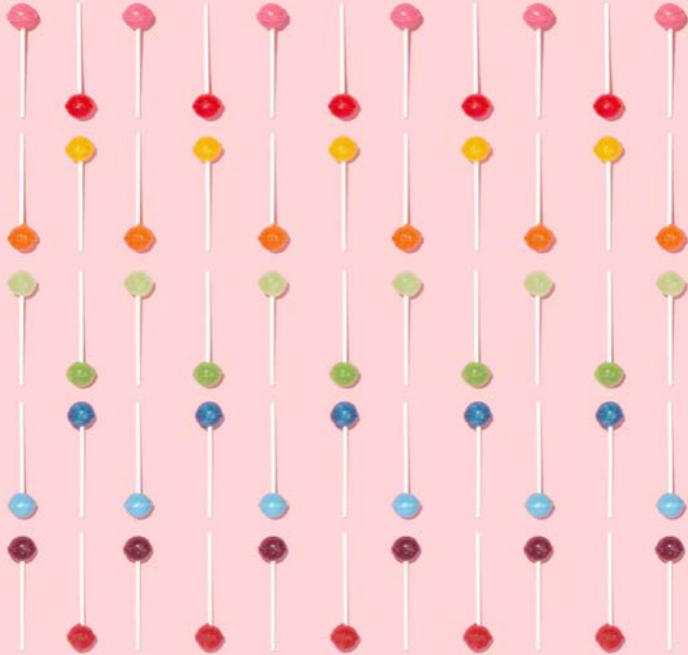


Photo credits by Amy Shamblen, Unsplash

How to make effective infographics and data visualizations



Remember that a good information visualization, as well as a good user interface, **always meets the user needs.**

So in designing your infographic or data visualization, **ask yourself:**

- What information does the user need?
- Why does the user need that information?
- What will the user do to find or after finding the information (interaction)?
- Does the information provided effectively support the user in reaching his/her goal?



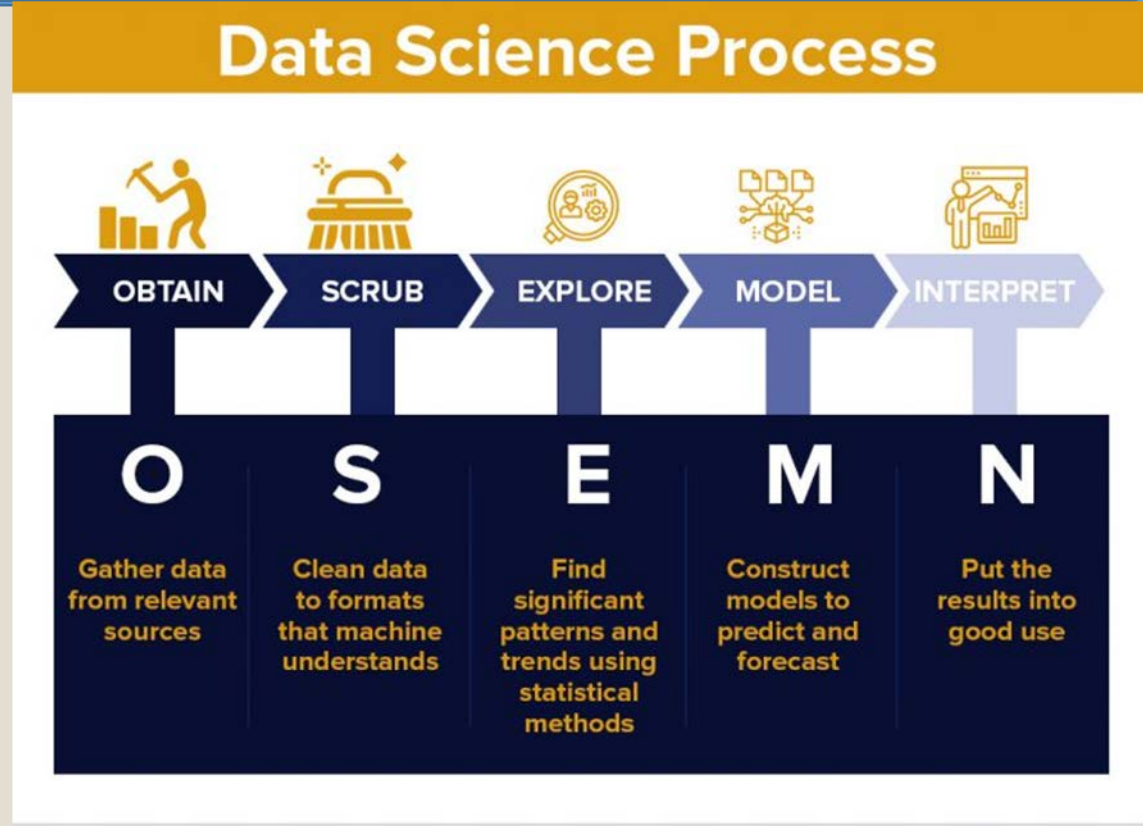
After that, you should focus on how and where collecting the information and data to be inserted in the infographic: it is fundamental to **follow an adequate process for gathering, elaborating, analysing, and synthesizing data.**

This figure represents the framework introduced by Hilary Mason and Chris Wiggins in 2010.

