TORCH
Transforming Open Responsible Research and Innovation through CHARM

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Promoting Citizen Science

Josep Perelló, UB

June 9, 2023. Online

UNIVERSITAT DE BARCELONA
Trinity College Dublin
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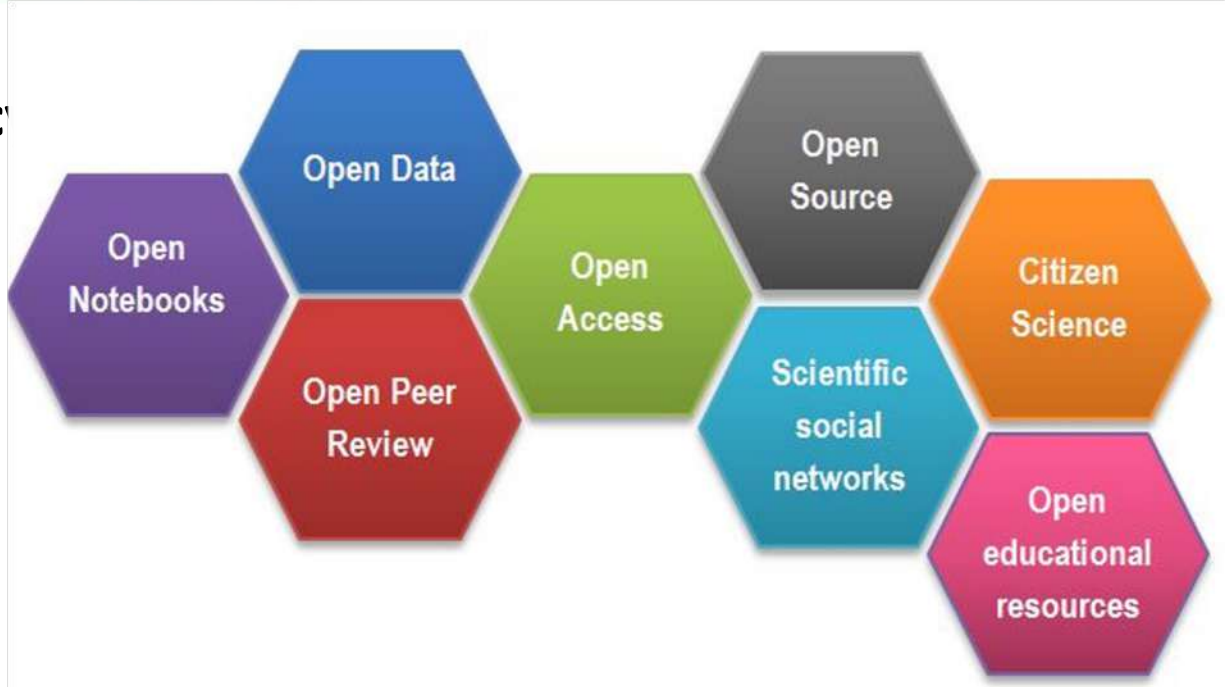
EU research policy

8 ambitions of the EU's Open Science polic

1. Open Data-FAIR data
2. European Open Science Cloud
3. New generation metrics for research quality
4. Future of scholarly communication
5. Rewards
6. Research integrity & reproducibility of scientific results
7. OS Education and skills
8. **Citizen science**



https://www.fosteropenscience.eu

EU research policy

"Bold missions can provide new syntheses that are today impossible and thus will hopefully achieve the breakthroughs that are urgently needed to solve some of the most pressing issues facing our citizens."

"Citizens can possibly be mobilised to become active participants in missions, for example by cleaning plastics from beaches or by providing real-time monitoring data as enabling technologies develop and become more universally present in society."

https://doi.org/10.2777/36546

Science

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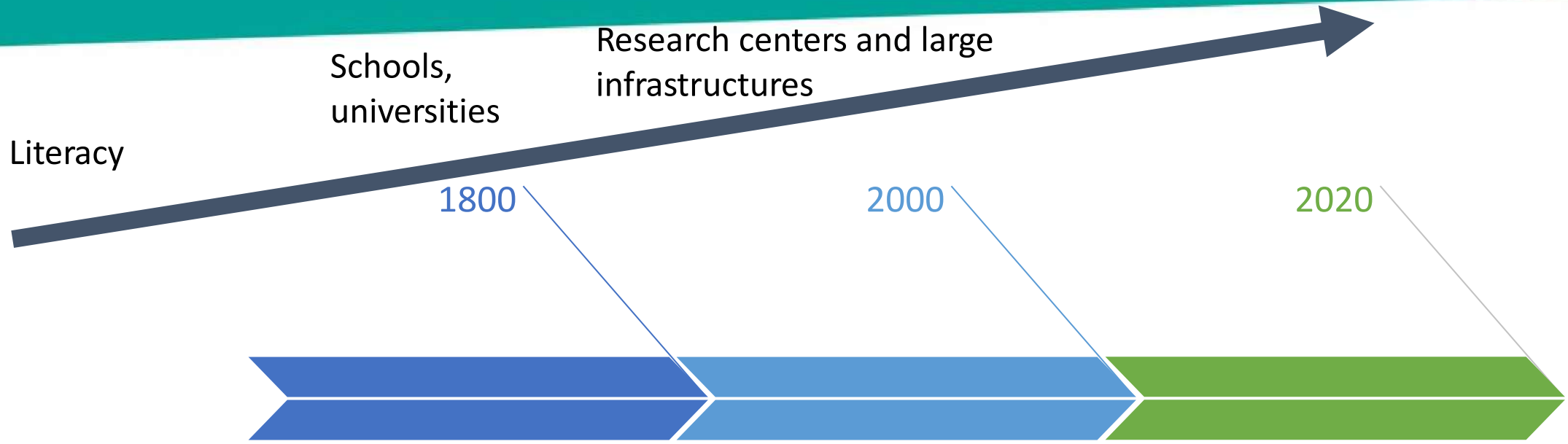


