

Scaling Up: First insights into the accompanying research "Plastic Pirates - Go Europe!"

Valerie Knapp^a, Vanessa van den Bogaert^{a,*}, and Joachim Wirth^a

aRuhr University Bochum, Research on Learning and Instruction

Universitätsstraße 150, 44801 Bochum, Germany

E-mail: valerie.knapp@rub.de, vanessa.vandenbogaert@rub.de,
lehrlernforschung@rub.de

When entire school classes participate in a citizen science project, teachers and youth group leaders take on the role of facilitators. What describes this group of facilitators who demonstrate the process of scientific knowledge production using citizen science? Quantitative surveys can be a valuable methodological approach to identify the characteristics of participants in citizen science projects. The report offers insights into the research accompanying the international citizen science campaign "Plastic Pirates - Go Europe!" by presenting and discussing results of questionnaires to teachers and youth group leaders as facilitators of participation.

*Austrian Citizen Science Conference 2022 – ACSC 2022
28 - 30 June, 2022
Dornbirn, Austria*

*Speaker

© Copyright owned by the author(s) under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License (CC BY-NC-ND 4.0).

<https://pos.sissa.it/>

1. Introduction

"Plastic Pirates - Go Europe!" is a citizen science campaign in which children and young people across Europe collect and map plastic deposits in and around flowing waters. In Germany, the project had already been in existence since 2016 and under the Trio Presidency 2020-21 of Germany, Slovenia and Portugal of the EU Council and was extended to these countries. Within the project, students (usually in year 9) collect data on the input of micro- and macro-plastics via rivers and streams into the seas and oceans and record them on a digital map on the internet. Data collection takes place twice a year during designated campaign periods in spring and autumn. These set data collection periods ensure the scientific comparability of the data. The objectives of the campaign are to strengthen scientific cooperation in Europe, to promote citizens' engagement in science and to raise awareness for a conscious and sustainable approach to the environment. In addition to the implementation of the actual project in Germany, Slovenia and Portugal, the German Federal Ministry of Education and Research (BMBF) also funded an accompanying research project from 2020 to 2022. The main focus of the accompanying research was on the participants of the campaign, i.e., pupils who carried out the sampling in class or in out-of-school youth groups on also supervising teachers and youth group leaders. Methodologically, the accompanying research included a longitudinal panel survey as well as experimental studies in order to ultimately make causal relationships visible. At the time of presenting at the Austrian Citizen Science Conference in June 2022, data collection had not been completed, so only descriptive data and initial findings could be reported at that time and are therefore also subject of this report.

2. Methods and Material

The aim of the research accompanying the campaign "Plastic Pirates - Go Europe!" was to gain knowledge about the specific effects of certain characteristics of the campaign on the participants and hence to help meet the increasing demand for scientific contributions to the discourse on citizen science. Furthermore, the accompanying research put a special focus on the specific importance of teachers in the implementation and scaling up of the project. In this project, teachers and youth group leaders assume the role of facilitators who mediate and enable the standardized realization of the campaign. The objective of the accompanying research was therefore also to answer questions about the characteristics of teachers and youth group leaders that enable young people to participate in the campaign. In addition to socio-demographic and occupational data, the accompanying research therefore also assessed specific characteristics of the teachers and youth group leaders with regard to their trust in scientists and their environmental awareness. Both of these characteristics were considered a prerequisite for participation. The data was collected between March 2021 and January 2022 through a survey. In the teachers and youth group leaders survey, established scales were used. To measure trust in scientists we used the Muenster Epistemic Trustworthiness Inventory (METI; [2]) and to assess environmental awareness we utilized the New Ecological Paradigm (NEP; [1]). The METI measures the individual's level of trustworthiness with a seven-point scale between 14 opposing adjective pairs (semantic differential) in the three sub-dimensions of expertise, integrity and benevolence. The NEP is a well-established international tool for measuring environmental awareness. The NEP

consists of five dimensions. A high score on the NEP scale can be interpreted as an environmentally friendly attitude of the respondent.

