

Empowering youth in citizen science and citizen social science

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Youth empowerment is a fundamental part of equitable participation in citizen science (CS) and citizen social science (CSS). Empowerment occurs through the creation of a collective, critical consciousness, but this creation requires complex structural and social considerations. During our Engaging Citizen Science Conference 2022 workshop in Aarhus, Denmark in April 2022, we collectively explored some of these considerations, specifically thinking about youth empowerment. Through the stages of planning, running, and sustaining a CS/CSS project and the question of why we should empower youth, we built important insights together into the challenges and opportunities facing citizen science practitioners.

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1. Introduction

The SEEDS project [1] and the YouCount project [2] focus on empowering youth in and through CS/CSS. We (the authors) are a team of researchers working on these projects in roles where we explore and centre youth engagement. Collectively, we want to engage youth in as many stages of the research process as possible, with a central shared goal being social inclusion. This translates to youth having agency and power to improve their terms of participation in society [3]. Therefore, we also see the importance of sharing experiences and ideas with fellow practitioners and researchers on how to empower youth. We explored this together at the Engaging Citizen Science Conference 2022, framed through the stages of planning, running, and sustaining CS/CSS projects for and with youth.

2. Methods

25 participants contributed to the 1.5-hour workshop, exploring questions about youth participation through the process outlined in Figure 1. On arrival, everyone was informed that the workshop output would be published in the conference proceedings. The warm-up activity shared perspectives on why it is necessary to empower youth through CS/CSS. These perspectives were further explored through classification under various themes and this data and corresponding analysis is presented in [4]. After warm-up, we introduced the workshop and shared theoretical perspectives and practical experiences from working with youth. Participants individually brainstormed ideas for empowering youth in the stages of Planning, Running and Sustaining a project (Figure 2) and then were randomly divided into three groups (one per stage). The three groups discussed and analyzed the input from the individual brainstorming session and then presented their findings to workshop participants.

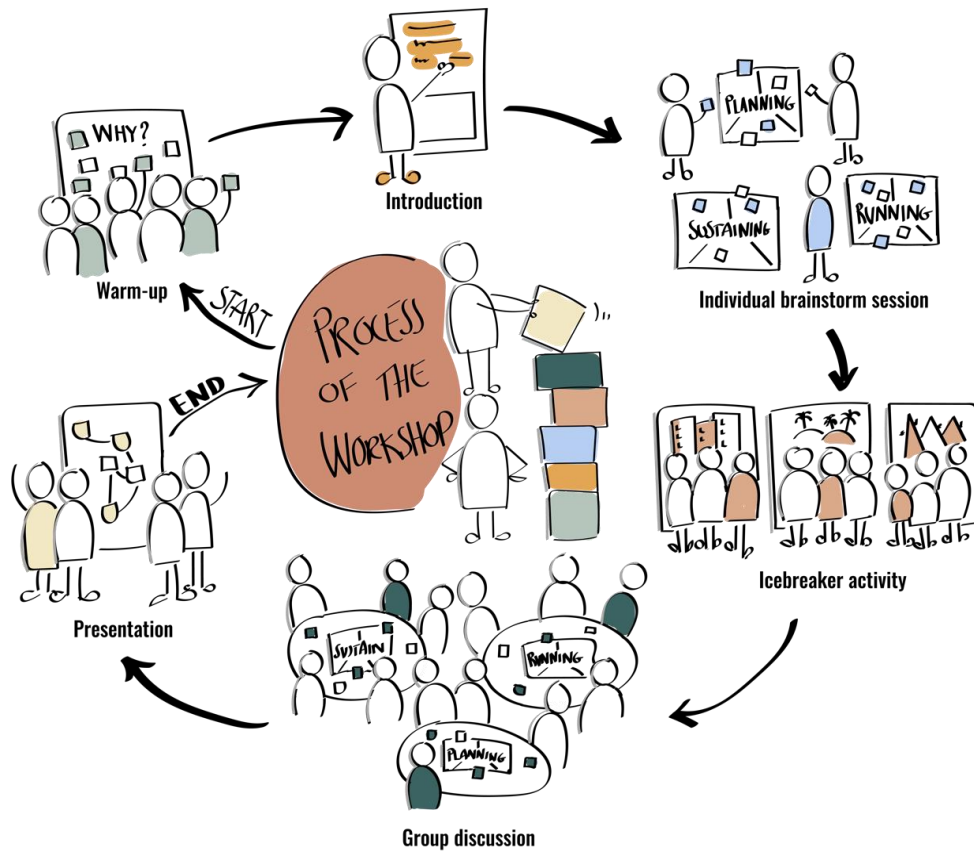


Figure 1 – A graphical representation of the workshop process



Figure 2 – A graphical representation of the stages of a CS/CSS project and the three questions that participants explored for each stage.

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3. Results

The following sections explore some of the themes discussed by participants from the four main sections of the workshop. The workshop data and analysis are available online [4].