Margaret Cavendish

Young science

Lords and ladies of science

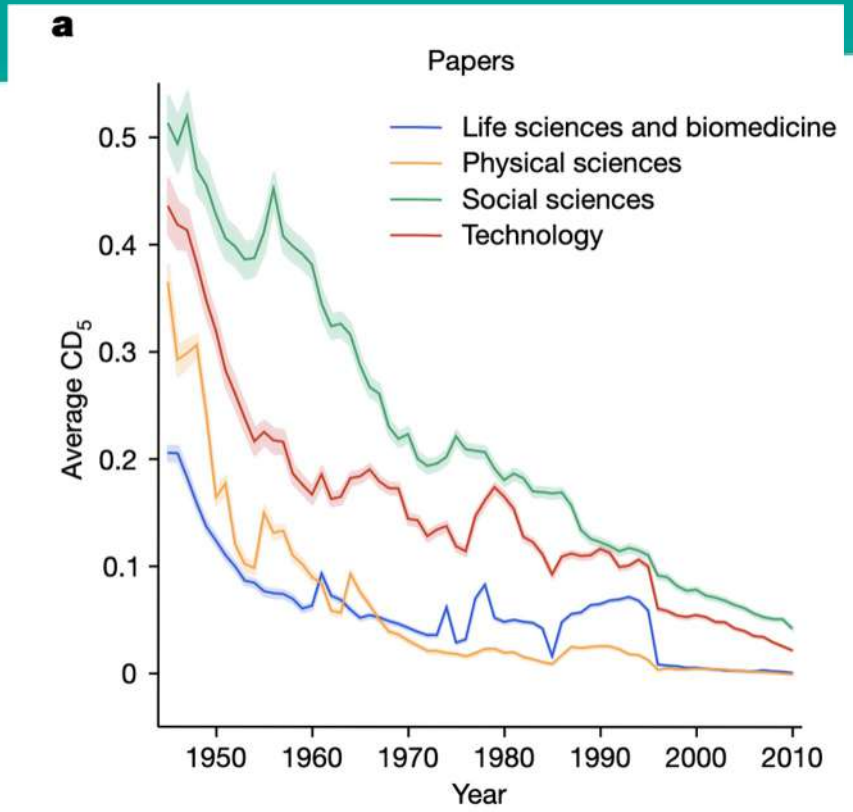
Professional science

Institutionalisation

Open Science, Knowledge coproduction, Crowdsourcing, Science democratisation

Science

"... a marked decline in disruptive science and technology over time. [...] We attribute this trend in part to scientists' and inventors' **reliance on a narrower set of existing knowledge**."



From: Park, M., Leahey, E. & Funk, R.J. Papers and patents are becoming less disruptive over time. *Nature* **613**, 138–144 (2023). https://doi.org/10.1038/s41586-022-05543-x

Science

NEWS FEATURE

PARTNERS IN SCIENCE

The people who should benefit from research are increasingly shaping how it is done.

BY CASSANDRA WILLYARD, MEGAN SCUDELLARI AND LINDA NORDLING

Vilarie Blue Bird Jernigan knew she had to tweak some standard scientific practices when she started her latest research project. One of the first things to go was the usual concept of a control group — people who would not receive interventions to encourage healthy eating. That wouldn't be fair to the people of the Osage Nation, a Native American people in northeastern Oklahoma.

Another concept to ditch was the idea that she was studying a group at all. Jernigan, a public-health researcher, who is Native American herself, has treated the Osage people as equal partners from the first day of the project. It took two years and seemingly endless rounds of community discussions to get the study off the ground, but Jernigan wouldn't have had it any other way. This kind of research "isn't just about proving your hypothesis", she says. It's more about improving people's lives and, at the same time, helping them gain the skills to do science.

Jernigan's approach, often referred to as community-based participatory research, has been gaining traction for the past two decades. It has become particularly important for research that involves indigenous and other populations who have been mistreated by scientists in the past. The Havasupai tribe in Arizona, for example, waged a lengthy legal battle with Arizona State University in Phoenix over researchers' misuse of blood samples that the tribe had provided for a diabetes study in the 1990s. The samples were eventually returned as part of a settlement two decades later. The lessons learnt from the event have set the tone for how best to do research involving Native Americans.

Community participation has become the norm. "In minority communities, it's probably the primary research methodology," says public-health researcher Alexandra Adams, director of the Center for American Indian and Rural Health Equity at Montana State University in Bozeman. "It reduces mistrust, it improves dissemination and it improves cooperation." The goal of such efforts is the co-production of research, in which the stakeholders who are supposed to benefit from a strand of research become active partners in conducting it. Scientists from disciplines as varied as archaeology, public health and climate change have embraced the approach, working with community members on many different aspects, from formulating study questions and design, to doing experiments and analysing and reporting results.

Nature talked to three groups that have built successful co-produced projects. Their experiences reveal the challenges and rewards that come with the open and collaborative exchange of ideas. The work veers away from the standard outputs of science, such as talks and papers, and expands the idea of what it means to be a scientist and a collaborator.

A PLACE AT THE TABLE

Jernigan's latest project with the Osage people wasn't wholly her idea. It started with Raymond Red Corn. As a child growing up in the Osage Nation, Red Corn helped his parents to harvest the dusky red ears of maize (corn) and process them into corn soup and hominy, a food made from soaking kernels in lye or wood ash until they go puffy. Taking the maize from seed to soup is something the Osage have done for centuries. But that tradition has nearly disappeared. "I couldn't hardly find anyone younger than me that had ever done it, even in the most traditional families," he says.

Four years ago, Red Corn was elected assistant chief of the Osage Nation. Right away, he started looking for a spot to plant traditional maize and other crops. Fresh fruit and vegetables are hard to come by in Osage County. Since the 1970s, the Osage people have increasingly relied on canned and processed foods that are high in salt, fat and sugar.

Red Corn wants to see the community take back control of its food supply. By restoring their connection to the land and its lost food traditions, he thinks, they just might be able to rewind to a healthier lifestyle. The efforts might even help to tackle the high rates of obesity and diabetes in Native Americans in the area. In the Osage Nation, "everything we do revolves around food", Red Corn says. "You can't heal the community unless you heal the food system."

Red Corn and other tribal leaders hoped that providing locally grown fresh foods would yield obvious health benefits, but they weren't equipped to measure those benefits themselves. So, they reached out to Jernigan at the University of Oklahoma Health Sciences Center, who is a member of the Choctaw Nation. Jernigan has spent the bulk of her career testing strategies to improve the food environment on reservations as a way to enhance health. She has another project with two other Native American communities in Oklahoma to get healthier foods into their convenience stores.

Research on marginalized groups can be fraught, and working with tribal communities is especially complicated. A history of research abuses has left many Native Americans mistrustful of the scientific enterprise. In the past, investigators have used tribal members as unwitting participants in unethical and dangerous experiments. And, as in the Havasupai case, scientists have at times withheld information from the communities they have studied and largely ignored tribal concerns.

When Native Americans think of health studies, they often think of "helicopter researchers", Jernigan says — scientists who fly in, collect data and blood samples, and then leave. "And they never see one benefit." What's more, working with indigenous communities means dealing with sovereign governments, some of which have their own institutional review boards. "You have to go through all these extra layers of protections," Jernigan says. These days, collaboration and co-production aren't just ethical, they are mandatory. "There's almost no other way of doing it," she says.

