

# **Citizen science to inspire educators – The importance of metadata and open data**

Miriam Calvera-Isabal & Patricia Santos

miriam.calvera@upf.edu & patricia.santos@upf.edu



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 872522.

The European Commission's support for this project does not constitute an endorsement of the contents, which reflect the views only of the partners, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

# Content

- Website analysis and citizen science information available online
- Case study - data to inspire teachers

# Workshop objective

- Explain CS Track database and the information extracted
- Show results of websites analysis
- Identify metadata standards usage
- Show a case study - how to inspire teachers with citizen science projects information
- Identify how data quality and availability could be improved to support teachers and other future case studies

# CS Track database

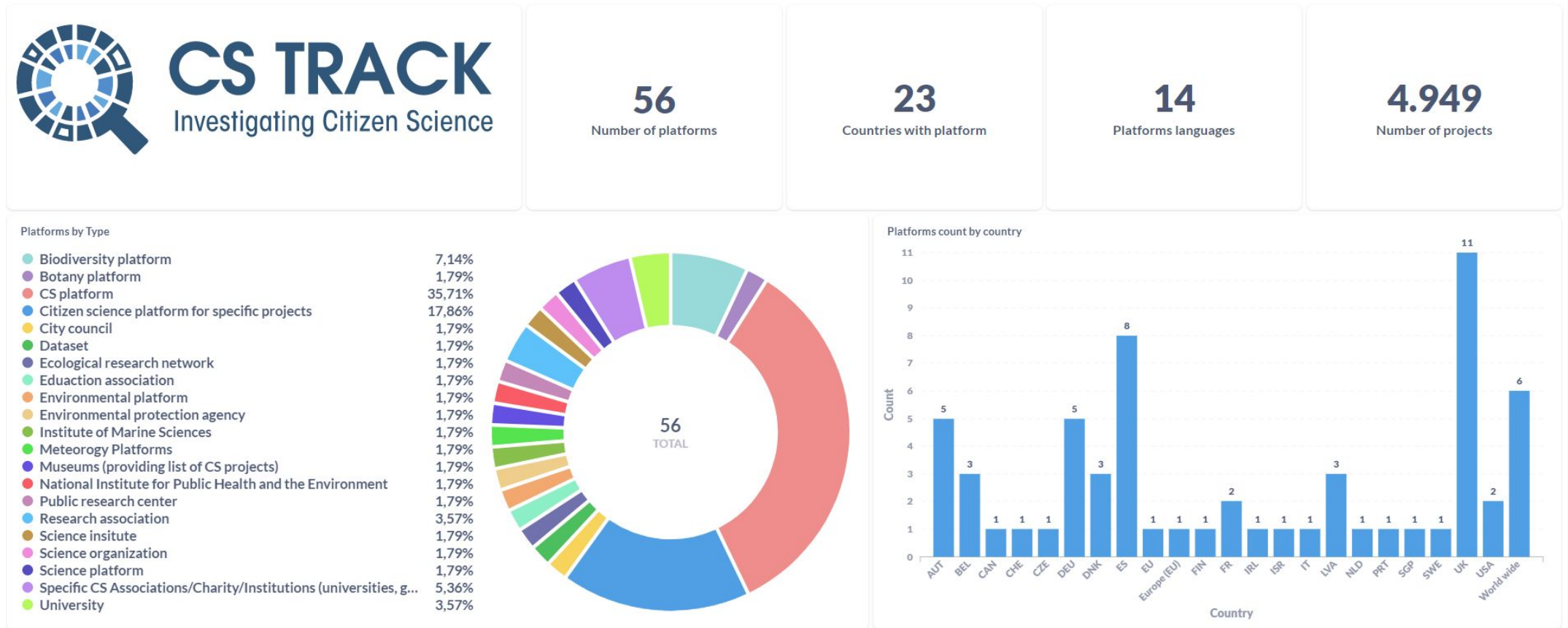
One central database aiming to compile **a comprehensive collection of CS projects**, mainly visible on the Web, as complete as possible.

**The CS Track database** opens a new perspective into CS knowledge by observing and characterizing initiatives through a quantitative approach that relies on **web-based and social-network analytics**.

- Key national CS platforms and other organizations from the European Union and H2020 Associated Countries have been analysed using web scraping and manual extraction techniques.

