



Citizen Science

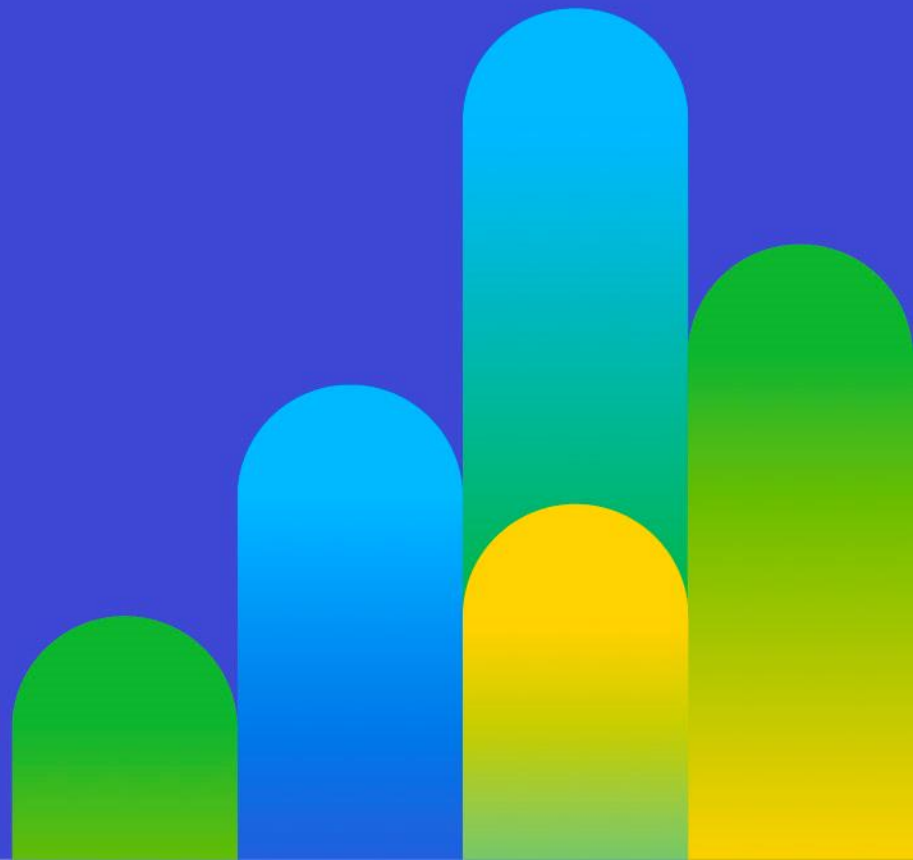
Training Action

Ana Delicado

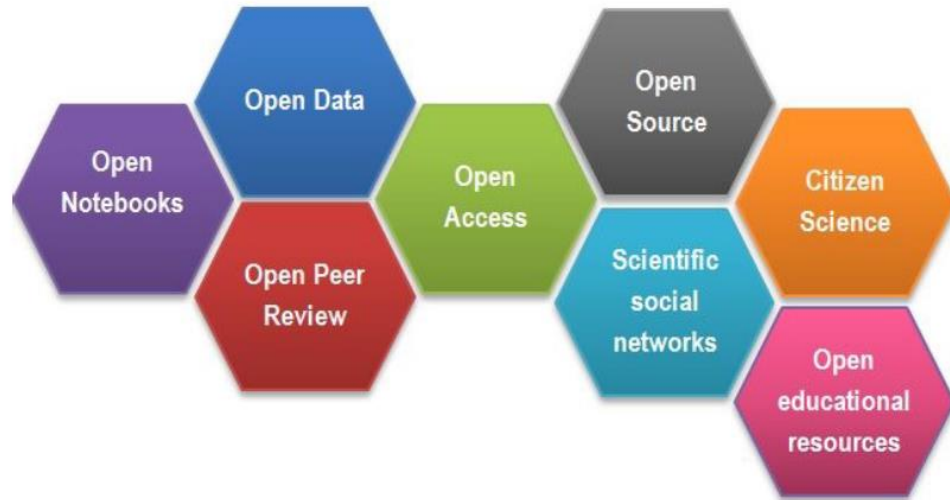
Instituto de Ciências Sociais da Universidade de Lisboa