As a first step, Jernigan proposed launching a pilot study to work out what the community actually wanted. The team surveyed everyone from community members to leadership, and found that people seemed most interested in the idea of community gardening. They wanted to use locally grown crops to help supply some of the tribally run programmes for children and older people.

But boosting the supply of fresh fruit and vegetables is only half the battle; people also wanted to increase the desire for healthy foods. So Jernigan worked with the Osage to design a community programme aimed at getting young children and their families to eat more fruit and vegetables. The trial, called Food Resource Equity and Sustainability for Health, or FRESH, launched in January. The team came up with new, healthier menus for a programme that provides care for children aged 3–5 from low-income backgrounds. The researchers also provided the schools with demonstration gardens. Each week, the teachers spend 90 minutes telling stories about food, working with the children in the garden, and conducting a simple cooking lesson. On Fridays, the children take home a healthy meal kit to prepare with their families. Meanwhile, their parents take part in a 15-week online workshop.

The cultural elements are important. Parents are encouraged to attend a monthly family night, where they talk about foods they remember eating when they were young, what they eat now, where it comes from and why they choose certain foods. Jernigan's team has given video cameras to families to record their own food stories. "There's a lot of realization about ▶

"YOU NEVER ASK SOMETHING OF SOMEONE WITHOUT GIVING THEM SOMETHING BACK."

Researchers excavate an ancient cattle pen for the Morombe Archaeological Project.

CO-PRODUCTION OF RESEARCH
A *Nature* special issue
nature.com/collections/coproduction

Ethics and diversity

Science

Editorial/Special issue 2018. Nature 562

https://www.nature.com/articles/d41586-018-06859-3

"A project that is **co-produced is one in which researchers, practitioners and the public together share power and responsibility for the work throughout**. The 'whys' of this process are self-evident: patients and the public have the right to be more than just participants in research, and their involvement can lead to better outcomes."

From *INVOLVE, UK health-research advisory group*

Science

It is time [...] to address the ethics of inclusion

POLICY FORUM

ETHICS AND DIVERSITY

Justice, diversity, and research ethics review

It is time for institutional review boards and research ethics committees to address the ethics of inclusion

By David H. Strauss[1,2], Sarah A. White[1,2], Barbara E. Bierer[1,3,4]

The disproportionate impact of COVID-19 on certain populations, such as Black, Latinx, and Indigenous populations in the United States, has focused attention on inequalities in health and on the need to increase enrollment of racial and ethnic minorities and other underrepresented groups in biomedical research (*1*). Yet too often, in the United States and globally, participant enrollment in research has not reflected the demographic composition of the general population, those affected by the health conditions being studied, or those for whom the investigational product is intended (*2*), with racial and ethnic minorities and the young and the elderly, among others, being consistently underrepresented (*3*). Underlying causes for this underrepresentation have been described (*4*, *5*), but change has been slow. Notwithstanding the roles of other stakeholders in addressing this issue, we maintain that the specific value of institutional review boards (IRBs) and research ethics committees (RECs) in promoting diversity has been underrecognized and their authority underutilized. Here, we substantiate the role of and outline practical steps for the IRB and REC (hereafter "IRB") to help achieve greater diversity in clinical research.

The appropriate inclusion of diverse populations in clinical research is necessary if we are to understand how biological variability and social determinants of health contribute to disease prevalence, transmission, course, experience of illness, and treatment outcome. The inclusion of understudied and underserved groups informs clinical decision-making and health policy and can serve efforts to address mistrust of research and health care (*6*, *7*). Responsibility to the goals of diversity lies with all stakeholders in the clinical research enterprise (*6*), and a commitment to diversity, individually and collaboratively, by research sponsors, funders, academic institutions, contract research organizations, study sites, investigators, and IRBs is necessary.

RESPECT, BENEFICENCE, JUSTICE

Most regulated clinical research undergoes obligate review and approval by an IRB. IRBs are charged with safeguarding the rights and well-being of human participants in accordance with the foundational tenets of respect for persons, beneficence, and justice, as described in the Belmont Report (*8*). An IRB's ethical responsibilities with regard to diversity derive from these and other principles, guidelines, and standards (*9*, *10*).

The discussion of justice in Belmont cites "moral requirements that there be fair procedures and outcomes in the selection of research subjects." As Belmont and other codes of ethics emerged from a historical backdrop of abuse and injustice in research, "fair procedures" have been applied by IRBs largely (and, we believe, too narrowly) to ensure that subjects are not exploited and enrolled as a matter of convenience. The idea of justice within the Belmont Report also includes the notion of access to the benefits of research (i.e., knowledge gained); this has direct implications for populations that have been understudied, whether incidentally or systematically. Subject selection cannot be equitable, and the requirements of justice cannot be met, when there is de facto exclusion of understudied populations.

This notion of justice is supported by the World Health Organization's International Ethical Guidelines for Health-related Research Involving Humans, Guideline 3, which states, "In cases where the underrepresentation of particular groups results in or perpetuates health disparities, equity may require special efforts to include members of those populations in research" (*9*), and by the World Medical Association Declaration of Helsinki, which states, "Groups that are underrepresented in medical research should be provided appropriate access to participation in research" (*10*). Therefore, consideration of diversity is essential to the question of fairness in subject selection and to IRB review.

Diversity in clinical research is responsive to the principle of beneficence, which places priority on the welfare of research participants and creates the obligation that research presents a favorable balance of benefit to risk, after risks and burdens have been minimized. In calling for "maximization of benefits" in the research, Belmont directs attention to both individual benefit and to the broader value of research to society. A clinical research enterprise that is not inclusive does not adequately address the health needs of a diverse society. Group differences in susceptibility to disease and in treatment outcome can only be identified when those groups are studied. It is the obligation of an IRB to maximize benefits through the inclusion of understudied groups in a manner that is consistent with the study aims and does not introduce unacceptable harm or burden.

Belmont describes two ethical convictions in relation to respect for persons, self-determination, and decision-making: the obligations to treat individuals as autonomous agents and to protect those with diminished autonomy. IRBs provide additional safeguards for research involving participants with compromised voluntariness (e.g., prisoners) or impaired comprehension. With regard to the inclusion of diverse populations, respect for persons demands efforts to foster informed and autonomous decision-making and, therefore, to address common barriers posed by age, language, culture, and educational disadvantage. Respect for persons requires the identification of opportunities and resources to engage understudied populations and to enhance awareness, access, and inclusion in research (*4*, *6*). It also demands modification of those aspects of research and of consent that inadvertently limit the participation of understudied populations. For example, although inclusion of non-English speakers in a study may involve additional expenses of translation and/or interpreters, it strengthens the commitment to autonomy and justice.