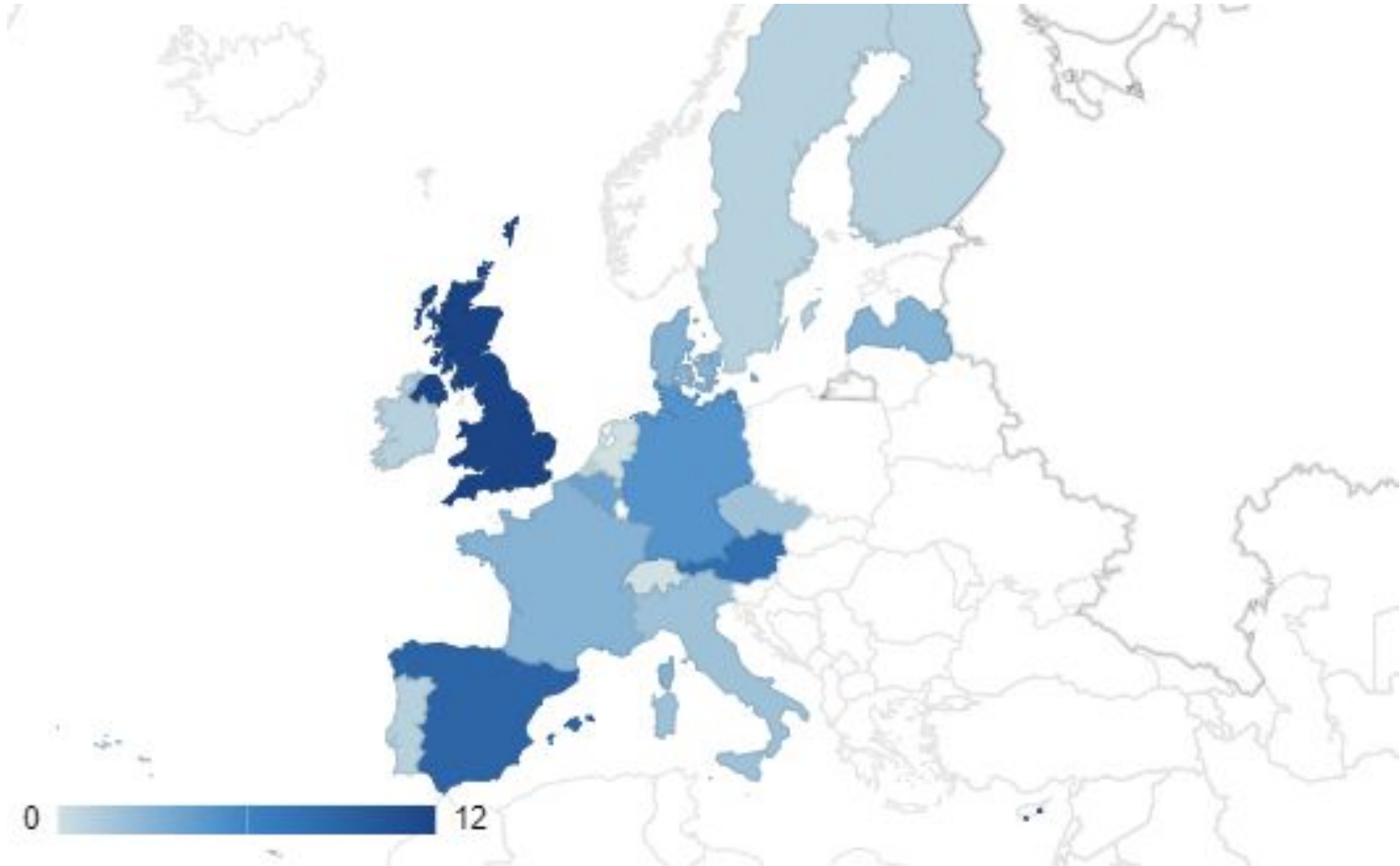
# CS Track database - overview

- Database (2022) overview

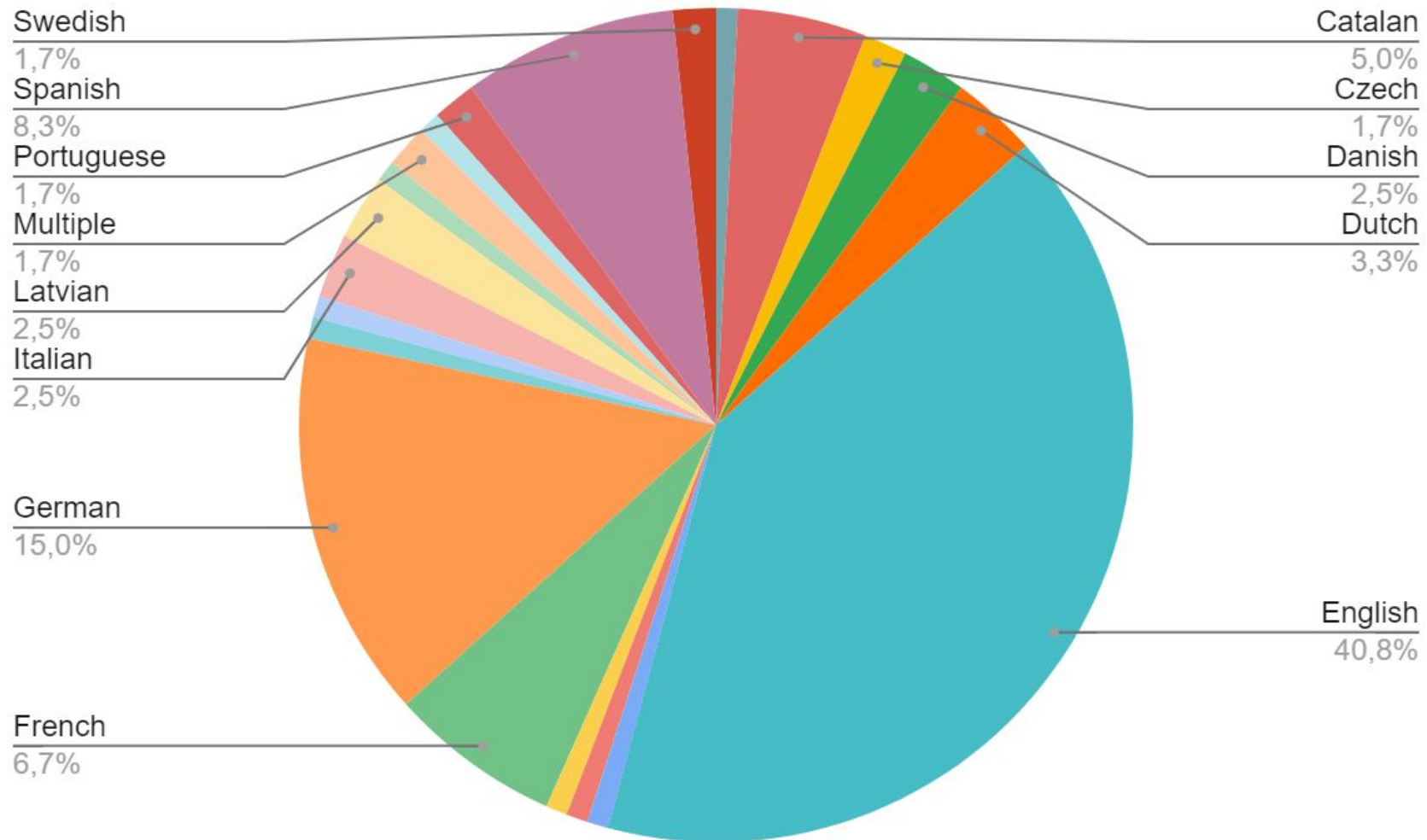


<http://database.cstrack.upf.edu/public/dashboard/daf5167e-7023-4d76-8059-064cd1219476>

