

University of Warsaw

Recommendations for citizen science

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Open science (OS), based on the principles of academic freedom, research integrity and scientific excellence, sets out a new model for the functioning of science and research practices. According to the definition formulated by [UNESCO](#), openness is based on a newly formulated paradigm which incorporates practices relating to reproducibility, transparency, sharing and collaboration into scientific endeavour, resulting from the increasing openness of scientific content, tools and processes. *Citizen science* (CS) is one manifestation of openness in science. It describes the openness of scientists to collaborate with citizens by making research practices and tools available. The term ‘citizens’ refers to volunteers, people who are not research staff at universities or other scientific institutions. These individuals engage in research outside their work or formal education. In this way, they help to build a community engaged in scientific research. Citizen participation in science creates a collective resource of knowledge and social experience aimed at solving problems; it offers the opportunity to take part in research that addresses the needs and concerns of, or reflects the aspirations of, various social groups, decision-makers and entrepreneurs.

This document contains guidelines on supporting and managing citizen science projects conducted at higher education institutions. The text is divided into four sections addressed to specific interest groups: researchers, universities and relevant university units (e.g. libraries), research funding organisations, and science policy-makers. Key to citizen science are: long-term and concrete investments in managing the community of citizens collaborating with researchers, striving for full transparency of research methods, and ensuring appropriate recognition and remuneration for the citizens involved, most often through co-authorship in publications. These guidelines call for the development of support infrastructure and the adaptation of evaluation systems to recognise citizen science as an important and rapidly evolving set of research methods.

These guidelines serve as an introduction to the topic of citizen science. They are intended to help understand how to conduct projects in which citizens collaborate with scientists. They may be particularly useful for individuals and institutions planning to work on projects involving elements of citizen science, as this document outlines the basic principles of their organisation and implementation and highlights good practices in this area. Those with more experience may use the guidelines as a checklist to help review their current activities and assess which areas are worth improving or developing. It should be emphasised that the recommendations presented should be treated as inspiration for institutions interested in (further) engagement with citizen science, and that it is necessary to adapt them to the specific characteristics, needs and capabilities of individual organisations. There is no single universal implementation model that would suit all entities; therefore, a flexible approach and consideration of the local context are crucial.

The text of this document is based on the following sources (in alphabetical order):

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<https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e504e66b94&appId=PPGMS>
3. Stilund Hansen J. (2021). Citizen Science Training for Library Staff, Researchers, and the Public. Section 1. In: *Citizen Science for Research Libraries — A Guide*. LIBER Citizen Science Working Group. <https://doi.org/10.25815/hf0m-2a57>
4. Wallis K. (2023). Library infrastructures & citizen science. Section 2. In: *Citizen Science for Research Libraries — A Guide*. LIBER Citizen Science Working Group. DOI: [10.25815/tz0x-m353](https://doi.org/10.25815/tz0x-m353)
5. Wyler, D., Grey, F., Maes, K., & Fröhlich, J. (2016). Citizen science at universities: Trends, guidelines and recommendations. LERU. <https://www.leru.org/publications/citizen-science-at-universities-trends-guidelines-and-recommendations>

I. Guidelines for researchers conducting citizen science projects

Researchers planning and conducting citizen science projects at universities and research institutions can use the following guidelines to ensure high-quality results and effective collaboration with citizens participating in the research.

1. Recruitment and community management

- a) **Planning activities.** When planning a CS project, it is important to include extensive outreach activities and community management to ensure an adequate number and diversity of study participants.
- b) **Ensuring diversity.** Care should be taken to ensure the diversity of the recruited cohort, and in particular to avoid biases regarding gender, race or age, which could be detrimental to the study results.
- c) **Maintaining engagement.** Transforming participants' initial curiosity into long-term engagement is a task requiring effort and skills in human-computer interaction, scientific communication and supporting the community gathered around a given research problem.

2. Quality, impact and influence of research

- a) **Defining the objective.** The objective and impact of the research must be clearly defined at the beginning of the project, and progress towards achieving these goals must be tracked and regularly communicated to participants via various channels (such as scientific publications or social media).

- b) **Expanded set of metrics.** The quality and impact of a CS project should be measured using a range of metrics, including altmetrics, in accordance with open science standards and declarations such as [DORA](#) (*The San Francisco Declaration on Research Assessment*). The use of more popular forms of communicating research results should be encouraged – from traditional media to social media and blogs.
- c) **Communication.** Ambiguous statements regarding the actual assessment of the impact and significance of research in a given field should be avoided. It is important to ensure transparent, reliable and audience-appropriate communication of research findings. This includes avoiding vague, overly general or over-interpreted statements regarding the impact and significance of the research. It is recommended to use precise scientific language and to clearly distinguish facts from interpretations and hypotheses.