The ethical positions presented above compel attention to inclusion of diverse populations in clinical research and define a specific duty for the IRB. In a 2019 survey (*11*), a majority of IRB chairs, IRB ad-

[1]Multi-Regional Clinical Trials Center of Brigham and Women's Hospital and Harvard University, Cambridge, MA, USA. [2]Vagelos College of Physicians and Surgeons, Columbia University, New York, NY, USA. [3]Brigham and Women's Hospital, Boston, MA, USA. [4]Harvard Medical School, Boston, MA, USA. Email: bbierer@bwh.harvard.edu

Strauss, D. H., White, S. A., & Bierer, B. E. (2021). Justice, diversity, and research ethics review. Science, 371(6535), 1209-1211. https://doi.org/doi/10.1126/science.abf2170

Citizen Science

Epistemological viewpoint

Citizen science…

as a participatory data gathering

Bonney (1996)

Bonney R. 1996. Citizen science: a lab tradition. Living Bird 15, 7-15.
Accessible at: https://www.biodiversitylibrary.org

12/9/2021 Living bird. - 7 (Illustration, Text)

CITIZEN SCIENCE

A Lab Tradition

BY RICK BONNEY

The history of ornithology is replete with the contributions of amateurs. From the early 1800s, when a Scottish poet named Alexander Wilson published the first comprehensive account of North American birdlife, to the turn of the century, as the Audubon Christmas Bird Counts were born, to the present time, as thousands of birders participate in bird censuses, surveys, and research projects across the continent, amateurs have gathered a treasure house of information on bird numbers, bird movements, even basic bird biology.

The Cornell Lab of Ornithology has played a major role in this tradition. In 1929 our founder, Arthur A. Allen, began soliciting bird watchers' sightings to construct a comprehensive database of the birds of central New York's Cayuga Lake Basin. Our Nest Record Program, begun in 1965, was one of the first North American projects to seek amateur-collected data in an organized fashion. Project FeederWatch, which started in 1987, is one of the largest amateur-based data collection programs under way today. And FeederWatch is now joined by several other Lab citizen-science projects, including Project Tanager, Project PigeonWatch, and the Cornell Nest Box Network.

It's safe to say that the Lab of Ornithology depends on amateurs to collect data. But citizen science is a two-way street: Participants gain from the projects, too. From backyard birders to school children, amateur ornithologists become proficient in bird identification, acquire the skills of patient observation, imbibe the process of scientific investigation, and gain the satisfaction of furthering scientific knowledge.

The Lab also hopes that public participation in bird studies will spawn action on behalf of birds. As project participants evolve from birders to citizen scientists, we hope they'll go to work on behalf of birds. Our goal? That bird watchers will save the world.

The next few pages present an overview of the Lab's many citizen-science projects. ■

For more information on any of our citizen-science projects, contact: Education Program, Cornell Lab of Ornithology, 159 Sapsucker Woods Road, Ithaca, New York 14850; or telephone: (607) 254-2440; e-mail: birdeducation@cornell.edu; or visit our web site (http://www.ornith.cornell.edu).

By contributing data on bird numbers and behavior on a continentwide scale, the Lab's "Citizen Scientists" make a real contribution to bird conservation. Here two Cornell Nest Box Network participants check the contents of a Tree Swallow nest.

Autumn 1996 7

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Citizen Science

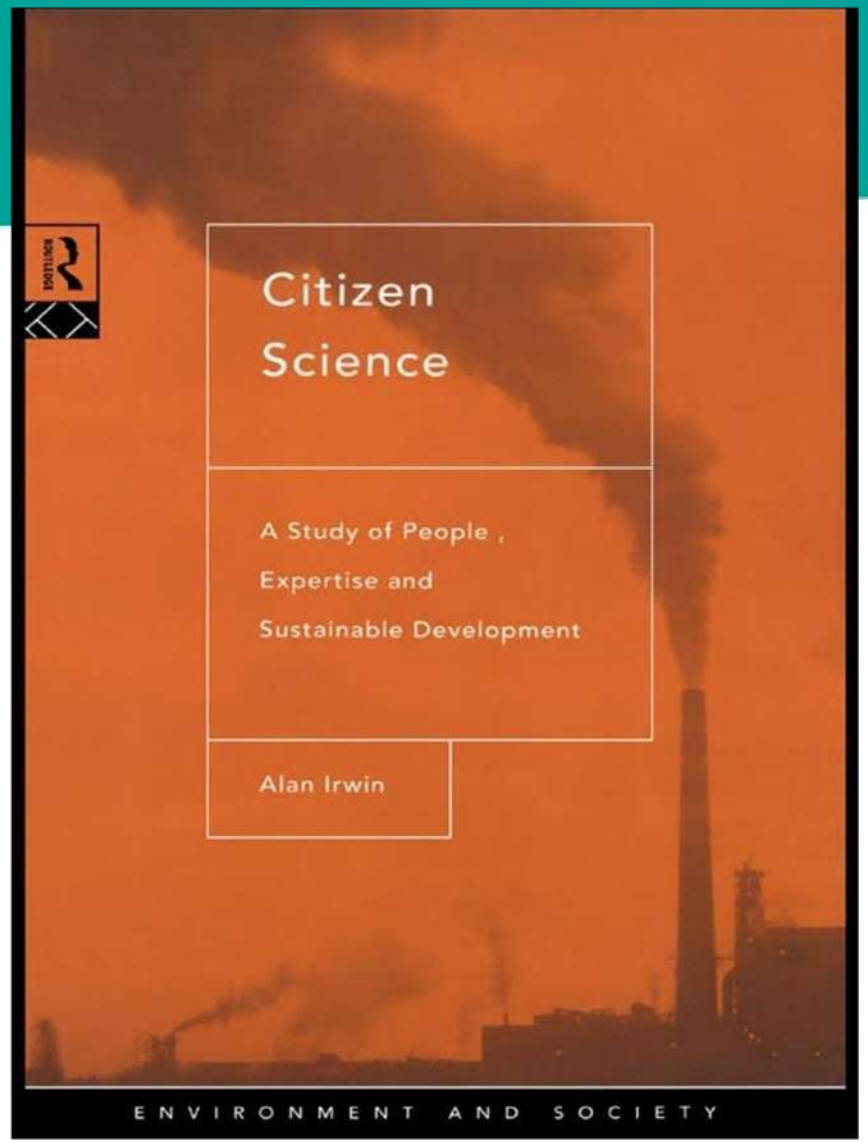
Epistemological viewpoint

[Citizen] science…

"[…] assists the needs and concerns of citizens"