# CS Track database - countries distribution

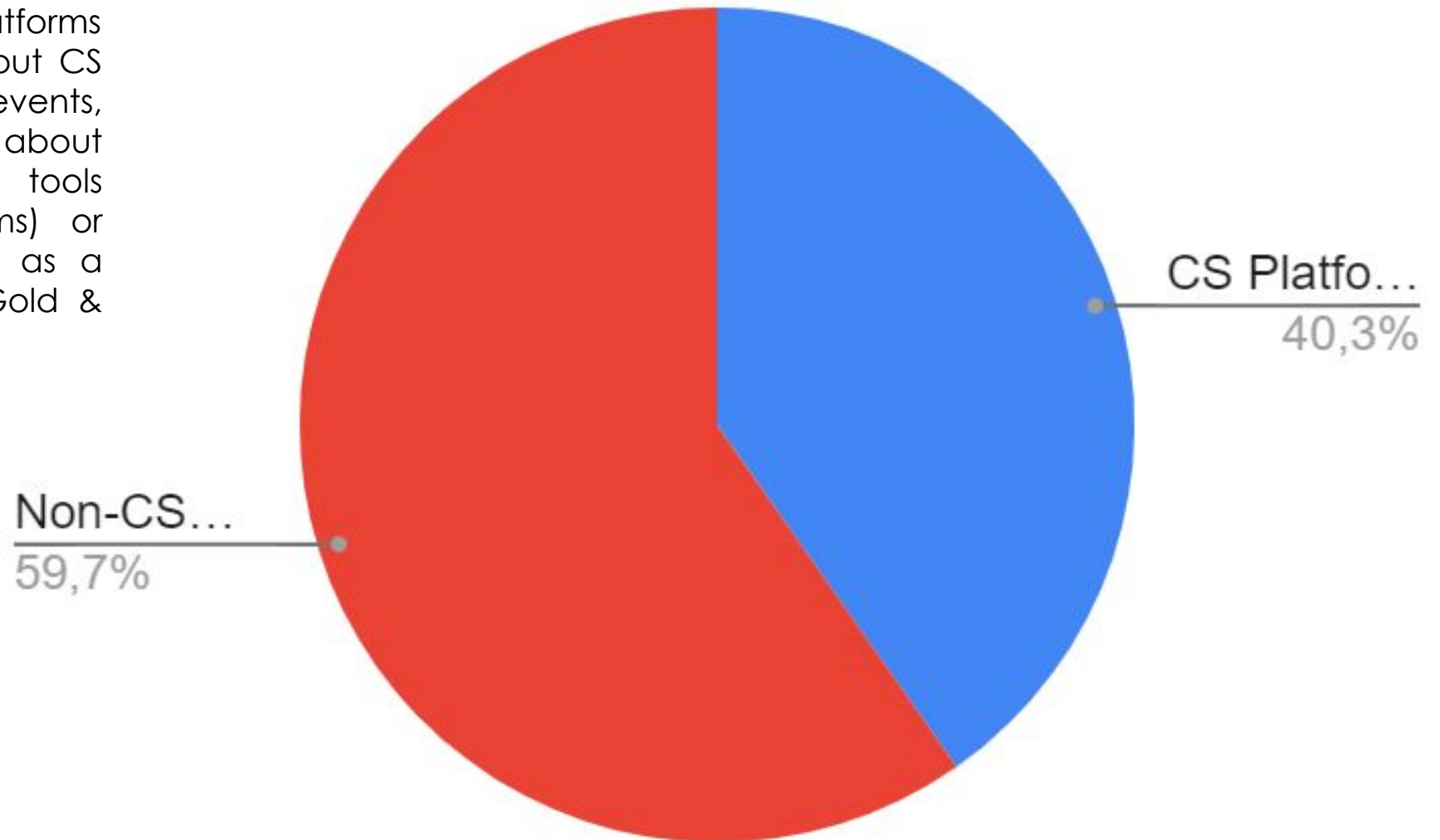


# CS Track database - websites languages

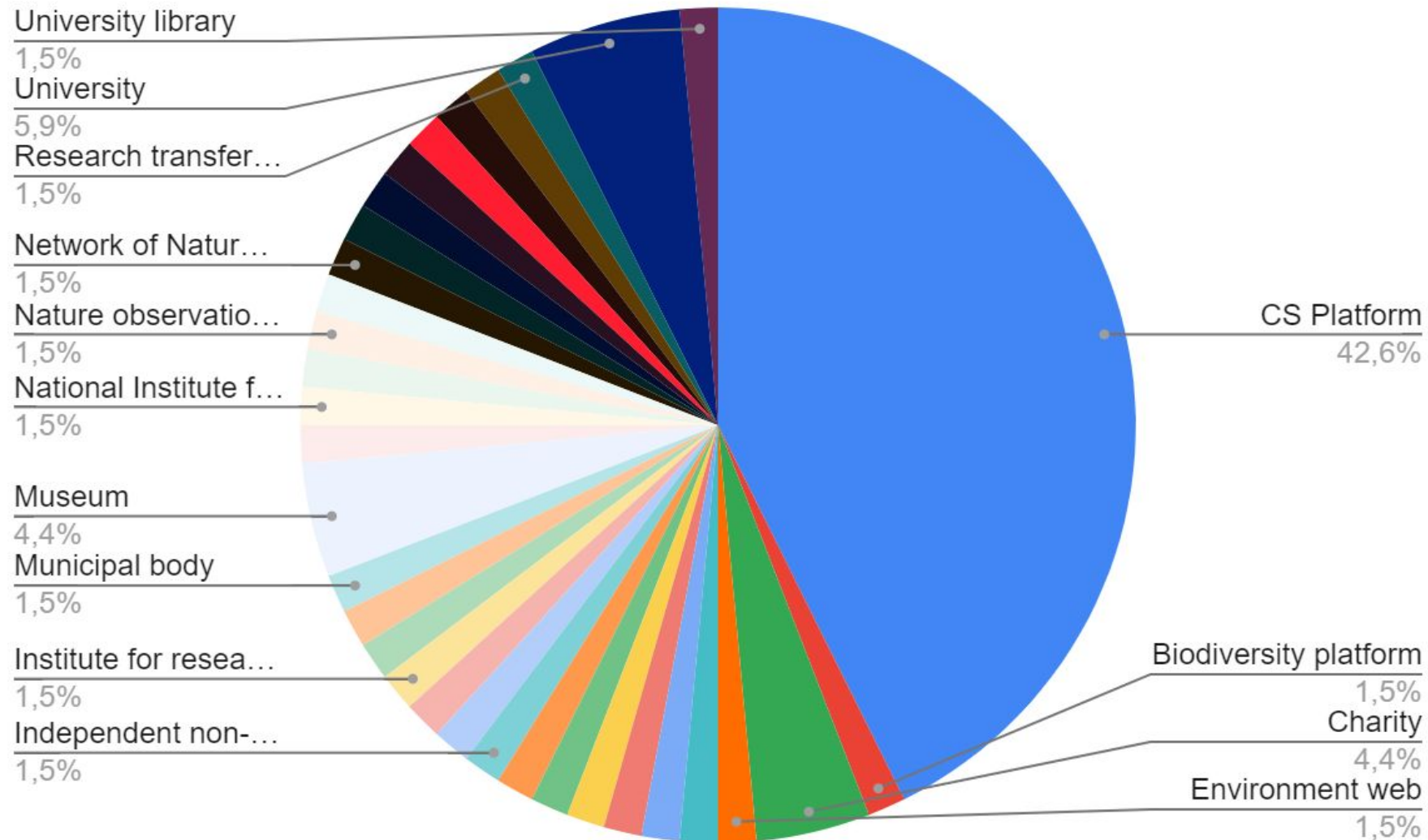


# CS Track database - Overview

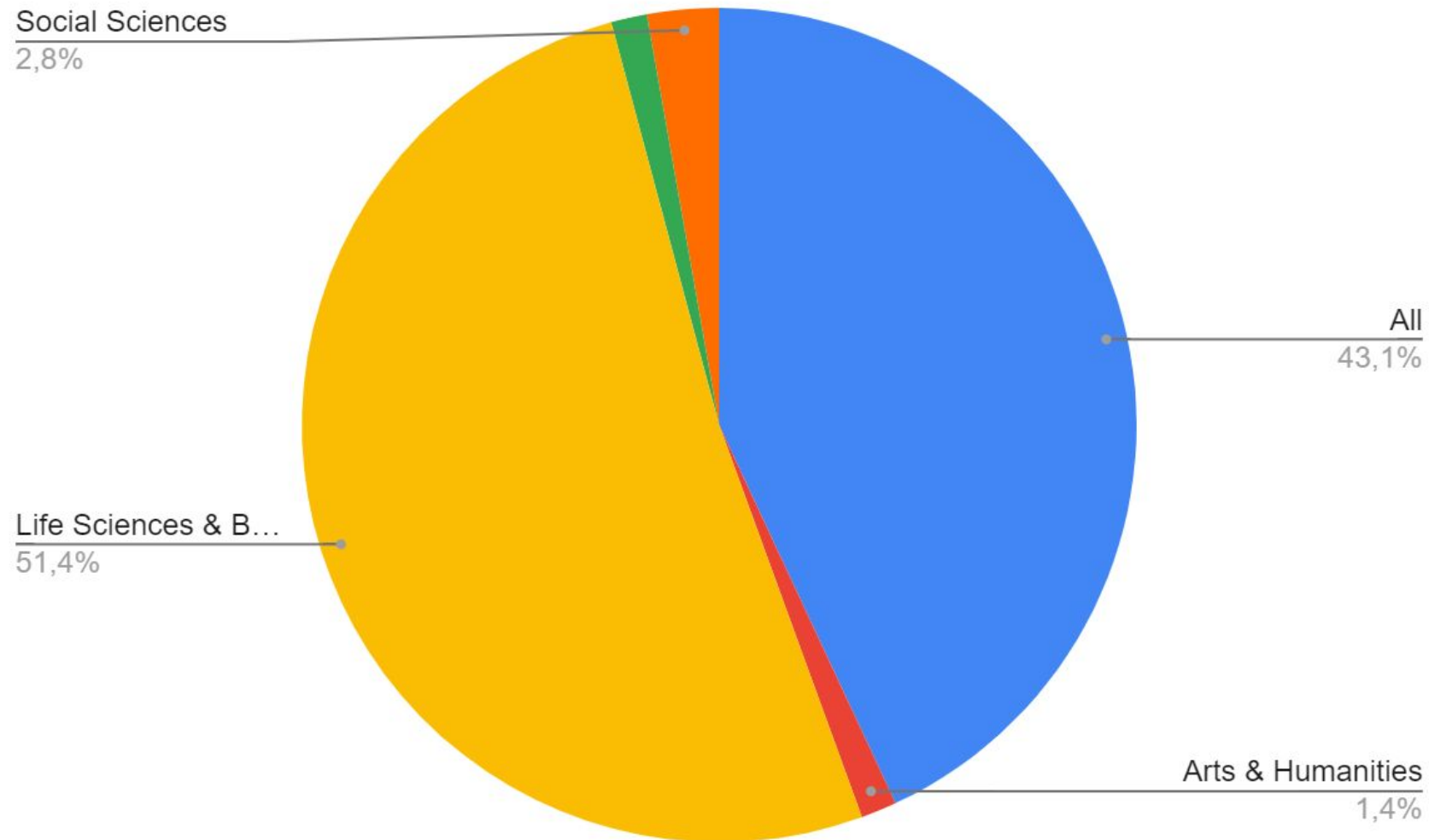
*CS platform* is a digital platforms that share information about CS projects, activities, events, material or resources, news about the field, communication tools (i.e., comments or forums) or sometimes are also used as a participatory tool (Sanz, Gold & Mazzonetto, 2019)



# CS Track database - Overview



# CS Track database - Overview



# Main obstacles and next steps

## Obstacles:

- Broad definition of CS
- The quality and variety of data collected from CS platforms >> different webpage structures and metadata standards
- Different languages

## Next steps:

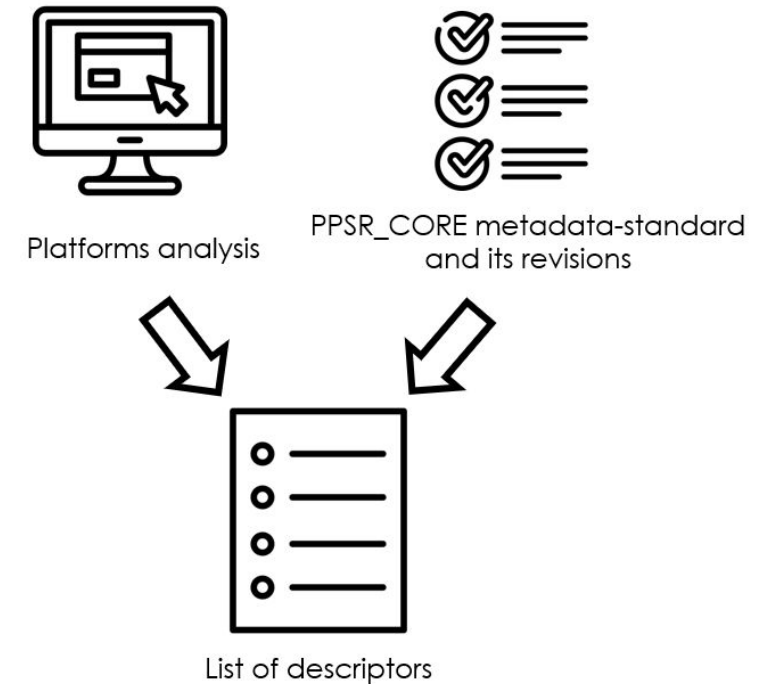
- There is still work to be done to standardize the data structure of CS Platforms/Projects visible online
- Obtain extra information by applying advanced data analysis
- Defining a data vocabulary for each descriptor to standardize information

# Database descriptors

A **descriptor** is an item that describes a characteristic of a citizen science project or data related to the project information.