3. Participants' learning and creativity

- a) **Skills development.** Where possible, research should be designed to encourage all participants to fully engage their skills and creativity, develop their competences and sense of responsibility within the project, and enhance their scientific knowledge.
- b) **Non-formal learning.** When planning and participating in CS projects, universities should emphasise opportunities for non-formal learning for citizens. This may include workshops, webinars, group discussions or educational materials available online, which support the development of participants' knowledge and skills in an accessible and engaging way.

4. Openness and transparency

- a) **Open science standards.** Researchers should apply open science standards in line with institutional policies, including planning to publish research results in open access, applying open data standards, using open-source software, and ensuring full transparency of research methods.
- b) **Transparency builds trust.** Greater transparency in CS projects builds public trust, with potential positive effects on the recruitment and retention of those involved in the project. Open access to research results is also important for ethical reasons, as it democratises access to scientific knowledge.

5. Research organisation and sustainable development

- a) **Structures and codes of conduct.** CS projects require appropriate organisational and oversight structures that represent all stakeholders. This approach allows for different perspectives to be taken into account, increases the transparency of decision-making, and fosters trust among project participants. It is essential to apply codified codes of conduct that ensure respectful communication.
- b) **Long-term data storage.** A long-term research data management plan is essential, including a preservation plan that will enable open access to research results. The plan should be retained (e.g. in university repositories) even after the project has ended.
- c) **Support tools.** Open tools that facilitate data analysis should be used, and source code written for research purposes should be publicly available so that citizens can analyse the data themselves and share their findings. Open tools and software (open source) increase the transparency of research, enable its verification and support the reuse of solutions by other researchers and participants, which fosters the development of collaboration and innovation.

6. Recognition and remuneration

- a) **Co-authorship and satisfaction.** Citizens' participation in research should be appropriately recognised and rewarded – not necessarily financially. This could, for example, involve acknowledging co-authorship in publications and using the [CRediT](#) system to indicate contributors' input to research findings. Where possible, it is worth using, for example, incentive awards or other forms of recognition (such as certificates, diplomas, badges). Participation in research projects can also be a source of satisfaction stemming from a sense of agency and having an impact on reality.
- b) **Criteria for co-authorship by research groups.** Group co-authorship (e.g. naming a group of citizens as an author) is recommended when the group expresses a desire for authorship and its contribution was essential to the project's success (e.g. data collection). In such cases, the criteria for awarding co-authorship should be clearly defined and the rules for recognising the contributions of all participants should be communicated transparently.
- c) **Gamification.** Points systems or team rankings can be a good motivator for the community, particularly for younger generations. Such mechanisms can increase participant engagement, encourage regular participation, and reinforce a sense of achievement and competition within the project.

7. Ethical and legal issues

- a) **Terms of participation.** Clear terms of participation in research should be defined, in line with open science requirements and privacy policy.
- b) **Data privacy.** Where necessary, citizens involved in the research should retain control over the personal data they have shared, even after the project has ended. In projects using personal data collected via personal devices (e.g. smartwatches, apps installed on phones), a careful balance must be struck between data openness and privacy protection.
- c) **Intellectual Property Rights (IPR).** Participants retain intellectual property rights to copyright-protected works they have created. It is recommended to conclude transparent copyright agreements and to strive to share rights or financial and educational benefits with citizens. It should also be noted that legal regulations concerning research data (including raw data) vary from country to country; therefore, the rules for their collection, storage and sharing should be clearly defined at the beginning of the project in accordance with applicable legislation.
- d) **Licensing of research data.** Unlicensed data does not comply with the FAIR principles (*Findable, Accessible, Interoperable, Reusable*) – these principles state that data should be findable (easy to locate), accessible (with a clearly defined method of access), interoperable (capable of being combined and used in different systems) and reusable (reusable by others under specified conditions). The choice of an appropriate licence should take into account the scope of access, the possibility of reusing the data, and the protection of the rights and interests of all project participants. It is recommended to choose licences such as [the Creative Commons Attribution 4.0 International License \(CC BY 4.0\)](#).

II. Recommendations for universities and research institutions

In Poland's [National Science Policy](#) citizen science has been defined as the third element of open science, contributing to a better understanding of science among the public and increasing citizens' trust in research results (p. 13). Universities and other research institutions should actively support citizen science. To this end, they may use the following guidelines, which support the effective implementation and development of citizen science initiatives.

1. Recognition of CS methodology

- a) **Recognition of methods.** Citizen science should be recognised as a research method on a par with others. It is also important to promote awareness within academic and institutional circles regarding the value, reliability and potential of CS methods, as well as incorporating them into research evaluation and project funding processes. It should be noted that international organisations and scientific associations are placing growing emphasis on the assessment of the impact of research on society, which further strengthens the role of citizen science methods within the scientific system.
- b) **Non-scientific benefits.** The social and educational benefits of involving citizens in scientific research should be recognised. Additional benefits include increasing the university's engagement with and impact on society, as well as strengthening the role of society in the research process through its active participation and co-creation of knowledge. Citizen science inspires the formulation of new research questions that address societal needs and encourages the youngest citizens to engage with science, showcasing its appealing and practical side.