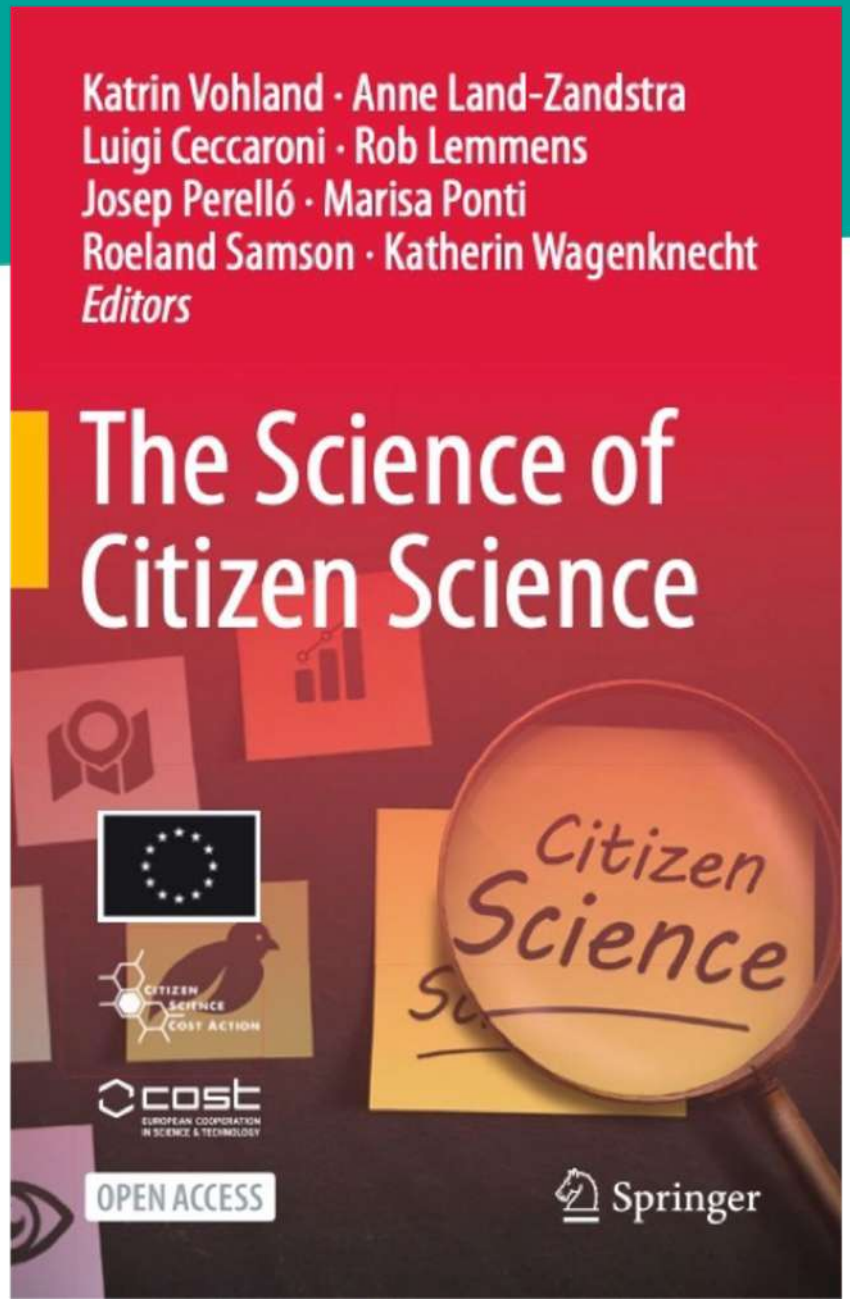
"a form of science developed and enacted by citizens themselves"

Irwin (1995)



Irwin, A. (1995). Citizen science: A study of people, expertise and sustainable development. Routledge Press.

Citizen Science



Vohland, K., Land-Zandstra, A., Ceccaroni, L., Lemmens, R., Perelló, J., Ponti, M., ... & Wagenknecht, K. (2021). The science of citizen science (p. 529). Springer https://doi.org/10.1007/978-3-030-58278-4

Citizen Science

Institutionalisation & Training
Methods / Protocols
Social dimension
Actionable Knowledge
Replicability
Upscaling
Actors
Locations / Contexts
Groups in a vulnerable democracy
Part of deliberative democracy
Beyond a disciplinary approach

CITIZEN SCIENCE
COMES OF AGE

Efforts to engage the public in research are bigger and more diverse than ever. But how much more room is there to grow?

BY AISLING IRWIN

Filip Meysman knew he had made his mark on Antwerp when he overheard commuters discussing his research project on the train. Then, just a few days later, he saw an advertisement about his work on television. There it was, he says, "in between the toothpaste and George Clooney's Nespresso".

As a biogeochemist at the University of Antwerp in Belgium, Meysman wasn't used to drawing so much attention. But that was before he adopted the citizens of northern Belgium as research partners. With the help of the Flemish environmental protection agency and a regional newspaper, Meysman and a team of non-academics attracted more than 50,000 people to CurieuzeNeuzen, an effort to assess the region's air quality (the name is a play on Antwerp dialect for 'nosy' people).

The project ultimately distributed air-pollution samplers to 20,000 participants, who took readings for a month (see 'Street science'). More than 99% of the sensors were returned to Meysman's laboratory for analysis, yielding a bounty of 17,800 data points. They provided Meysman and his colleagues with information about nitrogen dioxide concentrations at 'nose height' — a level of the atmosphere that can't be discerned by satellite and would be prohibitively expensive for scientists to measure on their own. "It has given us a data set which it is not possible to get by other means," says Meysman, who models air quality.

Citizen science — active public involvement in scientific research — is growing bigger, more ambitious and more networked. Beyond monitoring pollution and snapping millions of pictures of flora and fauna, people are building Geiger counters to assess radiation levels, photographing stagnant water to help document the spread of mosquito-borne disease, and taking videos of water flow to calibrate flood models. And an increasing number are donating thinking time to help speed up meta-analyses or assess images in ways that algorithms cannot yet match.

The movement is surfing wider societal forces, including a thirst for data; the rise of connectedness and low-cost sensor technologies; and a push to improve the transparency and accessibility of science. Increasingly, government institutions and international organizations are getting in on the action. The US and Scottish environmental protection agencies, for example, have incorporated citizen science in their routine work. The United Nations Environment Programme is exploring ways of using citizen science to both monitor the environment and stoke environmental concern. And the European Commission has made a range of funding opportunities available for citizen science within its €80-billion

Japanese priest Sadamaru Okano stands beneath a Geiger counter (top left) that sends radiation readings to the Safecast project.