It shows **the process** that data scientists usually follow when **analysing data**.

Source:

<https://www.guide2research.com/research/how-to-become-a-data-scientist>



Source: Mason and Wiggins (2010)

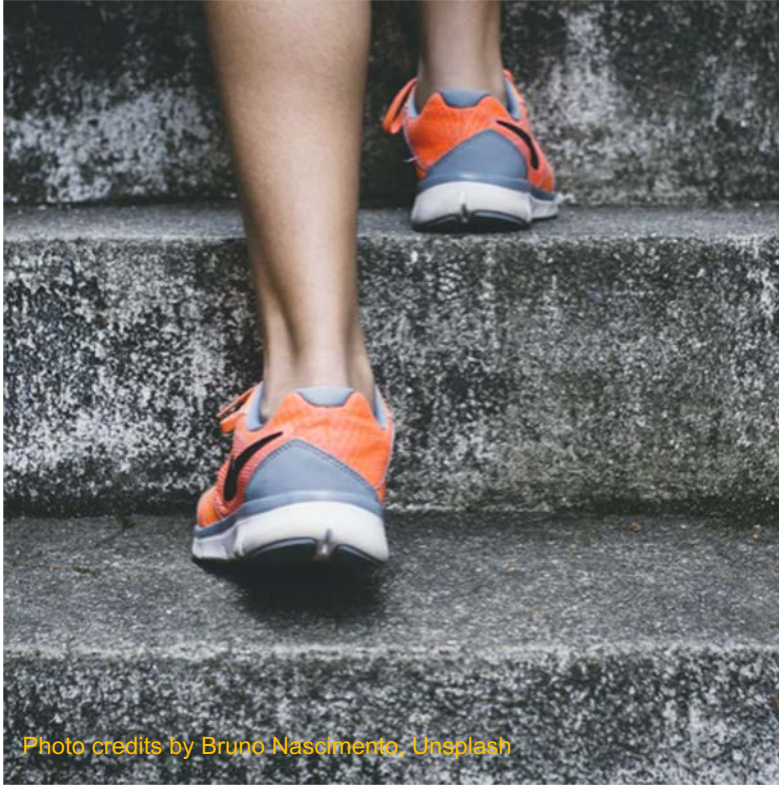


Photo credits by Bruno Nascimento, Unsplash

The **5 key steps** in the data science process are:

- **Obtain data:** e.g., from surveys, queries from databases, and online repositories.
- **Scrub data:** e.g., cleaning data to be as error-free and uniform as possible, filtering data, and converting formats.
- **Explore data:** e.g., using descriptive statistics and data visualization.
- **Model data:** e.g., clustering and categorizing data, using machine learning algorithms.
- **Interpret results:** e.g., making meaningful conclusions from data.

Please note that in creating an infographic you **do not necessarily need to conduct advanced statistical analysis**, you can just refer to a simple data table for collecting data.

What really matters is referring to **reliable and appropriate sources**, and that the **information** provided is **coherent with your project**.

Referring to sources, you can find **different typologies of data**.

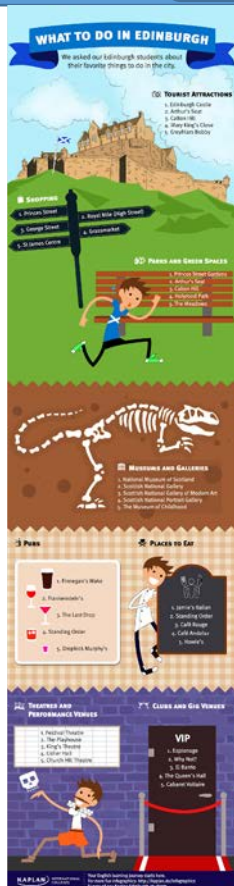
The following list is not exhaustive, but present a quite good variety of possible sources for data about natural and cultural heritage.



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Photo credits by Omar Flores, Unsplash

