Learning by Doing Science: A Citizen Science Pilot Study

Francesco Fedeli[1], Cristina Zogmaister[1], Michela Vezzoli[2], Irene D'Agati[1], Giacomo Giussani[1],

Scienza Under 18 Team (Maria Lauricella, Lella Razzini, Pietro Danise)

[1]University of Milano-Bicocca, [2]University of Urbino Carlo Bo

What is Citizen Science?

Citizen science refers to research approaches in which the **general public** actively contributes to one or more phases of the scientific process. Beyond data collection, citizen science as a **collaborative model** (Bonney et al., 2009) in which participants are not treated solely as research subjects, but as contributors to research design, interpretation, and dissemination.

THE PARTICIPATORY INTERVENTION

The project was developed within the ***Science Under 18*** framework with the aims of:

1. Promote reflection on sustainable practices and food choices;
2. Testing the feasibility of a Citizen Science project with fifth grade primary school students.

RESEARCHERS-LED PROJECT

1a. Meeting with teachers and SU18 Coordinators

- Definition of the topic of the intervention and
- Reflection on feasibility and planning

2a. Data collection

Participants | Fifth grade primary school students, N = 61

Measures

- ***Child IAT*** – sustainable vs non-sustainable behaviors
- ***Explicit Attitudes***
- ***Present behavioral frequency and future intentions***
- ***Open ended-question*** – *"What is sustainability?"*

CHILDREN AS CITIZEN RESEARCHERS

1b. Training session: "How to build a survey?"

- What attitudes are and why they matter
- How evaluations can be measured (self-report and indirect measures)
- How to formulate clear and unbiased survey questions

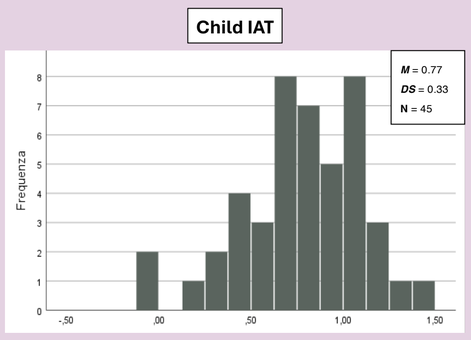
2b. Guided brainstorming

- Shared definition of sustainability
- Identification of key questionnaire themes
- Proposal of items and discussion of item order

3ab. Restitution and participatory discussion

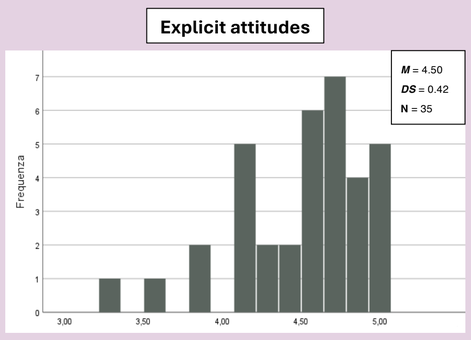
Discussion with students on data analysis and result visualization using their own questionnaire data

Child IAT



Against-zero t (44) = 15.78, p < .001

Explicit attitudes



WORD CLOUDS

What is a sustainable behavior?

What is a non-sustainable behavior?

4a. Process analysis

Mixed-methods investigation carried out by a designated researcher to assess how the intervention was implemented and esperienced

Respondents: class teacher, university researchers, local *Science Under 18* coordinators

Process evaluation questionnaire

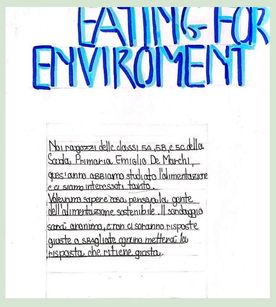
- Project design and implementation
- Perceived social impact
- Experiences and reflections following participation
- Overall evaluations

4b. Creation of the questionnaire

Children designed and implemented their own questionnaire, which was administered to parents and teachers.

5b. Dissemination

After developing their questionnaire, collecting the data, and analyzing the results, the children presented their work in a symposium at the university.



Insights & take-home messages

Participatory science projects in school settings are **feasible, impactful, and educationally valuable**, but require **adequate planning, resources, and coordination** to fully realize their potential.

Key Strengths

- Strong commitment of the class teacher
- High student engagement and motivation
- Effective collaboration between school, university, and local partners
- Rigorous yet accessible scientific approach
- Promotion of teamwork, digital skills, and interest in STEM careers (especially among girls)

Main Limitations

- Limited time and resources
- Logistical constraints (equipment, distance, limited in-class presence)
- Limited involvement of broader institutional and local stakeholders

Contacts
francesco.fedeli@unimib.it
cristina.zogmaister@unimib.it