BEHROUZ MEHRI/AFP/GETTY

480 | NATURE | VOL 562 | 25 OCTOBER 2018

Irwin, A (2018). Citizen Science Comes of Age. Nature, 562(7728), 480-482. https://doi.org/10.1038/d41586-018-07106-5

Synergies

Institut de Desenvolupament Professional
UNIVERSITAT DE BARCELONA

https://www.ub.edu/idp/web/ca/ciencia-ciutadana

Taula d'entitats del Tercer Sector Social de Catalunya

Citizen Science NOW

SENSE.

PUSH

And other UB CS projects

Synergies

Ciencia y Universidades
Cultura, Educación, Ciencia y Comunidad

QUIÉNES SOMOS | CIENCIA EN LA CIUDAD | INVESTIGACIÓN | UNIVERSIDADES | EDUCACIÓN Y CIENCIA | ARTE Y CIENCIA | ACTUALIDAD

Home / Ciencia en la ciudad / La ciencia y la ciudadanía / Ciencia ciudadana

Oficina de Ciencia Ciudadana

La Oficina de Ciencia Ciudadana de Barcelona es la plataforma multidisciplinar para el fomento de la ciencia ciudadana y del aprendizaje colectivo basado en la experiencia y las buenas prácticas.

La Oficina tiene la misión de apoyar a la ciencia ciudadana que se hace en Barcelona a través de asesorar, acompañar y promover proyectos que quieren trabajar en la ciudad y su Área Metropolitana, así como desarrollar acciones encaminadas a acercar ciudadanía e investigación y potenciar la conexión con nuevos agentes cívicos y culturales.

Contacta con la Oficina

Plan para el reimpulso de la Oficina

Documentos relacionados

- Guía Ciència Ciutadana i Aprenentatge Servei (PDF 5.46 MB)
- Recommendations to Mainstream Citizen Science in Policy (een inglés) (PDF 1.93 MB)
- Plan para el reimpulso de la Oficina de Ciencia Ciudadana 2022

OFICINA CIÈNCIA CIUTADANA BARCELONA

Synergies

Los ministerios de Universidades y de Ciencia e Innovación unen fuerzas para impulsar la ciencia ciudadana

Universidades - 11.7.2022

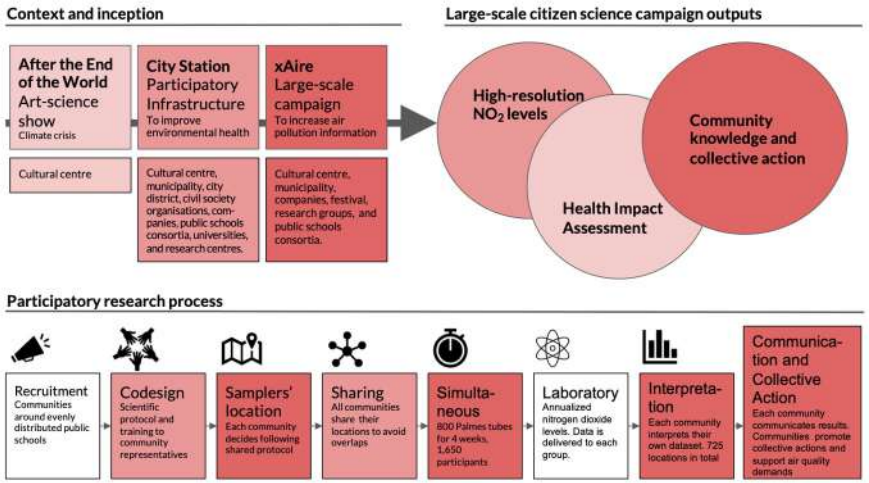
El ministro de Universidades, Joan Subirats, y la ministra de Ciencia e Innovación, Diana Morant, han participado en el curso "Ciencia Ciudadana y Universidades", organizado por la Universidad Internacional Menéndez Pelayo (UIMP) con la colaboración del Ministerio de Universidades.

Durante su participación, ambos ministros han anunciado que la convocatoria de ayudas para el fomento de la cultura científica, tecnológica y de la innovación, que gestiona la **Fundación Española para la Ciencia y la Tecnología (FECYT)**, dependiente del Ministerio de Ciencia e Innovación, contará en 2022 con una aportación adicional del Ministerio de Universidades por valor de 400.000 euros para reforzar las acciones de ciencia ciudadana en las universidades.

El objetivo es democratizar el conocimiento y la ciencia que se produce en las universidades, relacionando la labor investigadora con su entorno, impulsando su papel como instituciones útiles en la distribución social de recursos interpretativos y capacidades prácticas con justicia, sensibilizando acerca delos retos sociales y

Més informació

Previous experiences



Replicated with students of architecture in Venice (2020). Catalan pavillion in Venice. Architecture biennale.

La Biennale di Venezia
58. Esposizione Internazionale d'Arte
Eventi Collaterali

air/aria/aire
Catalonia in Venice

Perelló, J., Cigarini, A., Vicens, J., Bonhoure, I., Rojas-Rueda, D., Nieuwenhuijsen, M. J., ... & Ripoll, A. (2021). Large-scale citizen science provides high-resolution nitrogen dioxide values and health impact while enhancing community knowledge and collective action. Science of The Total Environment, 789, 147750. https://doi.org/10.1016/j.scitotenv.2021.147750

Previous experiences

Recercaixa. Ciència ciutadana a les escoles (2014-2016)

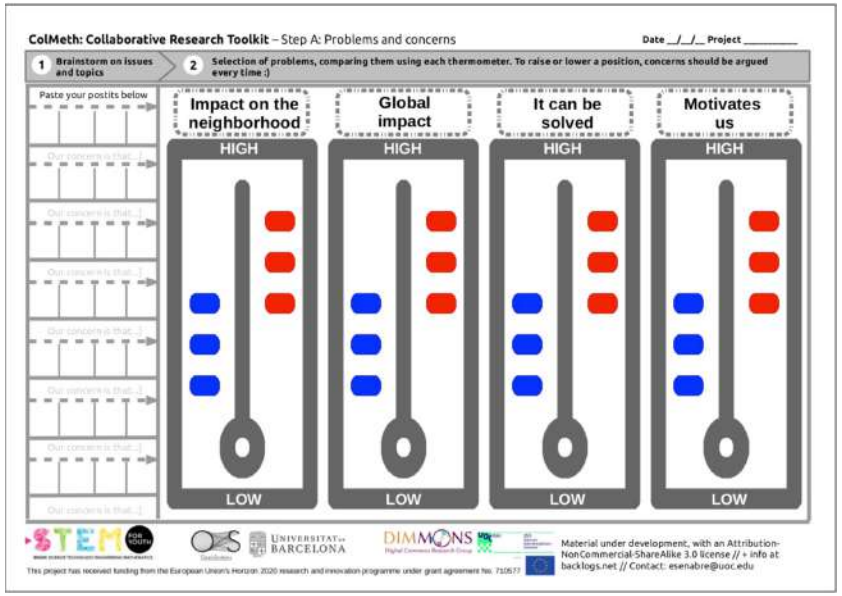
Rubrics:

1. **Scientific Competencies:** necessary for a critical analysis of the reality that surrounds us based on scientific methods and scientific methods.
2. **Communication Competencies:** necessary to communicate on different channels and at different levels and contexts.
3. **ICT Competencies:** necessary for the safe and critical use of technology, including different purposes.
4. **Participation and Motivation attitudes:** necessary to evaluate engagement within the CS project.

Perelló, J., Ferran-Ferrer, N., Ferré, S., Pou, T., & Bonhoure, I. (2017). High motivation and relevant scientific competencies through the introduction of citizen science at secondary schools: An assessment using a rubric model. *Citizen inquiry*, 150-175.

Previous experiences

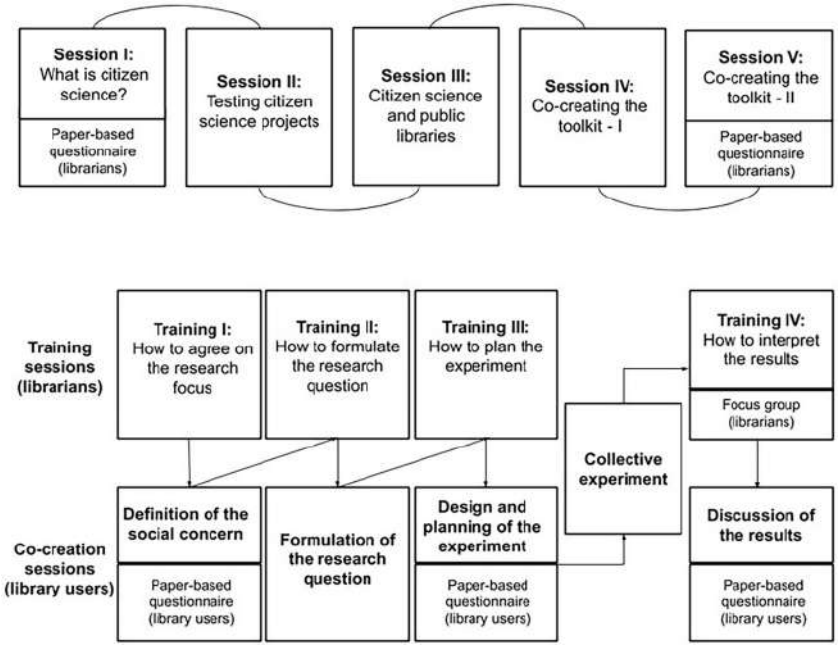
STEMForYouth 2016-2019



The Citizen Science Toolkit for Teachers is largely based on the materials that have been generated in the context of the STEMForYouth project. The aim was to co-create a Citizen Science experiments based on the social concerns of the students and that the results of this experiment had a local social impact. The Citizen Science Toolkit for Social Change differential value is that it allows the teachers and students to co-design a completely new CS project, based on the concerns of the students that are progressively transformed into a scientific experiment on human behavior in urban contexts.

Previous experiences

Public libraries. CS projects as resources and the role of librarians in a project cocreation (2016-2018)



Cigarini, A., Bonhoure, I., Vicens, J., & Perelló, J. (2021). Public libraries embrace citizen science: Strengths and challenges. *Library & Information Science Research*, *43*(2), 101090. https://doi.org/10.1016/j.lisr.2021.101090

Previous experiences

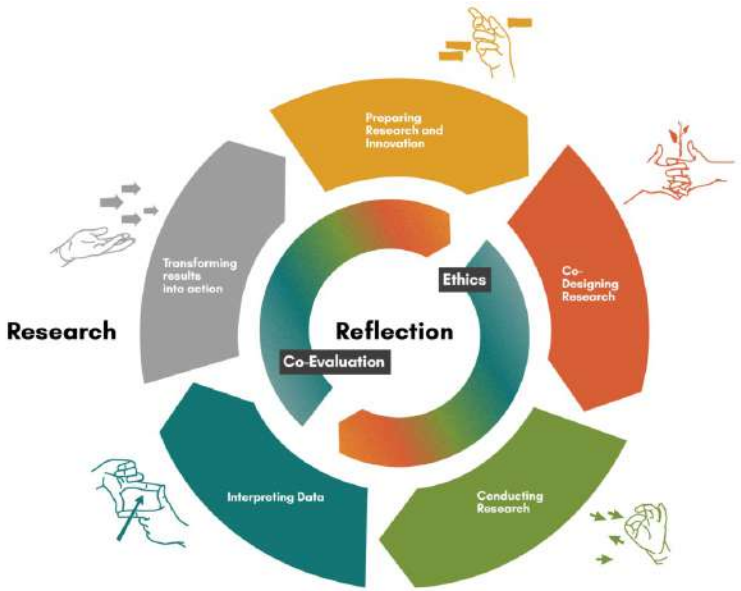
Public libraries. CS projects as resources and the role of librarians in a project cocreation (2016-2018)

Perelló, Josep, Bonhoure, Isabelle, Cigarini, Anna, & Vicens, Julià. (2019). Ciència ciutadana a les biblioteques: Observa, analitza, crea i participa. Zenodo. https://doi.org/10.5281/zenodo.3490610

Previous experiences

CoAct Citizen Social Science

2020-2022



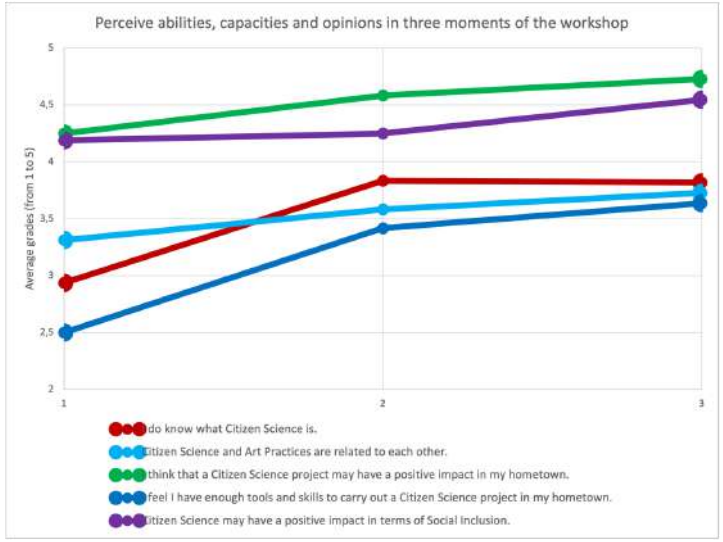
CoAct promotes and further develops methods and tools for citizen social science. Tools were developed, tested and applied in four research fields: mental healthcare, youth employment, environmental justice and gender equality. The Research Cycle presents the different steps and principles that guide the research process. These tools proved as helpful and valuable for the knowledge production and development of innovations in citizen social science projects.