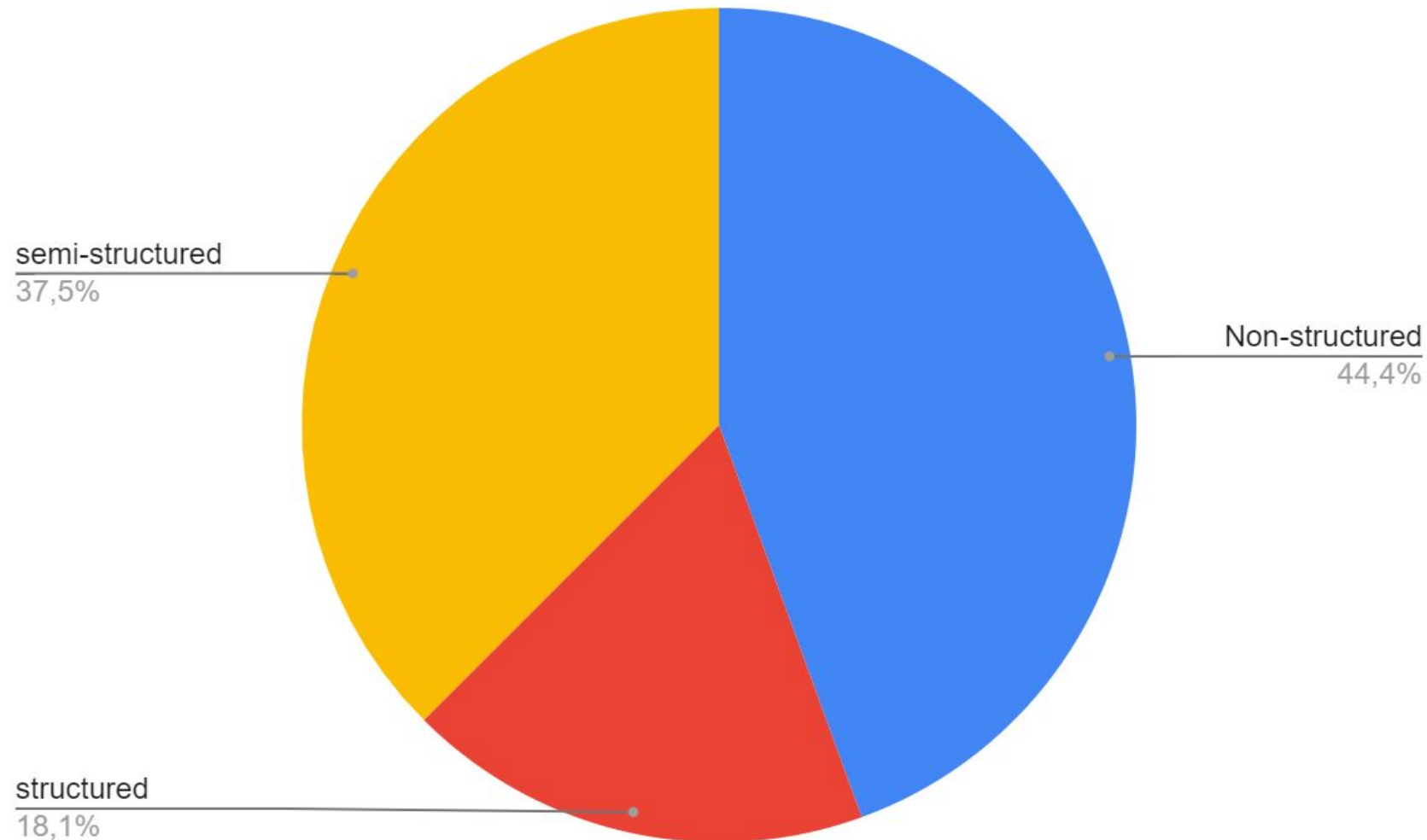
The **list of descriptors** developed for the CS Track database has been defined by analyzing:

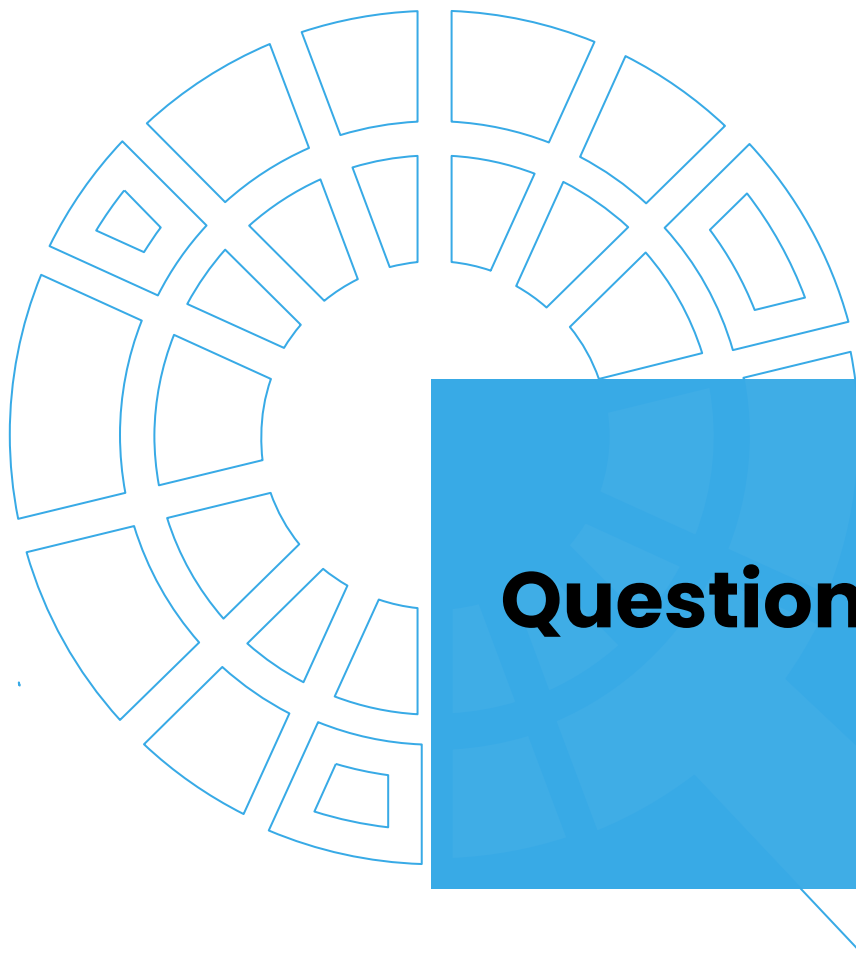
- Websites and online platforms that contain CS project information
- PPRS\_CORE metadata-standard [1] and the revisions made by Data and metadata working group [2][3]



[illegible]

# CS Track database - database structure





**Question about platforms**

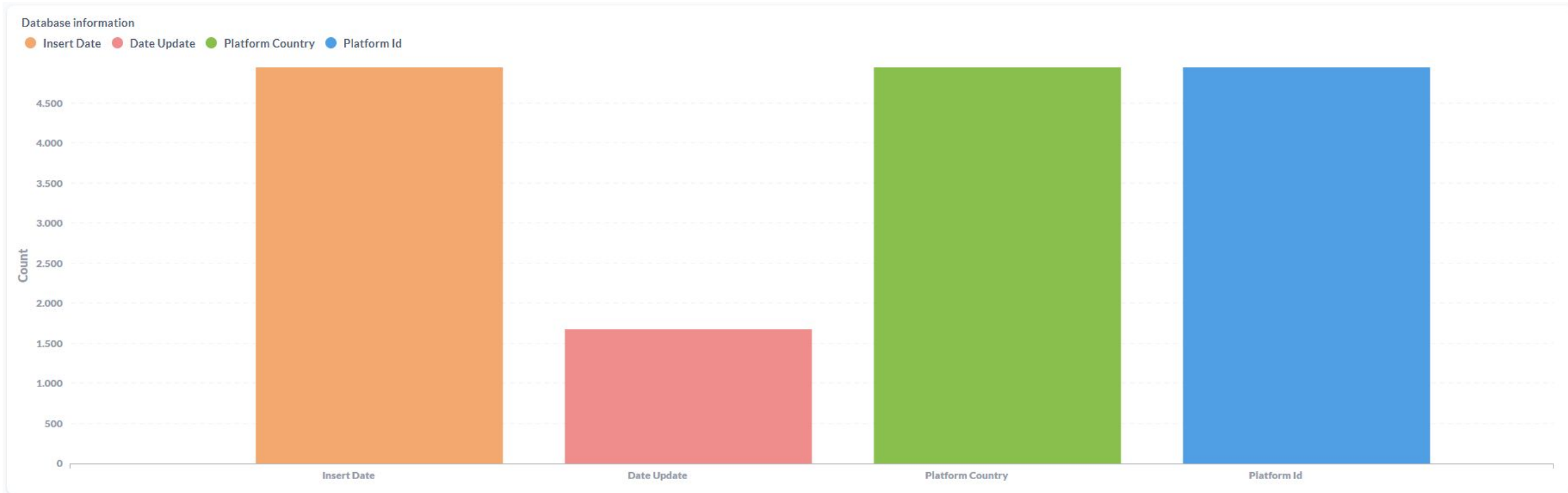
# Data categories about project information

The CS Track list of descriptors is classified into categories following the PPSR\_CORE metadata standard and the revisions: [1][2]

- Basic project information
- Images and communications
- Geography
- Personal organization and affiliation & Funding program
- Supplementary Information for Citizen Science

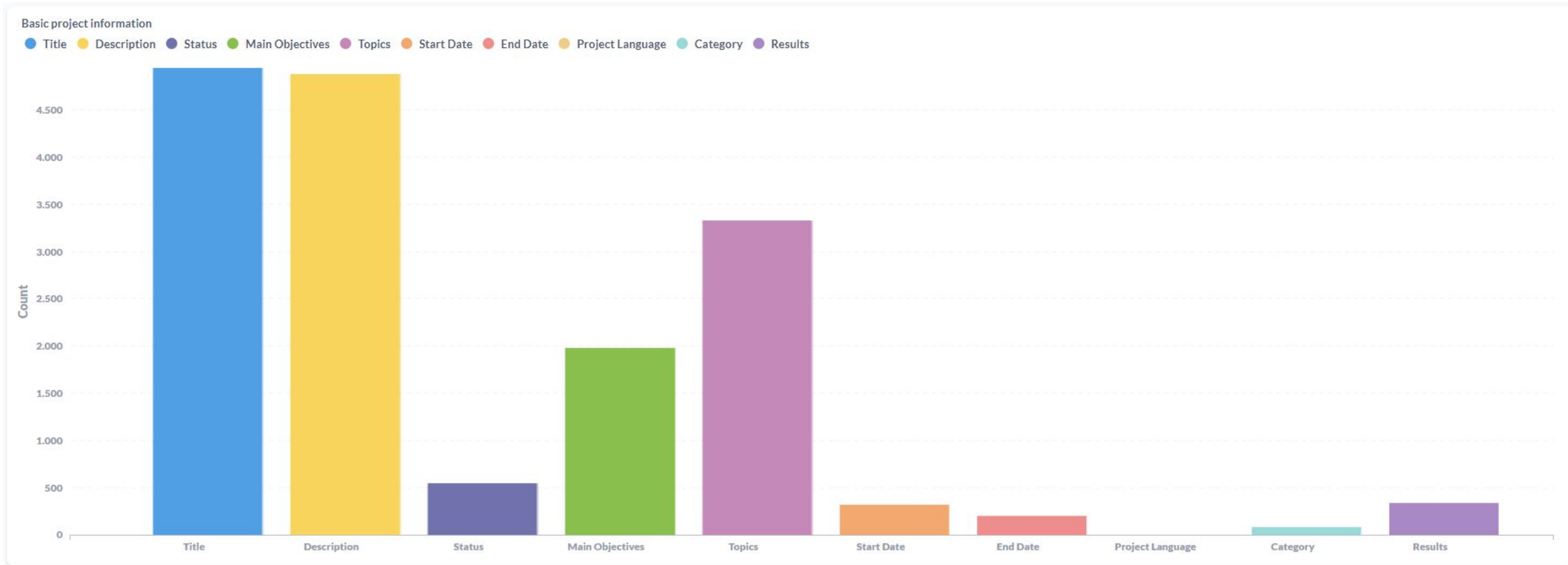
**Let's analyze each category together!**