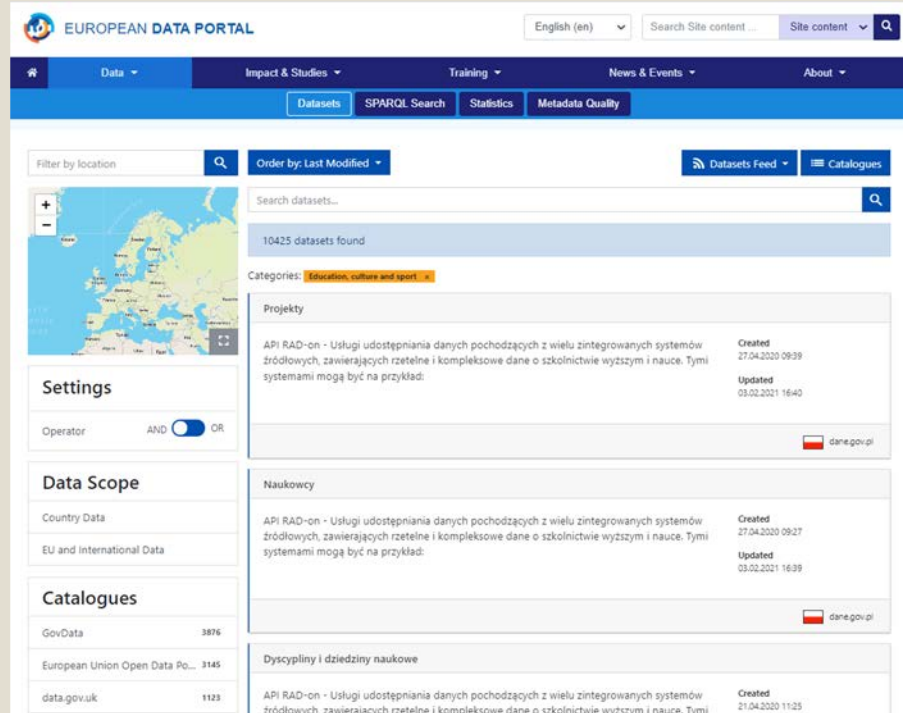
- **Data collected from research:** E.g. quantitative data derived from surveys, etc.
- **Open data:** Data freely available to everyone to use and re-publish as they wish.
- **Big data:** Large quantity of data (volume), from different sources.
- **Crowdsourcing:** Data produced by a large group of people (e.g. thematic maps from the geodata produced by our smartphones).
- **Sentiment analysis:** Data useful to analyse the “sentiment” (i.e. affective states and subjective information) of people, for example from social media.



Example of infographic that takes its data from a survey.



Source: <https://graphs.net/few-things-to-do-in-edinburgh.html>;
<https://www.kaplaninternational.com/>.



Example of Open Data repository about cultural heritage. Source: <https://www.europeandataportal.eu/en>.



Summing up, there are **some steps mostly dealing with usability and reliability**, that you **need to follow** in order to create effective infographics and data visualizations. Following, some suggestions.

A **focus on usability and user experience** is needed in the design of infographics and data visualizations. It includes:

- Before creating an infographic or data visualization, identifying its specific purpose.
- Selecting the right information to visualize.
- Selecting the right graphic to visualize information.
- Understanding the right information from the data representation.
- Focusing on how people can use the data visualization (the effect of the data) and their subsequent actions.
- Focusing on how people can interact with the data (user-centric approach).



A focus on reliability is particularly needed for data visualization. It includes:

- Checking and citing the sources.
- Standardising sources.
- Ensuring the quality of data collection techniques.
- Focusing on the completeness of data.
- Making sure that data are appropriately stored.
- Making sure that the chosen mode and model for the data analysis are correct.
- Ensuring that the privacy is respected.
- Avoiding the prejudices.
- Avoiding confusing charts.
- Giving clear instructions and keys to read the information visualization.
- Reporting clear and functioning URLs of the data sources.



Lastly, here some quick **tips and rules** for creating effective infographics and data visualizations:

- Adopt a **minimalistic approach** and use a simple language (less is more).
- If you use **data**, make sure they are really relevant, accurate, useful, and not biased. Moreover, check information and cite sources.
- Use **graphs and charts** immediately readable and easy to interact with, if it is the case. Give some clear legends, or keys, that can facilitate the reading of the data.
- Favour **storytelling**, since pictures tell a thousand stories. Be sure to create a coherent story.

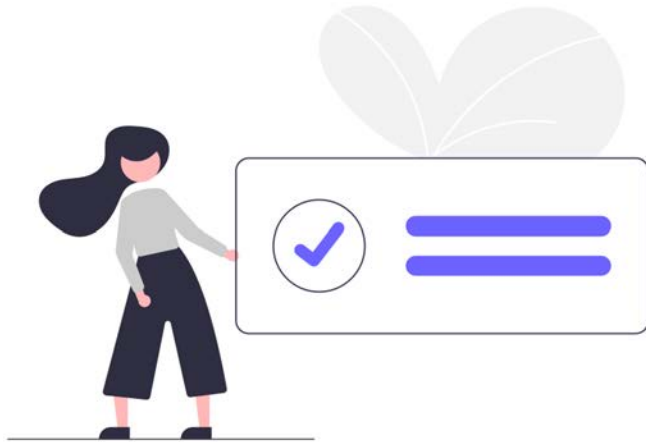
Photo credits by Javier Allegue Barros, Unsplash





Photo credits by Rowen Smith, Unsplash

- Make more evident the **most important elements** you want people to focus on. **Use icons** (or other symbols) to convey more instantaneous messages, especially if you have limited space.
- Present information in a **clear manner**, do not be ambiguous. Create interaction and information flows that do not confuse or overwhelm the user.
- Remember the **Gestalt rules** and the basic visual elements in UX and keep in mind that **colours, typefaces, and icons** can convey specific meanings.
- Always keep your **user** at the centre!



Conclusions

This introduction to infographics makes us understand how useful they are in favouring people's comprehension of data and information and it makes us reflect on how to make them truly effective.

Thank you for your attention!

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