3. Results and Discussion

Data is available for a total of $n = 152$ responding teachers and youth group leaders. At the time of presentation, survey data from 2 campaign periods was considered (data from spring 2021 and autumn 2021; the spring 2022 campaign period was not fully completed and the respective data was therefore not included in the reporting of the results). The results described here are based on the data collected from the teachers and youth group leaders before they participated in the campaign with their students (pre survey) and all analyses were carried out across data from both campaign periods. Data was collected among German ($n = 103$) and Slovenian-speaking ($n = 49$) teachers and youth group leaders. Contrary to what was planned, no data could be collected in Portugal at the time of the surveys due to restrictions caused by the Covid-19 pandemic. Of the teachers and youth group leaders surveyed, 81% said they were female, 18.3% identified as male, while the remaining 0.7% gave no information about their gender. The teachers and youth group leaders were on average 44 years old, with the youngest respondent reporting to be 26 years old and the oldest 72. Since, as mentioned, participation in the campaign was not only possible in classes, but also in youth groups, for example, it was also asked whether the participants were teachers. 139 of the 152 respondents (91.4%) stated that they were teachers. The teachers interviewed had an average of 14 years of professional teaching experience (with a standard deviation of 9.3 years), with a minimum of 0 full years and a maximum of 50 years. Thus, a large proportion of the people interviewed are female teachers and very heterogeneous in terms of their reported professional experience in years.

Overall, the teachers surveyed perceived scientists as trustworthy. Against the background of the seven-point scale of the METI, the responses of the teachers and youth group leaders with a mean value of 5.66 (standard deviation 1.02) can be considered high. With a minimum of 1.07 and a maximum of 7, the scale was largely exhausted by the respondents. Concluding from this data, the majority of teachers and youth group leaders perceived scientists as competent, integer and benevolent which in turn all indicates a high level of trust in scientists as a whole. High values can also be reported for the five-point scale of the NEP. The mean value of the responses is 4 (standard deviation 0.43) with a minimum of 2.87 and a maximum of 4.83. Participating teachers and youth group leaders therefore show a thoroughly pro-ecological worldview, which indicates environmentally friendly attitudes across all areas. It can be assumed that the responding teachers and youth group leaders have both a higher trust in scientists and a more pronounced environmental awareness overall than the population as a whole. Furthermore, given the characterisation of the data as pre-data, the constructs discussed here – trust in scientists and environmental awareness – are considered prerequisites for participation in the campaign. The sample studied suggests that perhaps teachers and youth group leaders with a high value on the constructs of trust in scientists and environmental awareness are particularly enabling of the participation of young people and are therefore suitable to implement and scale up a citizen science campaign like “Plastic Pirates - Go Europe!”.

4. Outlook

Overall, the sample size on which the data reported is based is not yet sufficient. At the time of the Austrian Citizen Science Conference, the data collection of the main study was still ongoing but has been completed at the time of this report. It is expected that the forthcoming data analysis will provide further insights into the characteristics of the teachers and youth group leaders that enable their students to participate in the campaign. Despite the limitations to date, these initial insights may help to highlight the added value of accompanying research. In order to expand the state of scientific research on citizen science in the future, it will be important – explicitly when it comes to scaling up existing citizen science projects – to further identify and explore factors which may facilitate participation.

References

- [1] Dunlap, R. E., Van Liere, K. D., Mertig, A. G., Jones, R. E., *Measuring endorsement of the new ecological paradigm: a revised NEP scale*, *J. Soc. Issues* 56 (2000) 425–442. 10.1111/0022-4537.00176
- [2] Hendriks, F., Kienhues, D., & Bromme, R., *Measuring Laypeople's Trust in Experts in a Digital Age: The Muenster Epistemic Trustworthiness Inventory (METI)*. *PLoS ONE* 10(10) (2015): e0139309. doi:10.1371/journal.pone.0139309