

## Citizen science communication and engagement: a growing concern for researchers and practitioners

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### Abstract

Anniversaries provide great opportunities to celebrate achievements, to look into the future, and to do some self-reflection. I have the honour of doing so in a specific field of science communication that I'm familiar with: the field of citizen science communication, especially with a European focus. I hope this commentary prompts others who are experts in their regions of the world to also reflect on the past and the future for this growing field.

### Keywords

Citizen science; History of public communication of science; Science communication: theory and models

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One can say that citizen science has truly developed into its own field of research and practice, thanks to the efforts of many active people, institutions, movements and lobbying groups with diverse roles, expertise and skills, but also interests. We have witnessed many great achievements within the field since the turn of the century including:

- The development of capacity building through citizen science associations in Europe, the U.S., Asia, Australia and New Zealand, Africa, and South America, just recently.
- National platforms and networks such as the eu-citizen.science,<sup>1</sup> Österreich forscht, Schweiz forscht, Bürger schaffen Wissen, Denmark etc., with national strategies e.g. White Paper Citizen Science Strategy 2030 for Germany.<sup>2</sup>
- Conferences for knowledge exchange and sharing best practice (e.g., the bi-annual conference in Europe and Australia, the conference in U.S., the annual conference in Austria, and the latest conference additions in Denmark and Switzerland).

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<sup>1</sup><https://eu-citizen.science>.

<sup>2</sup><https://zenodo.org/record/7117771#.Y2FRq-SZM2w>.

- Other great online networking opportunities to come together with communities, scientific outputs and outcomes.

Citizen science data is now acknowledged in the recommendations for electronic information systems of the Aarhus Convention for environmental monitoring, and form part of other policy relevant monitoring schemes. Citizen science is on the political agenda in funding schemes, and also strategic policy documents [see, for example, Hecker, Wicke, Haklay & Bonn, 2019], and is integrated in academic teaching at UCL London, BOKU Vienna and many other places.

After patting ourselves on the back for what we have achieved, it is important to also take a self-critical look at where we need to focus our future efforts. There are calls for more in-depth participation and co-creation in citizen science. I don't want to talk here about the value judgements on other forms of engagement in citizen science such as distributed intelligence, crowdsourcing or contributory activities of citizen scientists — which can be just the thing that citizen scientists *want* to do. The main point that often is overlooked, ignored or simply not (sufficiently) addressed concerns questions of power relations, of identity, and of learning in citizen science that might transform scientific and societal systems.

But before we dive into more detailed questions, let's remember this: we are able to do the research we do because we live within democratic systems that value science, and research is high on political agendas. In these countries, governments spend a considerable amount of their GDP on science and rely on scientific data, analysis and expertise for policy decision-making (although maybe not always to the extent that researchers would hope for) — which means the basis for a free and independent science system lies in our democracies. Recent events, like the Russian invasion of Ukraine in February 2022 for example, make us realise that this foundation is not a given, but one that needs defending. Science, as part of society, has a duty to support democratic systems, which are at its very source.

Citizen science has a lot to offer when it comes to transforming scientific and social systems. While engaging with different stakeholders, engaged communities, non-government organisations, and scientists, citizen science project teams have opportunities to create (metaphoric) spaces to discuss, to communicate and build trust through interaction. We can contribute to mutual understandings about different forms of knowledge, from scientific to local to everyday to so-far tacit knowledge, that might all be relevant for addressing the challenges this planet faces. These forms of citizen science communication and engagement need openness from all involved, the ability to accommodate the roles that all partners involved in a citizen science activity take, and commitment to the responsibilities and tasks that come with these roles [Hecker & Taddicken, 2022; Salmon, Rammell, Emeny & Hartley, 2021]. At the same time, acting together in citizen science projects allows researchers to rethink who they are in a scientific endeavour; not only what citizen scientists might be able to learn [Bela et al., 2016; Pandya & Dibner, 2018] but also what we can and have to learn. When we call for more co-creation, are we ready to share power? This is ultimately a consequence of co-creating. How much power are we willing to share?

Some fear that academic freedom is at risk in situations where too much power sharing comes into play. Academic freedom encompasses the freedom of research,

teaching and learning. It is a fundamental right, and it is part of the constitution in countries such as Germany, Austria and Switzerland. Research, teaching and learning need to take place independently from the state, the church and the economy. And without paternalism within science. There are risks associated with engaging other sectors of society and inviting non-scientific actors to have influence on the research agenda. But also so much to gain, including access to expertise and knowledge that scientists and scientific institutions could never obtain on their own. The results of our knowledge quests (every research endeavor is a knowledge quest at its heart) might become, not only more relevant but also profound, by including the voices of those from outside academia. We have a unique opportunity to reconnect with our co-citizens, gain a better understanding of what is relevant to them. For that, we might need to acquire skills we did not need in non-engaged activities: communication skills to interact outside academia, negotiation skills to refine our roles and aims, facilitation skills to work collaboratively with citizen scientists and manage co-creation processes — and most importantly: listening skills to re-learn to listen deeply. To listen deeply means to cross the limits of our own perspective to truly acknowledge our communication and interaction partners and take their perspective before getting into discussions and negotiations.

Our lives have become a big rush, and even more intensely busy during the COVID-19 pandemic. Many of us struggle with multiple obligations and challenges. So, let's take the time to listen to each other when we are working together towards a common project aim, a citizen science activity to achieve a common goal. Researchers can go one step further and reflect on what they learn through citizen science, and how they interact with citizen scientists and others involved in these projects. Individuals, institutions and the science system need to engage in these reflections. What are key points for learning? Where are challenges and barriers to overcome? This will not be easy. Eventually, however, this is what will help the field to mature, with more expertise and activities grounded in new forms of truly *common* knowledge and trust.

So, what is next for citizen science communication? More projects and activities will likely find themselves united under the umbrella of what is called citizen science. Without losing its diversity as an interdisciplinary and transdisciplinary approach that encompasses topics in all fields of academia, those engaged in citizen science activities may gather in larger groups related to relevant concepts, such as the Sustainable Development Goals (SDG), and activities may focus on evaluating the impact on those internationally agreed important goals [Fritz et al., 2019; Moczek, Voigt-Heucke, Mortega, Cartas & Knobloch, 2021].

While the concept of the SDG might seem abstract for many community sectors, another concept is growing in relevance because it offers a more straightforward communication and engagement approach: the concept of planetary health [Whitmee et al., 2015]. This offers a holistic way to connect the health of our planet with human health and well-being because it is based on the understanding that human health and human civilization depend on thriving natural systems and the sustainable stewardship of those natural systems. This demands knowledge and commitment from those working in the health and environmental science fields, and inter- and transdisciplinary efforts from all research fields, societal and political actors. Citizen science has a lot to contribute to improving the planet's

health, but especially it offers knowledge and expertise on how to engage people in activities that promote and support social and environmental action between different stakeholders.

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Susanne Hecker researches citizen science at the interface between science, society and politics and the role of communication in participative research projects. She has been instrumental in building the international citizen science network and is currently First Chair of the European Citizen Science Association (ECSA). She is first editor of the book “Citizen Science — Innovation in Open Science, Society and Policy” published by UCL Press in 2018. Since 2021, Susanne Hecker is head of the science programme Society & Nature at the Museum für Naturkunde, Berlin, Germany.



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