# Data categories about project information



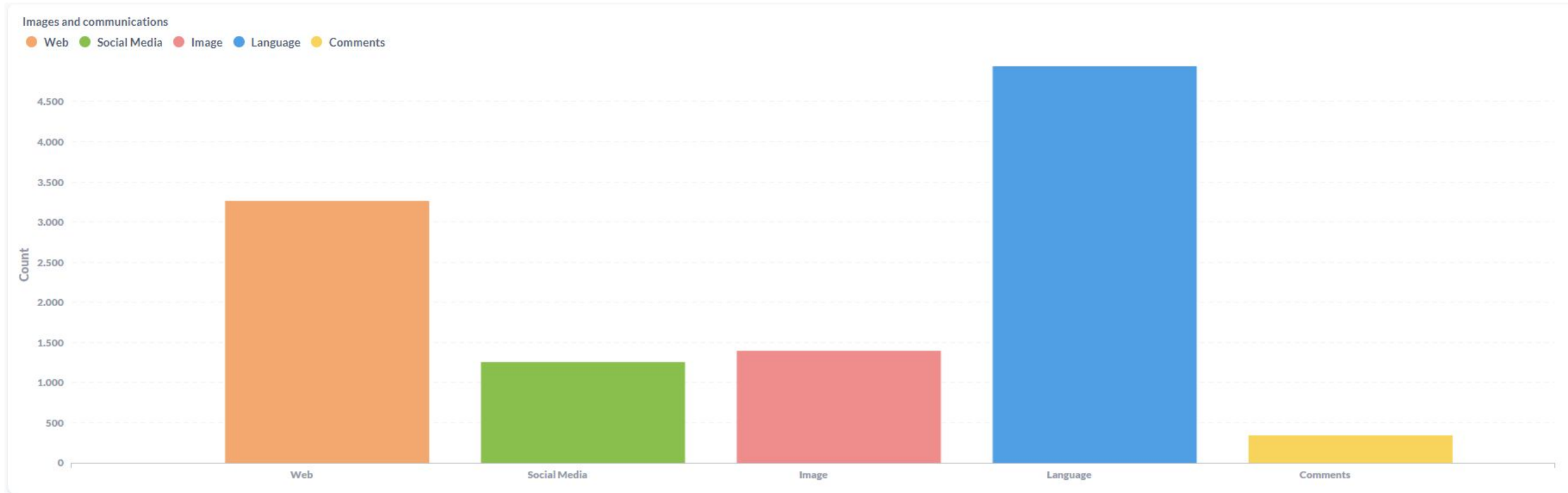
<http://database.cstrack.upf.edu/public/dashboard/8ebd08b0-94f0-4fc4-9551-51028aa9c29f>

# Data categories about project information



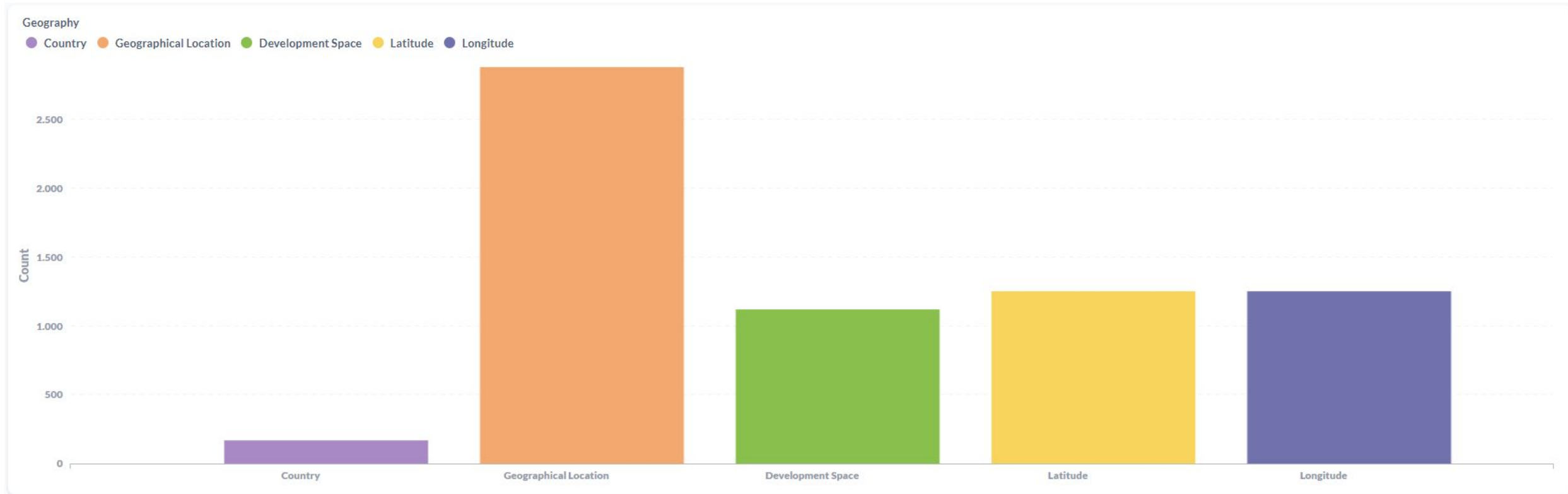
<http://database.cstrack.upf.edu/public/dashboard/8ebd08b0-94f0-4fc4-9551-51028aa9c29f>

# Data categories about project information



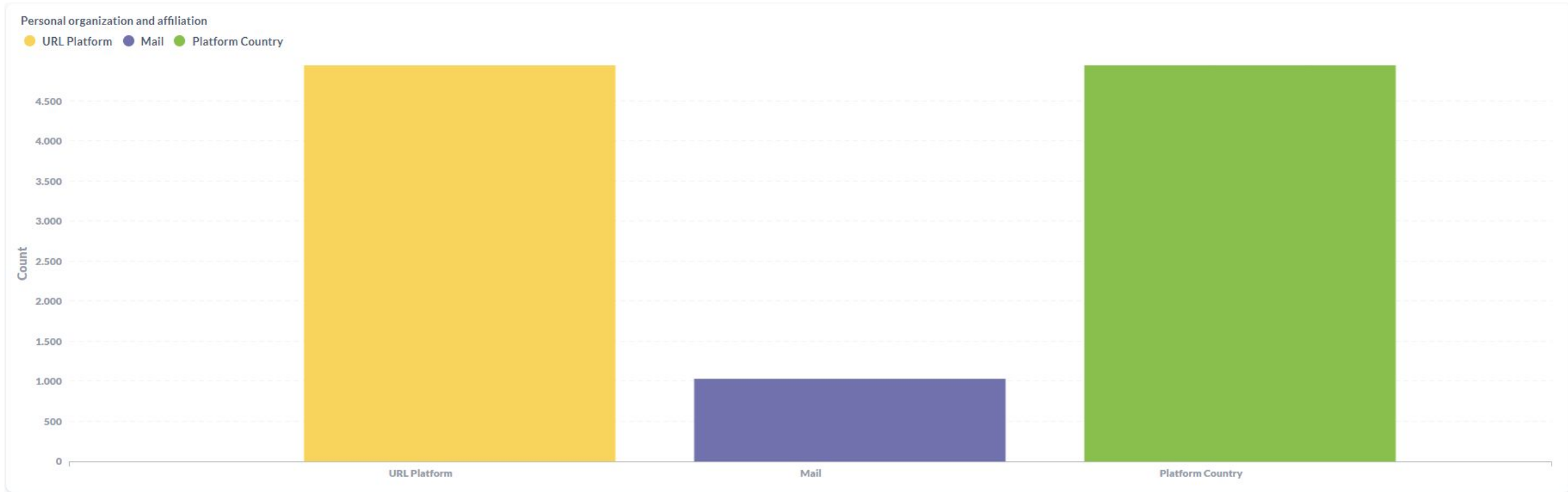
<http://database.cstrack.upf.edu/public/dashboard/8ebd08b0-94f0-4fc4-9551-51028aa9c29f>

# Data categories about project information



<http://database.cstrack.upf.edu/public/dashboard/8ebd08b0-94f0-4fc4-9551-51028aa9c29f>