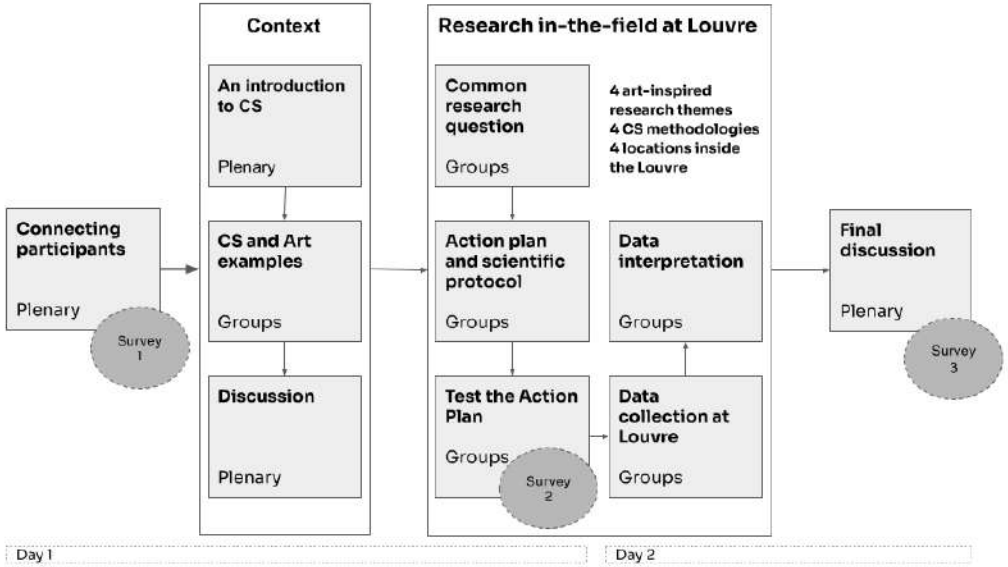
Toolkit: https://coactproject.eu/explore-the-toolkit/
Online Summer school: https://coactproject.eu/open-materials-citizen-social-science-school/

Previous experiences

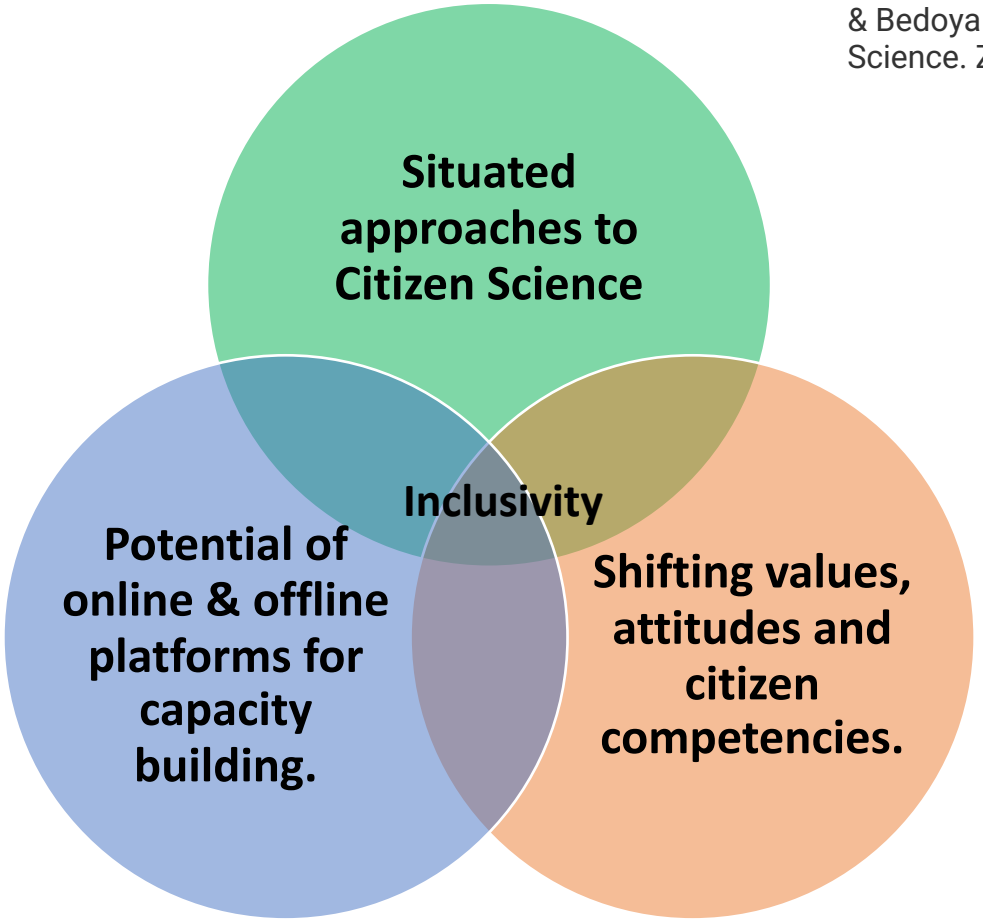
SENSE. 2021-2024

Citizen Science and Art practices workshop at Louvre 2023.
Social Inclusion as a cros—cutting issue





CS Training



Nicolas, E., van Dam, K., Tercanli, H., Trần, MA, de Vries, S, Vonk, J, Perelló, J, Lemus, M, & Bedoya Bernal, N. (2022). Needs assessment and future foresight report on Citizen Science. Zenodo. https://doi.org/10.5281/zenodo.7509521

CS Training

Inclusiveness	Horizontality	Equity	Trust	Respect
Open Science	Co-ownership	Empowerment	Reflexivity	Reciprocity

TORCH

Transforming Open Responsible Research and Innovation through CHARM

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