2. Support infrastructure

- a) **Single Point of Contact (SPOC).** Where possible, consideration should be given to establishing a single, publicly accessible point of contact for CS within the university. This role could be fulfilled by the academic library, working actively with academic staff. Institutions where a SPOC is already in place may plan to develop it into a BESPOC (*Broad Engagement in Science-Point of Contact*).
- b) **Role of the contact point.** The SPOC offers advice on: designing CS activities, seeking funding, recruiting and retaining volunteers, preparing communication and promotional strategies, and knowledge regarding applications and technical solutions used for data collection.
- c) **Technical infrastructure.** Universities should provide secure data storage, software and data collection equipment necessary for researchers to use in training and project promotion. It is also essential to ensure adequate accessibility and technical support so that participants can make effective use of these resources.
- d) **Network maintenance.** Universities should commit to the long-term maintenance of infrastructure, including data repositories. Repositories such as the [University of Warsaw Research Data Repository](#) can support CS by providing open access to research data. Platforms such as the [European Citizen Science Platform](#) or the [Registry of Research Data Repositories](#) provide valuable information and resources for those interested in participating in citizen science projects.

3. Skills development and training

- a) **Raising awareness.** Researchers' awareness of the factors that enhance the effectiveness of citizen science projects should be broadened, including methods for managing volunteer communities, teaching skills, the application of open science standards, and an understanding of social and gender diversity issues. Regular training in CS organised for researchers, library staff and university administrators is of great importance.
- b) **Key support roles.** Particular emphasis should be placed on systematically strengthening the capacity and developing the competencies of specific groups of specialists who support researchers in citizen science projects, which are key to the effective design and implementation of such initiatives.

These include:

- **CS Steward.** A person who advises during the project planning stage, supports the definition of objectives and scope of activities, assists in identifying and analysing target groups and the design of engaging forms of participation. They possess knowledge of UX (user experience), ensuring the accessibility, usability and appeal of the tools and processes used in the project. They also support the selection of appropriate research methods and tools and help ensure that activities comply with the principles of open science.
 - **CS Champion.** A person who assists in the direct promotion and dissemination of the project among various audiences. They are involved in building the initiative's visibility, developing cooperation with institutions, and initiating information and outreach activities. They support participant recruitment, ensure a consistent message, and adapt communication to the needs of different social groups. Good venues for promoting projects involving citizen science include, for example, libraries and museums.
 - **Community Manager.** A person responsible for ongoing engagement with the community of volunteers and project participants. They coordinate communication, moderate interactions, respond to emerging issues, and support the building of engagement and long-term relationships. They ensure that participants feel valued, are kept informed about the project's progress and results, and that their contribution is visible and duly recognised.
- c) **Libraries as platforms.** It is advised to utilise the potential of libraries (both academic and public) to become platforms for reaching people who may be interested in participating in research. Libraries contribute to the democratisation of knowledge, the advancement of research and the popularisation of science within society, while librarians possess the necessary skills to support activities related to CS and open science. It is recommended that libraries keep up to date with the latest developments in the field of citizen science.
- d) **International cooperation.** It is recommended to participate in existing networks and initiatives or to create new ones, which enables access to contacts and resources and makes them available to researchers. It is also worth developing national and international cooperation, thereby increasing the chances of participating in future funding opportunities.

4. Evaluation and communication

- a) **Adaptation of evaluation systems.** Research assessment systems should incorporate metrics describing successful CS projects in terms of measurable indicators of citizen participation. Evaluation tools should also be developed and implemented to enable the systematic monitoring of the long-term impact of citizen science projects.
- b) **Communication.** Universities should provide a communication channel through which researchers and citizens can exchange knowledge about projects and opportunities to recruit participants for future research. Effective communication can be a way of bridging the gap between research institutions and citizens and increasing trust in science.

III. Recommendations for research funding organisations

Public and private organisations that fund scientific research can use the following recommendations to design programmes that incorporate CS projects and support activities aimed at fostering the development of citizen science initiatives.