# Data categories about project information

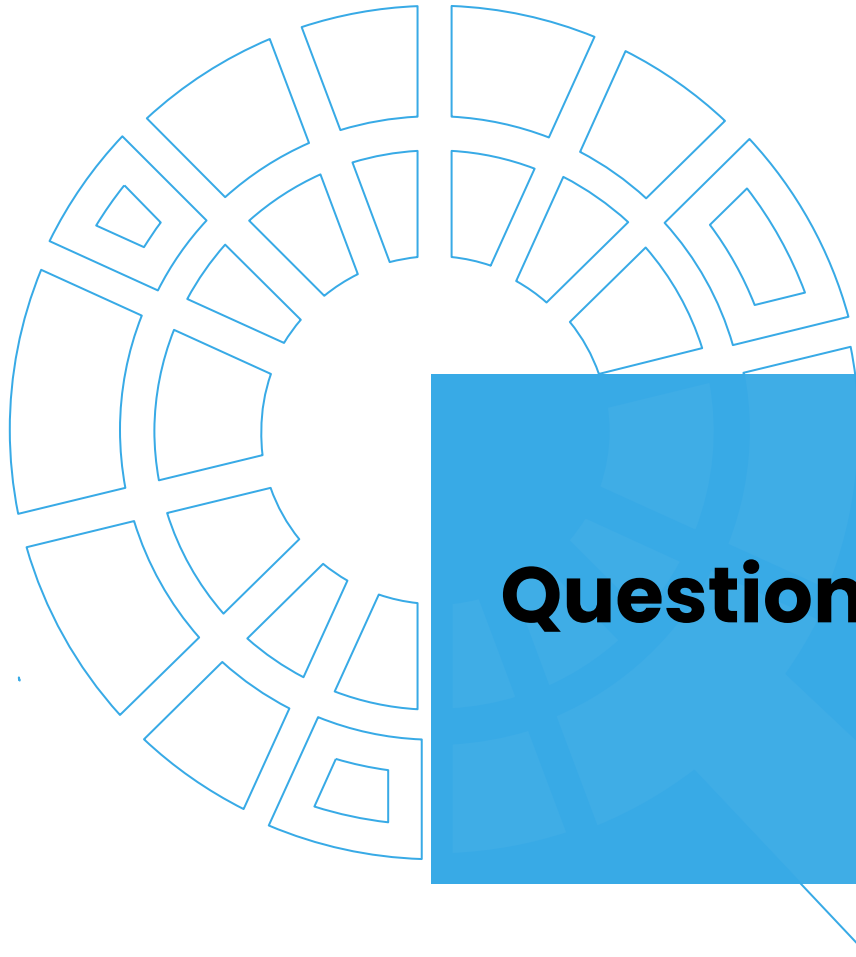


<http://database.cstrack.upf.edu/public/dashboard/8ebd08b0-94f0-4fc4-9551-51028aa9c29f>

# Data categories about project information



<http://database.cstrack.upf.edu/public/dashboard/8ebd08b0-94f0-4fc4-9551-51028aa9c29f>



## **Questions about metadata standards**



# **Discussion**

# Case study – data to inspire teachers

# Citizen science to inspire educators

The way to participate in CS projects is very diverse: from the beginning with the project design, at specific moments collecting data or analyzing the data collected. Usually a maximum or minimum time for participation is not established, but it depends on the project and its needs.

The schools can participate:

- Classifying data (<https://www.zooniverse.org/>) or collecting data (<https://www.inaturalist.org/>)
- Developing activities on-site organizes by projects (OdourCollect in the school)
- Co-designing projects between students and scientists (BRITEC)
- Using tools or materials in the classroom developed by projects

# **Citizen science to inspire educators**

What features and content should be integrated into a digital tool to inspire teachers in the design process of scientific learning activities based on citizen science?

# Citizen science to inspire educators

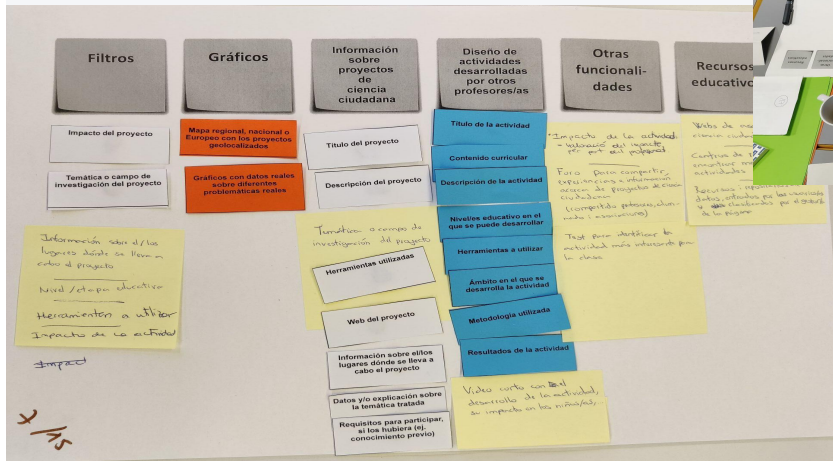
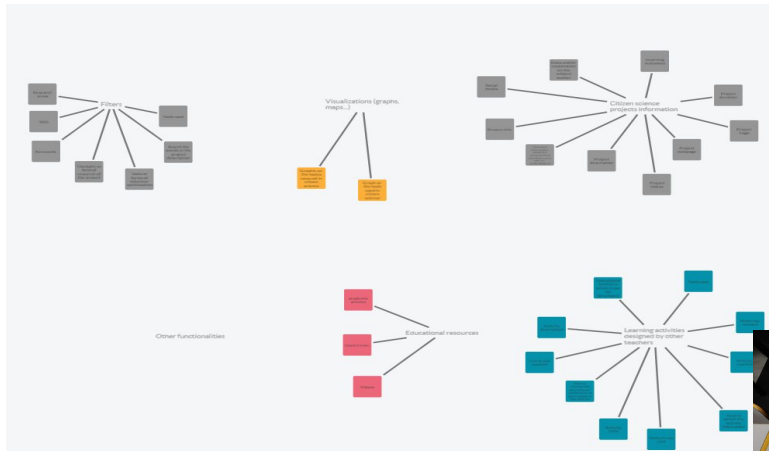
Co-design workshop with:

- High school teachers. The selection was done balanced between disciplines, educational centers and genders.
- Citizen science practitioners
- Learning technology designers

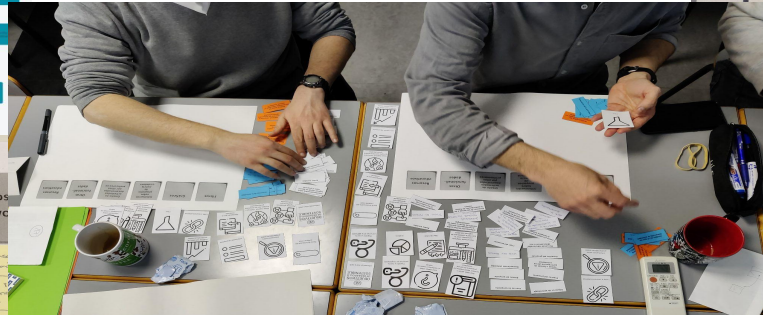
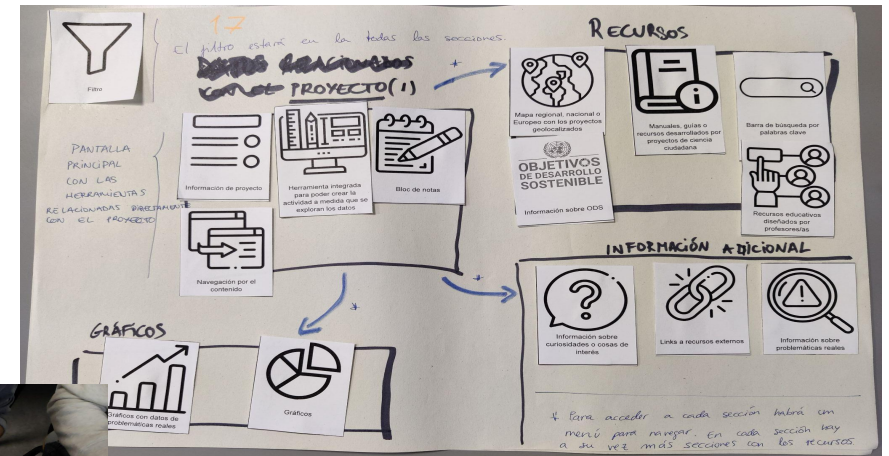
The **objective is to identify what inspires teachers while the learning design process**. We want to know what kind of data teachers want to see in the final tool and the functionalities the it will have.