ana.delicado@ics.ulisboa.pt

b-watersmart.eu

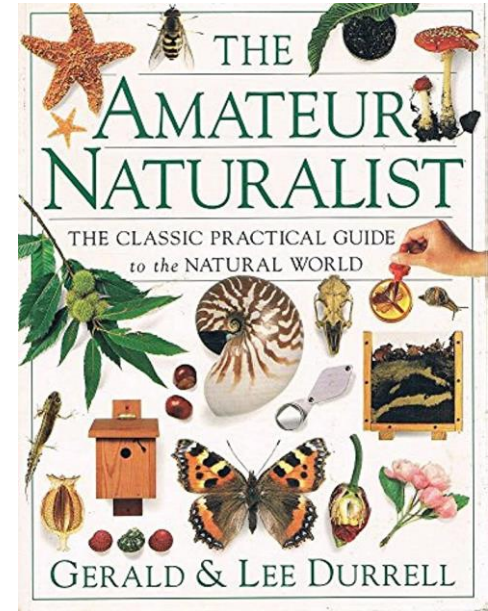


Open science and citizen science



<https://www.fosteropenscience.eu>

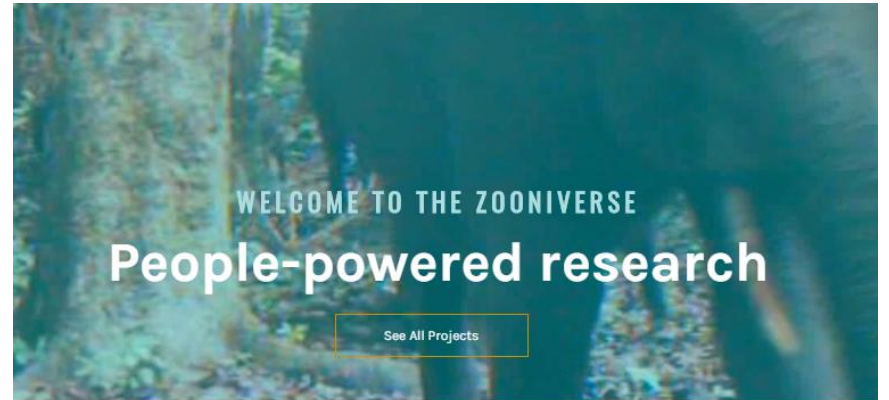
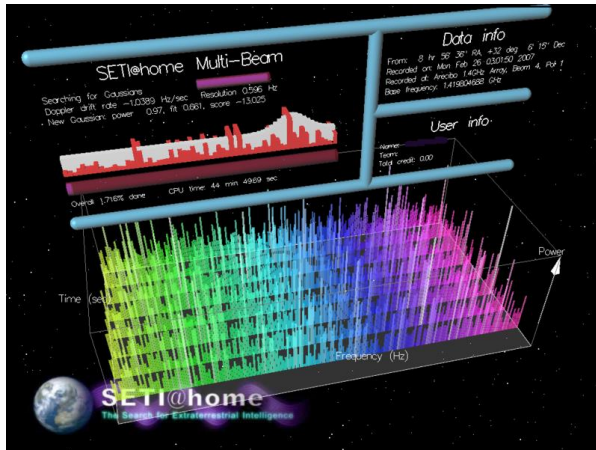
Historical precedents



Contemporary practices

The **Cornell Lab**  of Ornithology
Exploring and Conserving Nature

<http://www.birds.cornell.edu/page.aspx?pid=1664>



<https://www.zooniverse.org/>

Definitions

Citizen Science refers to the general public engagement in scientific research activities when citizens actively contribute to science either with their intellectual effort or surrounding knowledge or with their tools and resources. (Green paper on CS & White paper on CS)

Citizen science is a form of research collaboration involving members of the public in scientific research projects to address real-world problems (Wiggins & Crowston 2011)

Citizen science broadly refers to the active engagement of the general public in scientific research tasks (Vohland et al. 2021)

