Citizen science Approaches methodologies and typologies

For researchers across disciplines



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How the research choices fit together

Term	Meaning	Design question
Approach	Broad perspective or orientation	Whose questions and knowledge shape the study?
Framework	Organising roles and relationships	Who decides and who is accountable?
Methodology	Reasoning behind the evidence plan	Why can this design answer the question?
Methods	Practical tools and procedures	What will people record and how?
Typology	A classification using chosen features	What aspect of the project are we describing?

Working distinctions for this workshop. Disciplines use these terms differently. Shirk et al. 2012; Tweddle et al. 2012.

Approaches shape the question

Environmental inquiry

Observe patterns in species, sites or environmental conditions.

What evidence is comparable?

Humanities and local knowledge

Interpret histories, meaning and experience.

Whose account is represented?

Justice and inclusion

Examine exclusion, power and unequal burdens.

Who can influence the research?

Combine lenses deliberately; a discipline does not determine a single method.

ECSA 2015; Heinisch et al. 2021; Paleco et al. 2021; Tengö et al. 2014.

Approaches in practice

Perspective	Illustrative question	Useful evidence
Geography and ecology	Where are observations missing?	Maps, site records and a sampling plan
Humanities	How do people describe local change?	Oral histories, texts and interpretation
Feminist intersectionality	Whose experience is obscured by broad categories?	Attention to overlapping structures of inequality
Knowledge partnership	How will academic and local knowledge meet?	Agreed questions, dialogue and shared interpretation

Illustrative applications. Crenshaw 1989; McCall 2005; Heinisch et al. 2021; Tengö et al. 2014.

Methodology connects the question and evidence

1	2	3	4	5
Question	**Coverage**	**Recording**	**Checking**	**Interpretation**
Define a useful question	Choose people sites and times	Agree the fields and procedure	Practise and review records	Analyse and return findings

For the fictional case, explain why the selected sites and times can answer the question. Record what remains missing.

Tweddle et al. 2012. A mobile app or sensor is a method/tool, not a complete methodology.

Five participation arrangements

Shirk model	Typical participation arrangement
Contractual	Community members ask researchers to conduct a study.
Contributory	Researchers generally design; public participants mainly provide data.
Collaborative	Participants also help refine methods, analyse or share findings.
Co-created	Researchers and community partners design the study together.
Collegial	Non-credentialed researchers conduct independent research.

Shirk et al. 2012. These describe arrangements, not a compulsory ladder or a ranking of participant expertise.

Two different classification lenses

Haklay: forms of engagement

1. Crowdsourcing
2. Distributed intelligence
3. Participatory science
4. Extreme citizen science

Wiggins and Crowston: project aims

- Action
- Conservation
- Investigation
- Virtual
- Education

Haklay 2013; Wiggins and Crowston 2011. Use each framework for its own question; do not merge them into one ladder.

Social and feminist inquiry

Intersectionality examines how structures of inequality interact. It is grounded in Black feminist critique.

McCall stance	What it examines
Anticategorical	Questions the categories used to organise the analysis.
Intracategorical	Examines neglected intersections and complexity within groups.
Intercategorical	Provisionally uses categories to compare changing inequalities.

Interviews, ethnography and thematic analysis are possible methods. Choose them for the question and explain their limits.

Crenshaw 1989; McCall 2005. These stances are not participation levels or an identity checklist.

Broader lenses and analytical tools

Power

Arnstein asks how participation relates to decision-making authority.

Communication

Booth offers a broader lens for listening and rhetorical exchange.

Nature values

Kellert and Wilson offer a broader lens on human relationships with nature.

Analysis and planning

LCA analyses latent groups; SWOT and theory of change support planning.

Arnstein 1969; Booth 2004; Kellert and Wilson 1993; Collins and Lanza 2010. These are not all citizen science typologies.

Evidence quality benefits and limits

Before collection	Agree definitions, safe tasks, coverage and a practice round.
During collection	Keep comparable records, metadata and visible gaps.
After collection	Review a suitable sample, flag uncertainty and document corrections.

Potential benefits depend on resources, participation and use of the findings.

Freitag et al. 2016; ECSA 2015; Paleco et al. 2021. More reports do not automatically make a representative dataset.

The Noresund design case

A hypothetical classroom scenario inspired by a rural Norwegian setting.

Pollinators	Compare observations at agreed safe sites and times.
Lake environment	Choose a feasible shoreline observation or measurement.
Tourism and waste	Record visible litter along selected public routes.

These are exercise assumptions, not verified findings or demographic claims about Noresund. Check local evidence before a real project.

Design a feasible citizen science project

20 minutes

Groups of 3-4

Choose one main issue. Agree a question, participation arrangement, evidence plan, quality checks and a way to return findings.

Then: one minute per group to pitch, followed by five minutes of whole-room discussion.

Use the Noresund group activity worksheet. Pitch time is additional and depends on the number of groups.

The shared project proposal

1 Question and intended use

2 Partners and shared decisions

3 Participation arrangement

4 Coverage and evidence

5 Methods and analysis

6 Quality and uncertainty

7 Inclusion ethics and resources

8 Feedback and remaining concerns

ECSA 2015; Shirk et al. 2012; Tweddle et al. 2012. State a feasible scope and what is still unresolved.

Reflection and next steps

Which decision changed after hearing another perspective?

Who remains absent or needs a different way to take part?

What must be checked before a real pilot can begin?

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