Item number	Title/reference *(academic style) name initials (year) title, publisher, volume, pages*	Name of reviewer
6	Mahajan, S., Kumar, P., Pinto, J.A., Riccetti, A., Schaaf, K., Camprodon, G., Smári, V., Passani, A. and Forino, G., 2020. A citizen science approach for enhancing public understanding of air pollution. *Sustainable Cities and Society*, *52*, p.101800.	CESIE

Review of findings / main outcome

This study paper illustrates how a more active involvement of citizen scientists in all the stages of the scientific process (from problem formulation and experimentation to results dissemination) can foster public understanding of air pollution, as well as how it can help to build a bridge between professional scientists and the local community.

The innovative aspect of the study lies in the multi-component approach deployed, that is comprised by three main ideas: *inclusion, collaboration, and reciprocation.* In detail, a more diverse community participation in citizen science activities was guaranteed, and underrepresented groups, as well as participants from different background and age groups, were encouraged to investigate air pollution-related issues and equipped in a way to enable them to conduct research.
The potential of valuing the diversity of the participants is considerable, as it can lead to a global network of citizen scientists sharing their ideas and data. Also, the study highlighted the pivotal importance of ensuring a strong interaction between communities, scientists, and policymakers, that can collaborate towards a common goal. Last but not least, the approach highlights the importance of active debating over key inputs and results dissemination so as to engage citizens in effective communication with professional scientists, which is one of the key issues for citizen science research. To this aim, a storytelling method was proposed, providing citizens with a platform where they can present their overall experience by contextualizing the story i.e., identifying the aim, understanding the need, detecting the obstacles and finding solutions. This active level of participants' engagement contributed to a higher sense of empowerment of citizens who felt that their opinions and views are heard and valued.

Eitzel et al. (2017) describe citizen science as a process in which communities and individuals are involved in designing a research question and performing scientific experiments with minimum involvement of professional scientists. Besides this, a key element of the citizen science approach is the possibility to rely on open software and open hardware, which enables to study the devices/instruments easily, make changes and share them with other people. Citizen science also verifies the approach followed by the researchers, and can test the authenticity of the work.

In the last few years, many projects based on citizen science approach proved their positive impact on citizens' understanding and awareness of the issue of air pollution.
For instance, Jiang et al. (2018) deployed online surveys to grasp the level of perception of citizen science communities and experts about environmental issues and sensing data. This project sought to integrate official environment monitoring data with data sensed informally by citizen communities and show that formally and informally sensed data complement each other.
Also, D'Hondt t al. (2013) carried out a citizen science noise monitoring project, that showed that the accuracy achieved through the noise monitoring conducted by citizens corresponded to standard noise monitoring.

This paper also comprises an overview of a co-creation approach of citizen science for air pollution awareness and for empowering citizens with knowledge for pollution mitigation, based on multiple components. Among them, it is possible to trace: (i) an *interactive online air pollution quiz*, so as to engage people in a playful and informative way; (ii) an *offline questionnaire* to get participant's views

and suggestions about the quiz content and design, and (iii) *citizen science workshops* facilitating air pollution monitoring using low-cost sensors, to encourage citizen engagement and discussion.

In the research paper, the following conclusions were drawn:

- A citizen science approach can function as a very effective method to raise awareness and strengthen individual knowledge on air pollution, and eventually reduce personal exposure;
- Community-led air quality monitoring can have a positive impact on citizen science activities, when combined with surveys and other assessment methods, and may help address important questions like road-side expose assessment and indoor exposure;
- Engaging the local communities in air quality monitoring can generate partnerships in which citizens and professional scientists will work towards a common goal;
- Feedbacks and suggestions on behalf of the participants proved that the methodology presented in the study generates critical discussions, and boost community willingness to take actions to address air pollution.

The paper ends with a wish that, in the future, a larger number of citizens can be involved in all the stages of the scientific process, and that further investigation can be carried out to find out to what extent the experiences based on citizen science approach can lead to behavioural change in their daily habits.

Quotes / very useful statements

"The question about the curbside was interesting as it made me consider the mini-scale decisions I make. Clarity and ease of the interactive quiz was great."

"*Citizen science is a great way to involve local people and acts as a bridge between the academia and the community."*

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