3.1 Why should we empower the youth?

Participants started the workshop by sharing their perspectives on why we should empower youth in CS/CSS. Their answers were provided using post it notes (see Figure 3) but the full data are presented in the online repository [4]. This activity provided a rich insight into the attendees' experiences and drivers to work with youth.



Figure 3 – Participants' responses to the question: "Why should we empower youth?".

Full details available in [4].

On reading these perspectives, common themes and ideas were repeated. This was explored in further details through a data-driven classification approach, for which the data, analysis and further details are all provided in [4]. This approach was selected after initially sifting through the post-its and identifying common themes. Many of the participants identified concerns about the future as their drivers for empowering the youth, with this dominating the classification, whilst others suggested that this was an opportunity to give the youth agency to share their views. There was a small education focus, but this may reflect the fact that many CS/CSS projects cover informal and/or formal education programmes. Participants also connected the "why" to the fact that youth have valuable experience and expertise that is often ignored or omitted. This is closely linked to the answers that focus on the competences that only youth can bring with their perspectives and experiences, such as a different way of thinking, open mindedness, and creativity.

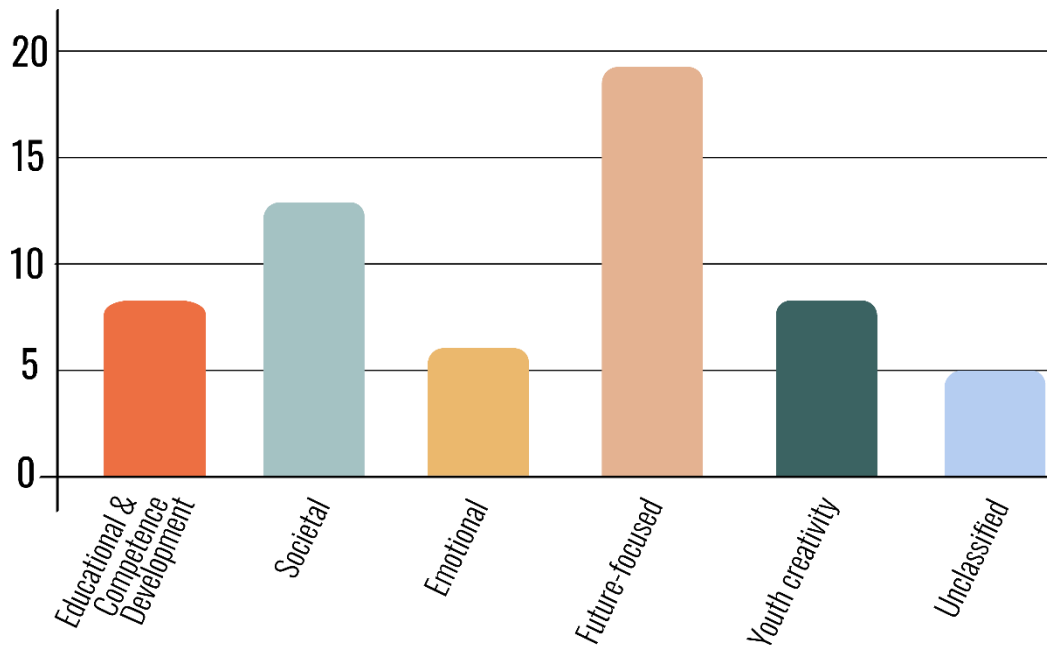


Figure 4 - A theme classification of responses to the question "Why should we empower youth?".

3.2 Planning

Seven participants discussed the aspects of empowering youth in CS/CSS through the planning processes of a project. They mapped the different inputs created from the earlier individual brainstorming session, creating three pillars mapping the ideal who/where/how in planning a CS/CSS project empowering youth: youth, gatekeepers, and administrative actors. The pillars visualized a clear connection between the who and the where, with the how covering all the themes.

The initial brainstorming session centred on youth as the key actor to engage, highlighting the importance of reaching the youth in the places they already go. The participants negotiated the possibilities of creating role models/representatives for the youth that could contribute to the planning process in this context, before moving to the role of gatekeepers in the planning processes. Parents often seem to be missing in the picture of planning, and their consent is essential when working with young people. However, the impact that parental involvement can potentially have on the willingness of the youth to participate was also explored. Educational institutions were debated both as places to meet the youth and as critical actors to include to secure time for the processes.

Trust-building and co-creation were frequently mentioned by participants throughout the workshop stages. In mapping trust-building during the planning stage, elements of investing time to get to know the youth, their relationships, and their interests, respecting personal borders, and being open to changes (both ups and downs), were heavily emphasised on the post-its. This all points towards the importance of building strong relationships with youth and other

stakeholders in CS/CSS projects. This relies on power sharing between these groups and citizen science practitioners, as well as inclusive design to ensure youth feel comfortable and empowered to contribute.