1. **Funding.** When evaluating CS projects, adequate funding should be provided for community management, infrastructure development (e.g. communication platforms) and other non-research functions characteristic of CS (e.g. enhancing scientific literacy in society, engaging citizens in decision-making processes, or building a sense of community spirit). It is worth supporting long-term funding contingent on the project's progress, which will enable its maintenance and further improvement.
2. **Support for facilitation.** Funding should be provided to cover both the research component and activities related to facilitating citizens and collaborating specialists, including training, communication tools and dedicated staff resources to support building and maintaining participant engagement.
3. **Combining roles.** It is recommended to appoint a *CS Community Manager*, where possible, working in collaboration with partner organisations or non-governmental organisations (NGOs). This role could be created by combining the functions performed by managers from various projects, thereby establishing a single role responsible for overseeing communication across multiple CS projects.
4. **Promoting OS.** It is essential to promote open science practices in CS projects through requirements for open access publishing, the use of open data standards and the use of open source software. These measures should be supported by training and guidelines to facilitate their practical implementation in ongoing projects.
5. **Legal and ethical criteria.** Clear legal and ethical criteria regarding data privacy must be established in accordance with applicable law. Particular attention should be paid to the protection of participants' personal data and the transparency of the rules governing its processing. Appropriate regulations and documents must be drawn up setting out the rules for participation, data processing and the responsibilities of the parties involved in the project.
6. **Success indicators.** When supporting CS projects, a wide range of success parameters should be recognised and promoted, without limiting oneself solely to traditional measures of scientific quality. For example, in addition to the number of publications, it is worth considering the level of participant engagement, the quality of collaboration between researchers and the community, the sustainability of volunteer involvement, and the actual impact of the project on society and the enhancement of participants' scientific competencies.
7. **Adaptation of templates.** Standardised and transparent quality assessment criteria for CS projects should be developed, and templates within grant applications should be created that are tailored to the description of CS projects. This approach will facilitate the evaluation of projects and enhance the consistency and comparability of submitted applications, as well as simplify the preparation of documents by beneficiaries.

IV. Recommendations for public authorities

Policy-making bodies (at local, regional, national or international level) can use the following recommendations to support the development of policies and instruments that foster the growth of citizen science.

1. **Credibility assessment.** Commissioning independent research to assess the credibility of citizen science, and ensuring that projects use evidence-based methodologies and comply with recognised standards and good scientific practice, including the principles of open science through the promotion of open publications, data and tools.

2. **Development of guidelines.** Development of clear guidelines on the legal, ethical, commercial and privacy issues that arise in projects involving citizen science. These guidelines should be regularly updated in response to legal and technological changes, consulted with key stakeholders (researchers, participants, non-governmental organisations), and supplemented with supporting materials and examples of good practice.
3. **Sustainability of projects.** Encouraging long-term collaboration between universities and research institutions and non-governmental organisations (NGOs) to ensure the sustainability of the results of citizen science. It is also important to establish and maintain long-term infrastructure, fund activities after projects have ended, and strengthen cooperation networks and cross-sectoral partnerships.
4. **Promotion of projects.** Funding the creation of national platforms (hubs) gathering information on ongoing CS projects, as well as supporting information campaigns to raise public awareness, disseminating good practices and achievements of CS projects, and enhancing their visibility at national and international levels.
5. **Capacity building.** Supporting the development of thematic training programmes and educational initiatives for researchers, institutions and participants, ensuring free and universal access for all interested parties.

Further reading: other useful resources on citizen science

- 1) European Citizen Science Platform – <https://citizenscience.eu/>
- 2) European Citizen Science Association (ECSA) – <https://www.ecsa.ngo/>
- 3) ECSA Conference (biennial) – <https://www.ecsa.ngo/conferences/>
- 4) Association for Advancing Participatory Sciences (AAPS; formerly the Citizen Science Association) – <https://participatorysciences.org/resources/>
- 5) The journal “Citizen Science. Theory and Practice” (published by AAPS) – <https://theoryandpractice.citizenscienceassociation.org/>
- 6) The Citizen Science Toolkit developed by the Sorbonne University – <https://sorbonne.tv/citizen-science-toolkit>
- 7) Citizen CyberLab at the University of Geneva <https://iss.unige.ch/research/application-domains/citizen-science/>
- 8) Swiss Citizen Science checklist – <https://www.citizenscience.uzh.ch/en/services/guidelines/checklist.html>
- 9) Citizen Science Toolkit developed by the California Academy of Sciences – <https://www.calacademy.org/educators/citizen-science-toolkit>
- 10) SciStarter: an American organisation and international platform serving as a link between scientists and citizens – <https://scistarter.org/>
- 11) Slovenian citizen science platform – <https://citizenscience.si/en/>
- 12) German citizen science platform – <https://www.mitforschen.org/>
- 13) The Australian Citizen Science Association (ACSA) – <https://citizenscience.org.au/>
- 14) Citizen Science Asia (CSA) – <https://citizenscience.asia/>

CRedit author statement

Zu Sendor: conceptualisation, data curation, writing — preparation of the original draft

Anna Książczak-Gronowska: writing — review & editing, validation

Karolina Minch — review and editing

Lilianna Nalewajska — review and editing

Zuza Wiorogórska — supervision

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