PROCEEDINGS OF SCIENCE

17 Criteria for Transformative Citizen Science

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The Hans Sauer Foundation is supporting transformative citizen science projects on societal aspects of sustainability. These receive marginal support, while at the same time offering innovative collaborative or co-creative approaches to social transformation. Based on the experience with the funding program, the foundation developed 17 criteria for transformative citizen science. A first draft was discussed at the Austrian Citizen Science Conference 2023 in Linz. The revised version is presented in this article. The criteria can offer orientation for actors who want to initiate a citizen science project that aims to generate social-ecological impact, and assistance to institutions developing (funding) programs to support such projects. This article is an invitation to the citizen science community to adapt and further develop the criteria for their contexts.

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1. Introduction

The foundation aims to promote societal benefits by initiating and accompanying transformation processes. It seeks to bring together academics and practitioners to find sustainable solutions.

The foundation's funding program supports transformative citizen science projects on societal aspects of sustainability. These offer innovative approaches to social transformation, such as collecting data and building action networks to help address local social-ecological problems. They often strive for a collaborative or co-creative approach that enables genuine participation and exchange of knowledge and skills between science and society, beyond data collection [1][2]. While designing the funding program, the foundation tried to answer questions such as: What defines transformative citizen science projects? Which criteria distinguish them from contributive citizen science projects? To this end, the foundation has developed 17 criteria for transformative citizen science projects [3] to examine project proposals and identify those that are likely to have a high impact.

2. Process and methods

The proposal for the transformative citizen science projects criteria is based on literature research and the Hans Sauer Foundation's experience with its funding program. The first draft primarily refers to the "10 Swiss Citizen Science Principles" [4] and further relevant literature [5][6][7]. Included are also findings from field reports by other citizen science projects in the context of events by the platform "Bürger schaffen Wissen" Germany. The criteria were intensively discussed and iterated several times together with experts such as Prof. Dr. Melanie Jaeger-Erben, Dr. Justus Henke and Dr. Julia Gantenberg. The foundation presented and discussed the first draft of the criteria in a 'cabin talk' session at the Austrian Citizen Science Conference 2023. Some of the comments made during the conference session by funders and stakeholders planning or implementing citizen science projects have already been incorporated into the version presented here. Open questions and points of discussion are taken up in the discussion.

3. 17 Criteria for transformative citizen science

In the following, the 17 criteria are presented, each with a short description text and categorized into five areas.

FRAMEWORK

1. Plausible project budget and schedule
The project has set itself a feasible framework. This requires a plausible budget and timetable.

2. Feasibility
The feasibility is supported beyond the project plan, for example, by existing previous experience in the project team or additional funding.

SUSTAINABILITY AND TRANSFORMATION POTENTIAL

3. Social-ecological impact
The project aims to generate social-ecological impact, e.g., through addressing local sustainability issues. This is also reflected in a sustainable project design, e.g., regarding mobility or event organisation.

4. Impact level
The project aims to have an impact on one or more levels such as behaviours and skills, develop new infrastructure solutions or inform political decision-making.

5. Consolidation
The project is working on lasting results by creating local structures such as spaces or networks or preparing transfer possibilities.

6. Different types of knowledge
The project recognizes and draws on different types of knowledge, such as everyday knowledge and situational knowledge.

7. Innovativeness
The project strives for innovative collaborations, formats, insights or brings them into new contexts.

PARTICIPATION AND COOPERATION CONCEPT

8. Degree of participation
The project strives for the highest possible degree of participation of citizen scientists. They are involved in some (collaborative) or all (co-creative) phases of the research process.

9. Empowerment and powersharing
The project design aims to enable participants to conduct research or to carry out participatory research processes. Demand-oriented trainings promote joint learning processes and competence building.

10. Transparent internal communication and responsibilities
The project pays attention to transparent communication between all project participants, especially citizen scientists and professional researchers, e.g., by communicating expectations and interests.

11. Project accessibility
The project design is explicitly low threshold in terms of access to the process and enables structurally and otherwise disadvantaged people to participate, e.g., by offering flexible participation options, paying for travel or providing barrier-free access.

12. Appreciation and recognition
The project strives to appreciate and recognise the different contributions of all those involved, e.g., through financial remuneration or co-authorship.

13. Cooperation mode
The project involves relevant (target) groups, important multipliers, and partner organizations in a cooperation mode suitable for the research topic, such as a consortium of science and practice.

MONITORING

14. Reflection and evaluation
The project reflects on and evaluates the process and its results. The participants' experiences and feedback are recorded and evaluated; the quality, form of participation and local relevance of the process and its outcomes are reflected upon.

15. Data quality and security
The project aims for high data quality and data security. Data is collected and processed by applicable data protection guidelines.

DISSEMINATION AND EXTERNAL COMMUNICATION

16. Visibility
The project communicates intensely with external stakeholders, thus contributing to the visibility of the project and its results. Target groups and appropriate media are selected and multipliers recruited.

17. Data accessibility
As far as possible, the project strives for a high degree of data accessibility such as publication in a free open-access format and the use of appropriate and barrier-free language.

4. Discussion and outlook

The criteria can offer orientation for actors who want to initiate a citizen science project that aims to generate social-ecological impact, and assistance to institutions developing (funding) programs to support such projects. They are not to be understood as exhaustive but can rather be further developed and adapted to one's own needs and project contexts. It is not assumed that all criteria are considered equally – they should rather serve as anchor points where the focus can be placed on selected criteria, depending on the project.

Reactions at the Austrian Citizen Science Conference 2023 showed broad interest and approval. Two frequent questions were about the ranking of the criteria among themselves and their measurability. The discussion showed that some citizen science actors attribute more relevance to the "03 social-ecological impact" and the "04 impact level" than to the "07 innovativeness" of the project and the scientific excellence of the research. So far, there is no strict weighting of the criteria. A discrete ranking of the criteria can only be understood by their order within the

categories, with the criteria listed first being considered more relevant. However, this weighting of the criteria according to the order within the categories does not work for every category nor allows any conclusions to be drawn across categories. Furthermore, the ranking in the different project contexts can differ greatly. For this reason, we do not consider it useful to give a general ranking of the criteria.

Regarding the question of measurability of the criteria, it should be noted that at present the criteria can be understood more as a framework for orientation, without a systematic set of indicators for the analytical assessment of the degree of compliance. At the Hans Sauer Foundation, we use 4-point Likert scales (agree – somewhat agree – somewhat disagree – disagree) for some of the criteria, while we deliberately leave others open. In both cases, however, we understand the criteria as an orientation and basis for qualitative notes, not as a hard evaluation and implementation grid.

Over the next funding periods, we continue working on and with the criteria. We would like to explore in depth the question of which funding conditions and prerequisites transformative citizen science projects need, to contribute to a needs-based funding landscape for social-ecological transformation. Therefore, we want to expand the exchange with the citizen science community and cordially invite everyone to be part of the process.

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