Increasing the effectiveness of 'next generation' citizen science programs

Healthy Waterways Strategy 2018-2028
Port Phillip & Westernport, Victoria

Melbourne Water

THE UNIVERSITY OF MELBOURNE

Strategic alignment

Regional Performance Objectives (RPOs):

- RPO 37: Participation rates in education, capacity building, incentive programs and citizen science activities have increased and enable greater levels of environmental stewardship for our waterways.

Key Research Areas:

- Liveability, community engagement and social research: Understanding, involving and supporting volunteers in waterway management to facilitate shared waterway objectives

Summary

This research project investigated the impacts of 'next generation' or digitally-mediated approaches on the experiences of citizen scientists, in particular on the ways in which they experienced: knowledge production and learning; social connections with other participants, organisers and scientists; and connection with nature. The project also investigated the ways in which citizen science programs employ digital technologies and how these technologies support (and perhaps constrain) participants' experiences. This project considered the composition of the volunteer cohort, the kinds of activities that volunteers engaged in, and the nature of their volunteer experience. Given that connection to place and social interaction are important motivations for many environmental volunteers, the study explored the new forms of connection that might be supported by these technologies, and the relationship with face-to-face and place-based volunteer experiences.

Volunteers are increasingly important to biodiversity and environmental monitoring in Australia, given the urgent need for extensive data sets to inform the management of sites and species. Within the Healthy Waterways Strategy 2018, the catchment performance objectives include increased participation rates in citizen science activities. The stated goals for citizen science activities include community education, community empowerment, the development of networks of local champions, and data generation. In the last few years, a key trend in citizen science programs has been the development and use of smartphones and internet technologies as the interface for data collection and capture, data storage, data analysis and review, and communication with organizers and other participants.

For example, Melbourne Water is currently increasing its commitment to 'next generation' digitally-mediated citizen science programs such as the Frog Census app. Whilst there has

been some research to date that considers how and to what degree ambitions for citizen science programs are being achieved, there has been relatively little research into the impacts of digitalisation on the experiences of volunteer participants in these programs. An understanding of the technologically mediated experiences of citizen scientists can inform the design of citizen science programs and their technological interfaces, as well as strategies for recruiting, supporting and retaining participants.

Recommendations:

- Develop a program to include training for citizen scientists on monitoring design and data analysis, to support their use of data in protecting their local waterways and wetlands

- Recognise the achievements of participating citizen scientists, both to acknowledge valuable contributions and to motivate others

- Inform participants about the processes of data migration into government biodiversity datasets (e.g. ALA and VBA)

- Enable the ability of citizen scientists to download audio records from the app for personal use, whether as data, memories, or sharing with others

- Enable the ability to share an audio recording from the app into social media

- Enable the ability to aggregate data from multiple users, allowing community groups to consolidate their dataset

- Enable or encourage more interaction between participants on Facebook (or other social media platforms)

What did we do?

Case Study

The research project employed a case study approach, with detailed and intensive focus on two citizen science programs in Australia that are currently using digital platforms: 1) The Frog Census, a citizen science initiative of Melbourne Water; and 2) MyBeachBirds, a citizen science initiative of Birdlife Australia focused on monitoring Hooded Plovers, an endangered bird species.

Interviews

Interviews were conducted with 37 citizen science program participants and program staff, selected to explore a diversity of citizen science experiences and perspectives. Interviewees ranged across a diversity of roles in the program, personal and professional backgrounds, experience of citizen science, degree

of engagement with the program, age and gender. In these semi-structured, in-depth interviews, participants were asked questions about the ways in which they engage in digital citizen science, particularly about their experiences with social connections, nature connection and knowledge production.

Participant observation

Participant observation of face to face events and online activities related to the two programs drew on established ethnographic techniques, and included: accompanying citizen scientists in their monitoring activities, training events, educational events and webinars, social media interactions, and group gatherings. Some activities were organised by the citizen science programs, while others were self-organised by participants in these programs.

Document analysis

Documents, online communications and other materials generated by the two programs provided data on the perspectives and approaches of institutions and organisers. The documents analysed include publicly available program field guides, handbooks, newsletters, websites and organisations' posts on open social media channels.

Thematic analysis

Data from interviews, participant observation and program documents were uploaded into nVivo, a software package used for qualitative data analysis. Data was coded using an iterative approach that identifies key themes within the data.

What did we find?

Some citizen scientists do much more than collect biodiversity data for these programs:

- they make sense of their data for their own research questions
- they use their and others' data to advocate for local environments
- there are opportunities to further support their advocacy for protecting local environments, by advising on monitoring design, and addressing access to monitoring data in the digital platform and migration into government databases

For some participants, the biodiversity records uploaded into digital platforms are not just data:

- they enjoy revisiting their recordings or sightings, to remember the encounter
- they enjoy sharing their recordings and sightings with others
- they educate and inspire others, engaging with people beyond the citizen science program in connecting to and protecting local species and environments
- there are opportunities to increase their ability to share biodiversity records to support this championing work

For some participants, monitoring as a collective endeavour is important:

- they want to experience biodiversity monitoring and data collection as a group
- they want to collate data that has been captured individually by group members
- they want to work alongside like-minded others
- there are opportunities for further supporting collective experiences through data management and interaction in digital platforms

Future direction and Knowledge gaps

A key rationale for the digitalisation of citizen science is to extend the reach of these programs to engage with more participants and make it easier/more flexible for their participation, and to help visualise results. Our research (from this study and others) suggests some key questions (and future research opportunities) for rethinking the performance of such engagement programs:

- how might we support and evaluate the range and depth of value that participants offer citizen science programs and the management of waterways (i.e. beyond the rate of participation and the number of biodiversity records submitted)?
- how might we support and evaluate the outreach performed by program participants through to non-participants (e.g. education and awareness)?
- how might we support citizen scientists in using data from these programs as evidence in advocating for their local waterways and wetlands?

How are we sharing findings?

- Gonzalez Canada, D., Lavau, S. and Williams, K. (2024) Volunteer practices in digital citizen science for biodiversity monitoring. June 2024. Melbourne Waterway Research-Practice Partnership Technical Report 24.8.
- Gonzalez Canada, D. (2022). 7 Free Apps To Help Wildlife and Monitor Biodiversity While You Travel. Matador. 22 April 2022.

For more details on the research outcomes of this project, or other projects of the MWRPP, please contact:

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