# Citizen science to inspire educators

### Selection of data to integrate them with the functionalities



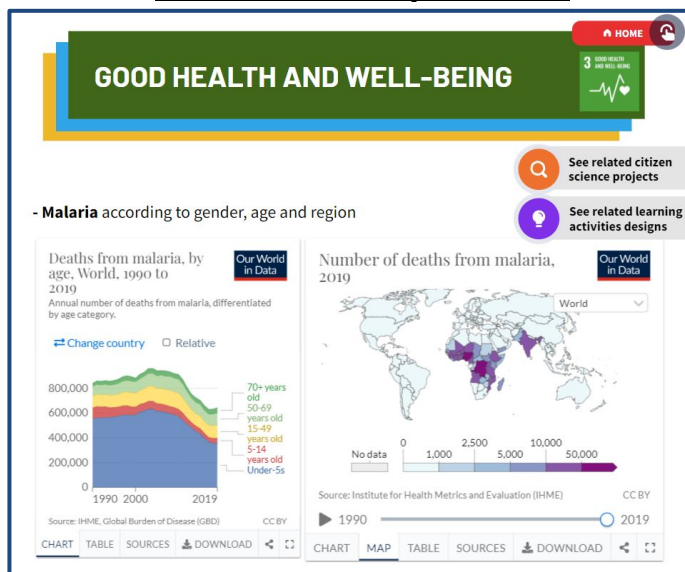
### Functionalities selection and positioning



<https://view.genial.ly/61a5e90136c7d00e03473836/interactive-content-citizen-science-and-educationen>

# Citizen science to inspire educators

## Dashboard exploration



### MALARIASPOT

Malaria is one of the most serious threats to global health. Currently, the standard way to diagnose this disease (with more than 200 million cases of malaria a year and killing half a million people) is to count the number of parasites in blood samples using a microscope. A process that can take up to 30 minutes. And there are not enough specialists in the world to diagnose all cases of malaria. MalariaSpot is a project that wants to solve this problem with citizen participation. We turn the diagnostic process into a video game and investigate techniques to combine player results so that we get a reliable result. The first investigation was with MalariaSpot in 2012. We applied the idea to Tuberculosis in 2014 with the TuberSpot game. And now we launch MalariaSpot Bubbles to try to differentiate between the different species of parasites.

- **Tools:** Learning objectives: Use of technology and development of skills of asking questions and collecting data

Research area:

Environmental Sciences & Ecology



## Citizen science & SDGs - 004

Activity title

**Stop mosquitoes, stop mosquito-borne diseases**

Activity description

The students use the Citizen science mobile app "Globe Observer" to locate a potential mosquito breeding habitat, to enter and confirm details such as date, time, and location of their observation and to choose the type of habitat observed: still water (such as a pond or swamp); flowing (still water that is next to a river or stream), or water in a container. They check to see if there are any visible mosquito larvae in the water source and finally they are encouraged to eliminate the habitat, such as dumping out standing water in the tray of a flower pot. The data entered into the app are used by scientists to verify NASA satellite data.

Phases of the activity or sub activities (if needed)

- Presentation about mosquitoes and the diseases that are spread to people by mosquitoes like Zika virus, West Nile virus, Chikungunya virus, dengue, and malaria
- Presentation about the SDGs focusing on Goal 15.
- Visit to an area of the town with still, running or water in a container, better in the summer period.
- Exploration of the existence of mosquitoes and larvae.
- Use of the app "Globe Observer" to enter information about date, time, location, and type of habitat
- Finding solutions to eliminate the habitat
- Creation of a padlet with all the information gathered and photos
- Creation of an infographic with mosquito-borne diseases
- Communication of the padlet and the infographic to the municipality
- Dissemination of the activity to the school community (web site, e-newspaper, etc.).

Social form (i.e., individual work)

Students work in groups of 3 or 4 persons

Learning objectives (See activity annex)

After the implementation of the activity, students should be able to:

- define the mosquito-borne diseases
- analyze the importance of achieving the SDGs
- explore and examine a local area using a mobile app
- use of technology and web 2.0 tools
- produce data for the Citizen science app
- propose a solution to eliminate the habitat
- design a padlet and an infographic
- disseminate the results of their research
- act as members of Citizen Science

Activity information:

- Create a learning activity to develop in your classroom with your students
- Explore citizen science projects by SDGs available in the dashboard
- Complete the information about the activity
- You can explore the dashboard: <https://view.genial.ly/61a5e90136c7d00e03473836/interactive-content-citizen-science-and-education>

Competences:

- Basic competence in science and technology
- Social and civic competences
- Sense of initiative

Activity title

- Data exploration 20

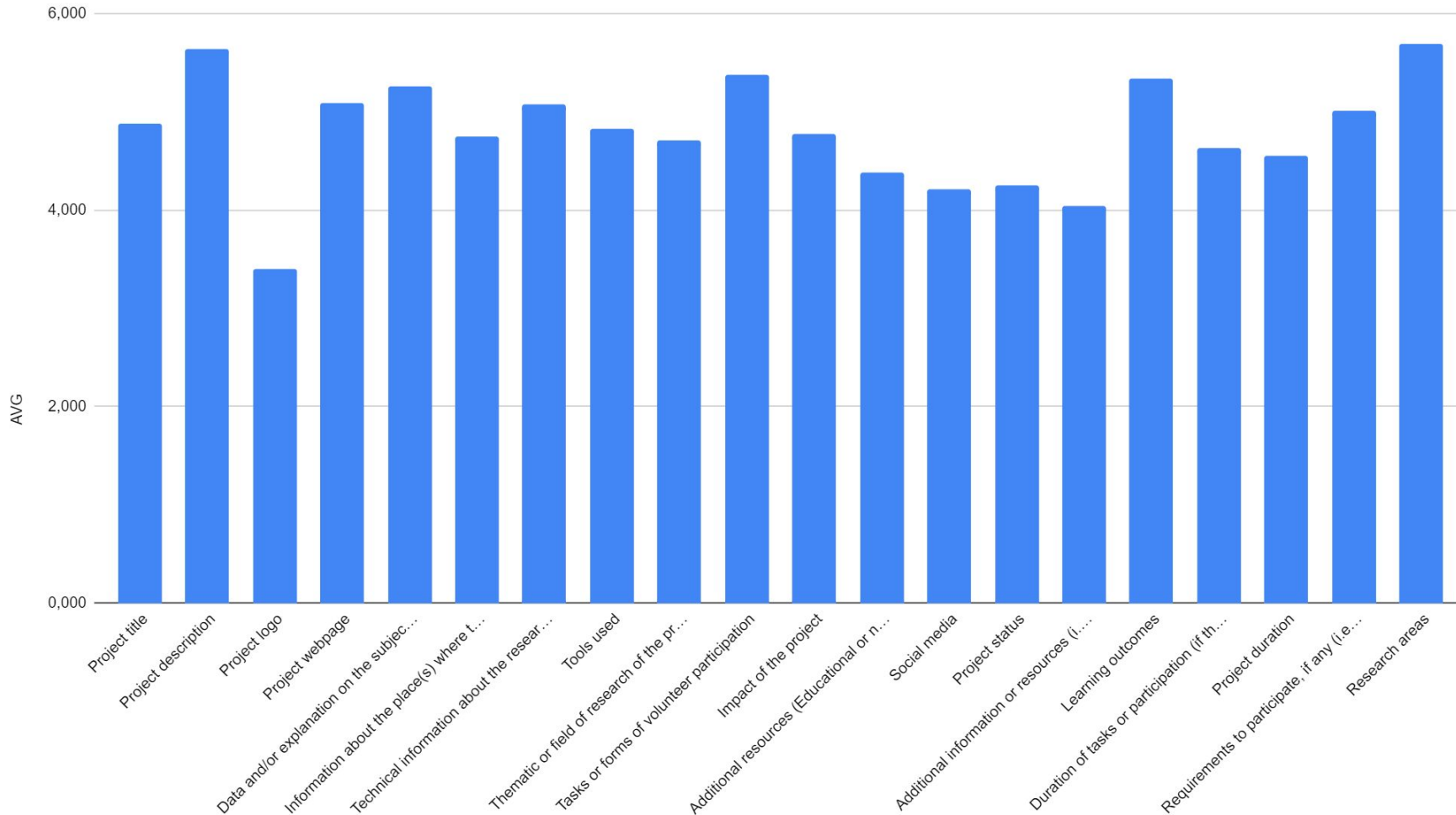
- Writing 50 minutes

- Individual work:

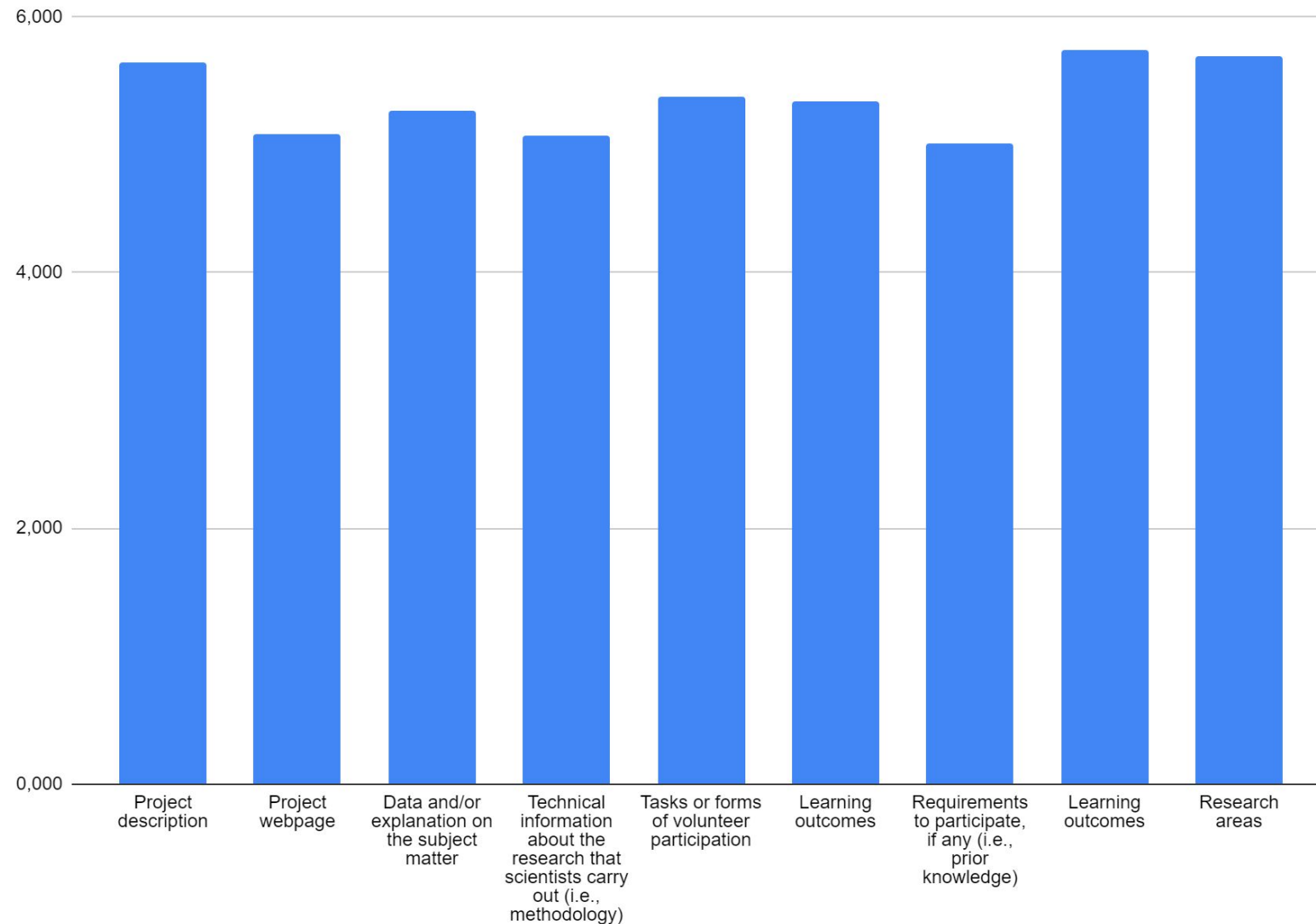
<https://ildeplus.upf.edu/PBL-SDG/pg/las/odsview/5045/>

# Citizen science to inspire educators

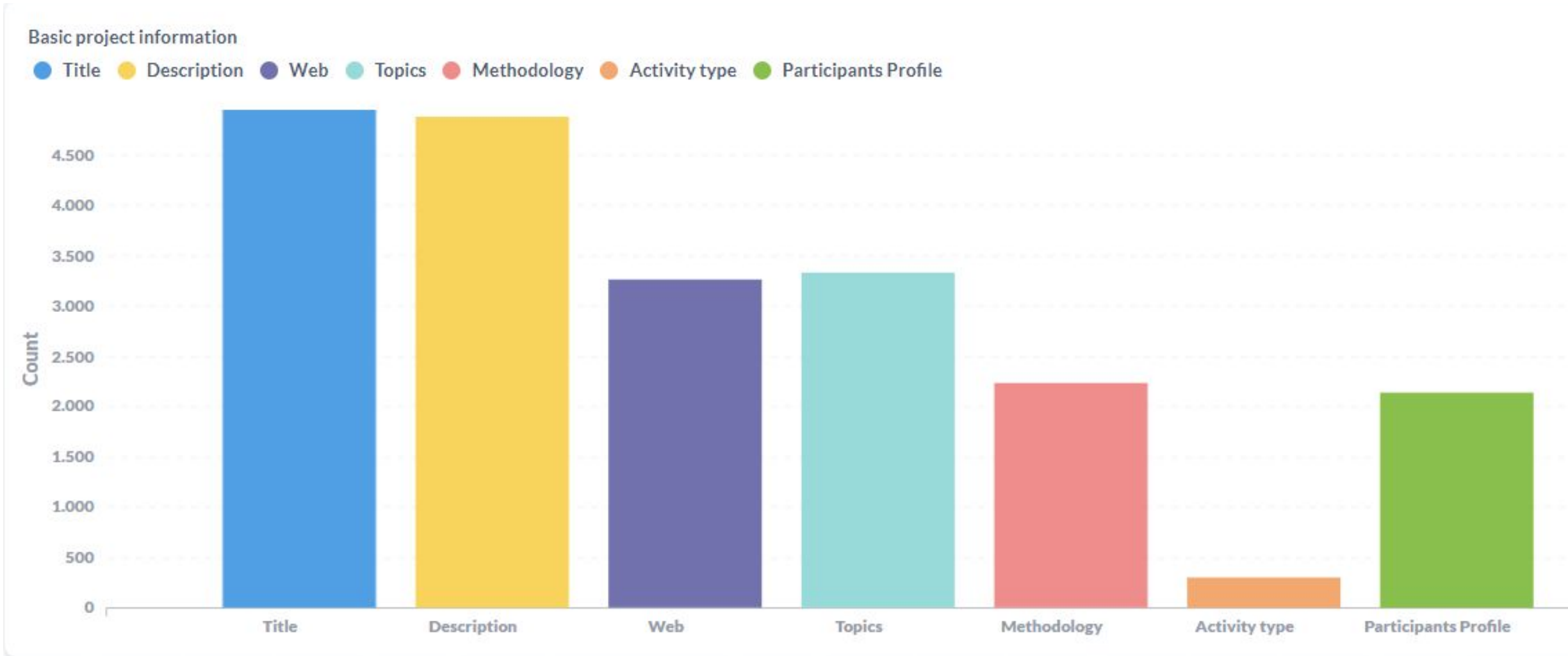
Project description



# Citizen science to inspire educators (>5)



# Citizen science to inspire educators



# Main obstacles and next steps

## Obstacles:

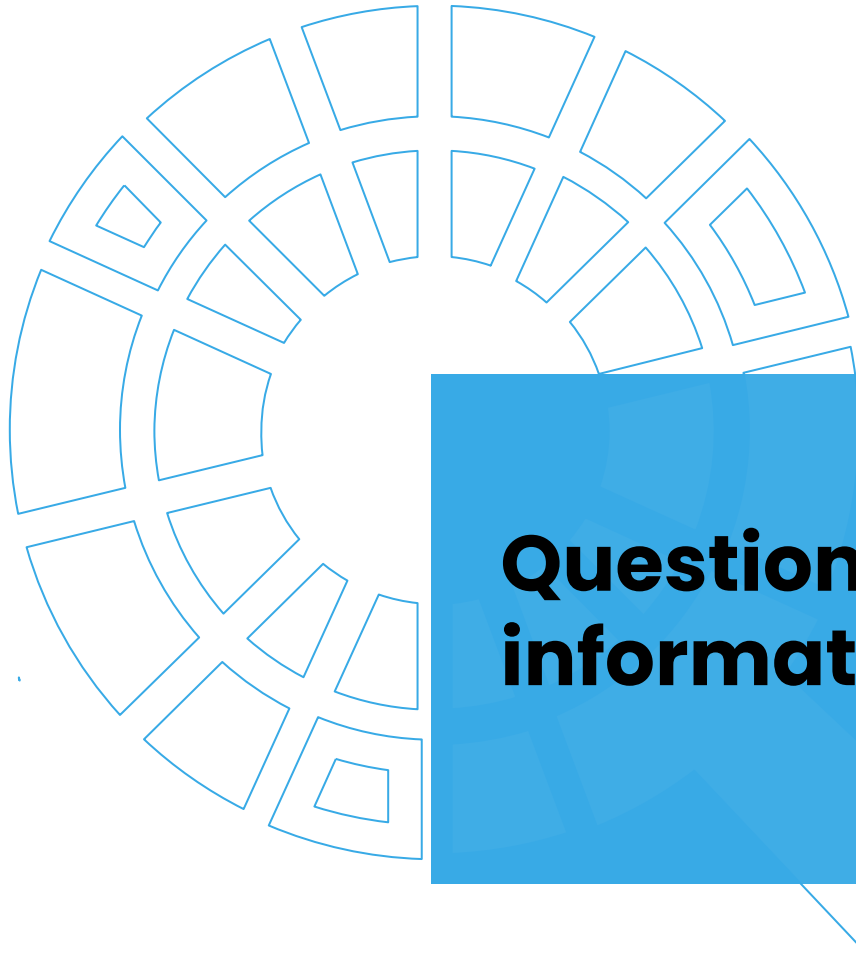
- Websites information available or how is classified

## Next steps:

- Data mining techniques application
- Development of a data exploratory tool

## Conclusionses:

- The role that platforms play should be more informative and should be a consensus on the type of information to be included



## **Questions about citizen science information available online**



# **Discussion**



**CS TRACK**  
Investigating Citizen Science



Universitat  
**Pompeu Fabra**  
Barcelona

**TIDE** Grup de Recerca  
en Tecnologies Interactives  
i Distribuïdes per a l'Educació



# Thank you!

Miriam Calvera-Isabal & Patricia Santos

[miriam.calvera@upf.edu](mailto:miriam.calvera@upf.edu) & [patricia.santos@upf.edu](mailto:patricia.santos@upf.edu)