ECSA 10 principles



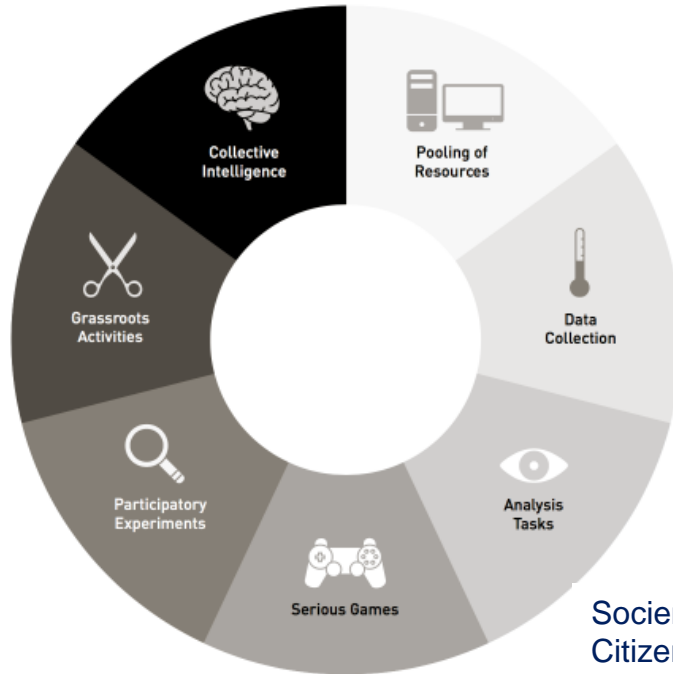
1. Citizen science projects actively involve citizens in scientific endeavour that generates new knowledge or understanding. Citizens may act as contributors, collaborators, or as project leader and have a meaningful role in the project.
2. Citizen science projects have a genuine science outcome. For example, answering a research question or informing conservation action, management decisions or environmental policy.
3. Both the professional scientists and the citizen scientists benefit from taking part. Benefits may include the publication of research outputs, learning opportunities, personal enjoyment, social benefits, satisfaction through contributing to scientific evidence e.g. to address local, national and international issues, and through that, the potential to influence policy.
4. Citizen scientists may, if they wish, participate in multiple stages of the scientific process. This may include developing the research question, designing the method, gathering and analysing data, and communicating the results.
5. Citizen scientists receive feedback from the project. For example, how their data are being used and what the research, policy or societal outcomes are.

ECSA 10 principles



6. Citizen science is considered a research approach like any other, with limitations and biases that should be considered and controlled for. However unlike traditional research approaches, citizen science provides opportunity for greater public engagement and democratisation of science.
7. Citizen science project data and meta-data are made publicly available and where possible, results are published in an open access format. Data sharing may occur during or after the project, unless there are security or privacy concerns that prevent this.
8. Citizen scientists are acknowledged in project results and publications.
9. Citizen science programmes are evaluated for their scientific output, data quality, participant experience and wider societal or policy impact.
10. The leaders of citizen science projects take into consideration legal and ethical issues surrounding copyright, intellectual property, data sharing agreements, confidentiality, attribution, and the environmental impact of any activities.

Types of citizen science



Socientize, White Paper on
Citizen Science for Europe

Types of citizen science

Table 2. Models for public participation in scientific research (PPSR). X = public included in aspect; (X) = public sometimes involved in aspect

Aspects of scientific research/monitoring process:	Contractual Projects	Contributory Projects:	Collaborative Projects:	Co-Created Projects:	Collegial Projects
Choose or define question (s) for study	X			X	X
Gather information and resources	(X)			X	X
Develop explanations (hypotheses)				X	X
Design data collection methodologies			(X)	X	X
Collect samples and/or record data		X	X	X	X
Analyze samples			X	X	X
Analyze data		(X)	X	X	X
Interpret data and draw conclusions	(X)		(X)	X	X
Disseminate conclusions/translate results into action	(X)	(X)	(X)	X	X
Discuss results and ask new questions	X			X	X

Shirk et al. 2012

Types of citizen science

	Traditional Science Research Model	Community Science				
		Scientific Consulting Research Model*	Citizen Science Research Model	Adaptive Citizen Science Research Model	Adaptive Co-Management Research Model	Participatory Action Research Model
Question	✓	✓	✓	✓	✓	✓
Study Design	✓	✓	✓	✓	✓	✓
Data Collection	✓	✓	✓	✓	✓	✓
Data Analysis and Interpretation	✓	✓	✓	✓	✓	✓
Understanding results	✓	✓	✓	✓	✓	✓
Management Action	Managers	Community Groups	Managers	Individuals	All	Community Groups
Geographic scope of project	Variable	Narrow	Broad	Broad	Narrow	Narrow
Research priority	Highest	Medium	High	High	High	Medium
Education priority	Low	Medium	High	High	High	High