3.3 Running

During the project "Running" stage, youth can employ their knowledge in practice and co-create empirical data, engage in scientific analysis, or even help researchers to formulate the research questions. Eight participants collectively explored the questions in Figure 2 for this stage, using notes from the individual brainstorming session and building insights on top of these.

Participants emphasized that the specific composition of stakeholders highly depends on the topic and the type of citizen science project. Depending on a topic, parents might facilitate or obstruct and create constraints for youth involvement in the project. However, participants also emphasized that there are cross-cutting types of stakeholders that should be considered if we want to implement a successful and empowering project. Three main groups of stakeholders were identified: Youth (the target group), youth ambassadors (including other students and influencers) and actors that empower youth. The role of youth ambassadors can encompass mediator and influencer elements, and they have great potential to catalyse the engagement of other youth. Actors can include school staff, sport NGOs, universities and scholars, politicians, family members and others.

Participants offered many innovative ideas that might facilitate youth involvement and empowerment in the running stage. These ideas can be grouped into 5 major characteristics of how the process should be managed:

Flexibility. Make citizen science project activities a part of daily youth life.

Accepting ups and downs. Realistic expectations about dropouts and decreased motivation of youth to participate in CS/CSS means there is no pressure on youth to participate. This leaves more space for motivational rather than coercive youth participation

Engaging communication. Communication should be inclusive and interesting with targeted content and language for youth. Ask them what they want and make it relevant to them.

Respect. Empower the youth and situate them as experts so they know their voice counts. It is very important for youth to know that instead of just giving (data, time, etc.) to CS/CSS projects, they are also owning (results, respect, etc.).

Fun. Involvement should not be a burden but rather a pleasant, playful, and fun activity.

Participants identified several places where the empowerment of young people through citizen science might happen, but all emphasised that it should be a place where youth "hang out", not the researchers, and that it should be fun for the youth. This means researchers should be prepared to leave their labs and go to where the youth already gather/interact or to places that they find interesting—the same is true for social media. It is essential that the youth feel secure in these places. Researchers should also consider what incentives might attract youth. This will

directly relate to the topic, target group and results we want to achieve, but could be everything from food/beverages, financial benefits, travels or learning new skills.

3.4 Sustaining

The nine participants in the Sustaining group initially reflected on the fact that being "young" is not a constant state, which led to discussion about how long youth empowerment is sustainable within the lifetime of a given CS/CSS project. They then divided the ideas from the brainstorming session into distinct categories, which framed the subsequent discussion. Linking to the Planning and Running stages section, many themes reappeared but participants in this stage and in the other stages all agreed that it was essential to plan to sustain a CS/CSS project from the very start. Stakeholders play an important role in this, but participants highlighted the need to think more broadly about who these might be. Working with youth ambassadors/leaders who might age out of the program to stay on and mentor younger students or collaborating with established local initiatives are both frequently overlooked opportunities to ensure sustainability beyond the project lifetime. This sustainability can also be explored through infrastructure in existing platforms such as the Dutch youth advisory boards called "Kinderraad", where the youth advise their local city council.

Communication with the youth using channels they already interact with was strongly emphasised by participants. A feedback loop for findings and results is not always included in the project, but this is a crucial part to ensure the youth feel connected to the project and for them to feel like they and their work are valued. The latter points can be further supported by inviting them to help launch or organise the project round for next year. Documenting the project's commitments also supports this goal of connecting the youth to CS/CSS, by creating clear expectations that the youth can have of the project's researchers during the project and beyond. Examples of this included setting regular meetings with the youth, making some of the youth responsible for specific assignments, having an alumni platform and having a contact person available after the project. Participants identified that major limitation in this respect can be funding, but there are opportunities for researchers to work with NGOs to apply for funding to sustain projects or for finding sponsors or organisations to adopt the project in the longer term.

4. Conclusions

Empowering youth in CS/CSS is a complex process that has been actively explored within the citizen science community in various contexts. A small selection of these research questions include: youth agency [5, 6], relevant stakeholder engagement [7], youth setting the research agenda [8, 9], formal learning [10], informal learning [10-13], limited youth engagement in CSS projects [2, 14], and the quality of youth research contributions [15]. The practical experience and knowledge shared by participants of this workshop builds on this work, but there is limited space within this paper to critically engage with our results or to set them in the broader context. However, key themes reoccurring across all stages in our workshop were: 1) youth agency and centring their voices/experiences/ideas, 2) planning for success and sustaining, and 3) building trust with youth and relevant stakeholders. These themes

fundamentally translate to equitable power sharing with youth, which can be challenging for new CS/CSS project teams or for teams inexperienced in working with youth. However, the citizen science community are open to sharing best practices or learning about others' experiences, as demonstrated through this paper and other literature, conference sessions, informal discussions, etc. We encourage prospective project teams to make the most of these opportunities and use this knowledge to inform their practice. Empowering and equitably engaging youth in CS/CSS projects creates a better future for everyone, but especially for the youth who must live in it.

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