

Change – The transformative power of citizen science

Science for change tools: the new methodological toolbox to create zero-waste collaborative workshops

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Abstract

Collaborative practices are more common every day in contexts where citizens of different backgrounds need to be involved in science and decision-making processes. These practices often translate into co-creation workshops, in which we find two main issues to address. First, the lack of an expert to guide the sessions and second, the quantity of consumable material that is used in these activities. In order to address these two issues, we have carried out an experimental study in 22 citizen science projects that has brought us to develop a sustainable toolbox for collaboration. This paper summarizes the experience of presenting and testing the toolbox with citizen science experts at the ECSA Conference 2024.

Keywords: co-design, collaboration, methodology, participation, sustainability, toolkit, citizen science.

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Introduction

In the interdisciplinary world we live in, collaboration is on the rise. Design thinking, co-creation and co-design practices represent an opportunity for constant improvement and innovation. They promote joint decision-making, the balance of power among participants, and the use of multidisciplinary knowledge to achieve a specific goal (Knight et al. 2020). Characteristics that are very needed in citizen science projects.

These projects are very common in academic contexts (Guasch et al. 2020). Co-creation is used to carry out group projects, add diverse knowledge, detect common challenges, find synergies, experiment

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together, analyze, summarize, and many other processes that serve both to transmit, understand and assimilate knowledge.

We can also find collaborative practices for citizen science both in the private and in the public sectors, where these types of activities are used to reach and listen to citizens (Ansell and Torfing 2021; Guasch et al. 2019). Both companies and institutions often need to know the needs and opinions of the general public. This is why co-production sessions are usually organized to find strategies to identify and face social, environmental and health challenges.

Finally, on many occasions it is necessary to involve all the aforementioned audiences and others, such as the media, to reach consensus on issues that affect them all (Magalhães et al. 2022; Matozinhos et al. 2022).

In the context of all these activities, we have observed two main problems. On the one hand, the lack of training in session facilitation and moderation by the people responsible for the workshops. On the other hand, a lot of consumable material is used for each session. In order to address these two issues, we have developed and are now testing a new methodological toolbox: Science For Change Tools (SFC Tools). This is the first time that the logic and the development process behind the toolbox is presented.

Methods

The workshop carried out during the ECSA Conference 2024 consisted of four main parts: (1) an icebreaker, (2) a presentation about the toolbox, (3) a hands-on exercise, and (4) a questionnaire.

For the first part, the icebreaker, the room facilitator asked four questions to the participants, which they were asked to answer using the materials they had on the table (Figure 1). They were asked to choose the color that best suited their answer: green for totally agree, yellow for partially agree, orange for partially disagree and red for totally disagree. The questions were related to their experience with collaborative workshops.

These questions brought us to the second part of the session: the presentation of the toolbox. In this part, we introduced the four ideas on which the toolbox is based: the idea of a puzzle, the idea of something



Figure 1. SFC Tools hexagonal shapes and participants at the table.

that can grow in all directions, the hexagonal shape, and the sticky note. We also talked about the philosophy of thinking with our hands so that everything that is spoken in a workshop remains written down. After this, we introduced the five prototypes that we have developed so far and the different arrangements that can be done using the hexagonal shapes.

Then, we moved on to the hands-on exercise. This consisted of presenting a case study and working on the five phases of the design thinking process: (1) empathize, (2) define, (3) ideate, (4) prototype, and (5) test. In the phase of empathizing, participants were asked to select a topic and a public within the case study, and build a bridge of needs between these two. In the phase of defining, they were asked to group the needs by similarity and put a title to each group of needs. In the ideation phase, they were asked to propose solutions around the groups of needs. In the prototyping phase they were asked to choose one of the solutions they proposed and answer the questions: What? Why? Who? Where? When? How? Finally, the testing phase would be done after the end of the workshop.

To finish the session, we did an online questionnaire using the Slido platform. We asked participants the following questions: (1) Can you share your first impressions of the toolkit with us? (2) How likely is it that you would use the kit in your professional and/or academic environment? (3) On what occasions and for what purposes would you use it? (4) What material would you produce the pieces from? (5) How much would you pay for the whole pack? (6) How would you describe SFC Tools in a word?

Results

In the icebreaker, we discovered that participants were not very familiar with designing collaborative workshops, but they were quite familiar with facilitating them. They were very familiar with participating in them and it was very likely that they would only think of post-its when envisioning these types of activities. About half of them had thought about what happens to the materials after the sessions, and the other half had never thought about that.



Figure 2. Resulting map of the hands-on exercise of one group.

In the hands-on exercise (Figure 2) participants came up with many needs and solutions for the topics and publics within the case study. Since the goal of this workshop was having participants experiment with the toolkit, we are not deepening the content of their proposals.

The actual results of the session for us were the answers given in the questionnaire, which are displayed below:

(1) Can you share your first impressions of the toolkit with us?

- Love the inclusive design.
- I like it a lot. Once you know the rationale behind it, even more.
- Love the inclusivity of the colors/patterns. More sustainable/biobased materials would be better.
- Cool - need to work a bit more to understand better.
- Fun.
- Love the shapes, colors, symbols!
- Fascinating.
- I love it!
- Playful
- Awesome!

(2) How likely is it that you would use the kit in your professional and/or academic environment?

- 75% very likely.
- 13% quite likely.
- 13% neutral.

(3) On what occasions and for what purposes would you use it?

- During the next community of practice, climate assembly deliberation.
- Collaborative workshops with my team, consortium partners, in Citizen Science projects, conferences, etc.
- Workshops, but also simple meetings with my colleagues.
- Co-design a survey with participants.
- Internal planning/brainstorming, workshops with researchers or stakeholders (adults).
- Planning research group strategy.
- I don't know yet.
- For co-creation sessions, with colleagues, with kids in citizen science projects.
- Teaching at the University.

(4) What material would you produce the pieces from?

- Wood - 0%.
- Plastic - 14%.
- Other - 86%. They proposed cork and corn.

(5) How much would you pay for the whole pack?

- 43% would pay 25-50€.
- 43% would pay 50-75€.
- 14% would pay +100€.

(6) How would you describe SFC Tools in a word?

- Insightful, intuitive, inclusive, multifunctional, exciting, magic, easy, hexagons, innovative.

Conclusions

This workshop revealed new insights for the development of the physical reusable materials included in the SFC Tools methodological toolbox. On the one hand, we verified that the toolkit is well received by an audience that is very familiar with collaborative tools and activities in the field of citizen science. On the other hand, we discovered that the material of the hexagons was criticized and new options were given to develop the final ones.

Next steps include the testing of new materials for the hexagons, and the development of the digital part of the toolkit to complement them.

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