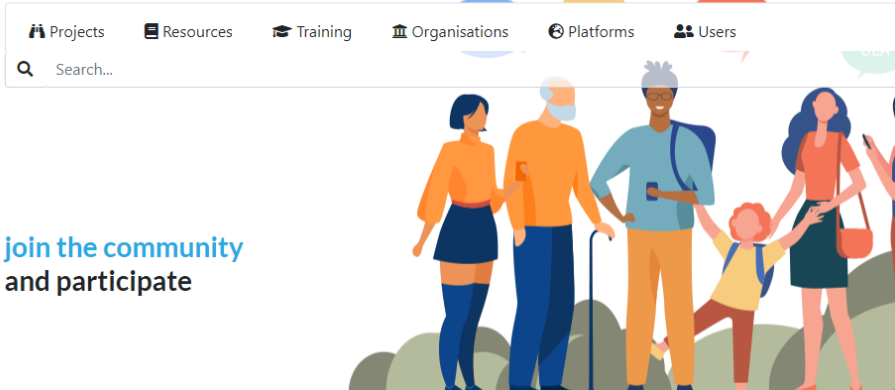
*often called Science Shops

Cooper et al. 2007

Data bases of projects

eu-citizen.science

Welcome to the platform for sharing citizen science projects, resources, tools, training and much more



<https://eu-citizen.science/>

<http://ciencia-ciudadana.es/proyecto-cc/>

Buscar iniciativas de ciencia ciudadana en España

Áreas de conocimiento Tipos de iniciativa Palabra clave o texto:

[x limpiar los filtros](#)

Water-based projects



FuenAragón, Spain

Aim: to identify and characterise the sources and springs of Aragon through citizen science, to assess the water quality of springs and fountains using nitrate concentration as an indicator.

Target participants: individuals, villages/organisations, educational centres

Tasks: audio and video recording, data entry, data analysis, geolocation, identification, learning, problem solving

Resources needed: smart-phone with the CityMapp app

Water-based projects



SmartLagoon, Spain

Aim: to develop a digital twin to build a systemic understanding of the socio-environmental inter-relationships affecting coastal lagoons and their ecosystem. It will digitally replicate the policy-making procedure of these complex socio-environmental systems by combining, analyzing and interpreting data from different sources

Target participants: individuals

Tasks: audio and video recording

Resources needed: smart-phone with the Discharge app

Water-based projects



DRYvER, international

Aim: to collect, analyse and model data by working in collaboration with resource managers and citizens in order to investigate how biodiversity, ecosystem functions, ecosystem services and their values in drying river networks (DRN) are directly and indirectly altered by climate change, to co-develop new strategies to mitigate the effects of climate change on DRNs

Target participants: individuals,

Tasks: classification or tagging, geolocation, photography, site description

Resources needed: smart-phone with the DRYriVERS app or computer

Water-based projects



floodup

Floodup, Spain

Aim: to explore and collect the main impacts of natural hazards and climate change, aspects to improve and how communities adapt

Target participants: individuals

Tasks: geolocation, photography, learning, observation

Resources needed: smart-phone with the Floodup app or computer, rain gauge

Water-based projects



Eye on Water, international

Aim: to assess the Colour and Clarity of natural waters (rivers, lakes, coastal waters, seas and oceans). Water colour indicates the algae and organic content of water.

Target participants: individuals

Tasks: data entry, geolocation

Resources needed: smart-phone with the EyeOnWater app, Secchi dish

Water-based projects

Projeto Rios, Spain and Portugal

Aim: to monitor and improve rivers, to promote environmental education

Target participants: local groups (often schools)

Tasks: each local group “adopts” a 500m stretch of a river and performs two monitoring campaigns (data collection on fauna and flora species, water quality, cultural heritage) and one improvement action (e.g. cleaning) a year



Water-based projects

Aim: raising the visibility of the problems of living and working in Matanza-Riachuelo basin (a heavily contaminated river in Buenos Aires)



<https://coactproject.eu/environmental-justice/>

Target participants: community

Tasks: collective mapping methodologies to identify key categories of social/environmental harm within a population, workshops to co-design the research (water quality, conservation of natural areas), and a public-access database that will be generated using an open source platform.



How to set up a citizen science project

- Define the aims of the project and the target participants
- Design/co-design the methodology: suited to the aims, skills of target participants and available resources - recognise the experiential expertise of citizens
- Recruit and train the participants
- Data collection and registry
- Data validation
- Data analysis and interpretation of results, publication, dissemination
- Feedback to participants and evaluation/co-evaluation

Why do citizen science?

- Way to engage citizens in water issues, raise awareness and even change practices
- Collect distributed data (less expensive)
- Tap into experiential knowledge and skills of citizens and particular groups
- Strengthen partnerships between academia, civil society groups, companies, public administration
- Provide training (to citizens, groups, school children)
- Generate good science



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869171. The publication reflects only the authors' views and the European Union is not liable for any use that may be made of the information contained therein.