Citizen Science: What is it exactly and what are the challenges?

2. Dezember 2020
ZHAW DataLab Seminar
Let me introduce myself

• Originally a biotechnologist
• 12 years of experience in science communication (PR Agency, NPO, science events, science writing, dialogue between science an public)
• 2014: Analysis about citizen science in Switzerland
  → foundation Swiss Citizen Science network „schweiz-forscht”
• 2019: **Start-up catta** to actively promote citizen science in Switzerland

https://www.linkedin.com/in/riaviviani/
Citizen Science?

Bürgerwissenschaft

Crowdsourcing

DIY Science

Participatory science

Science 2.0

Lay scientists
Citizen science (CS; also known as community science, crowd science, crowd-sourced science, civic science, volunteer monitoring, or online citizen science) is scientific research conducted, in whole or in part, by amateur (or nonprofessional) scientists.[1] Citizen science is sometimes described as "public participation in scientific research," participatory monitoring, and participatory action research whose outcomes are often advancements in scientific research by improving the scientific communities capacity, as well as an increasing the public's understanding of science.[2][3][4] Based on Alexa rankings[5] iNaturalist is currently the most popular citizen science website[6] followed by eBird[7] and then Zooniverse[8] in second and third place respectively.[needs update]
Range of citizen science
Rick Bonney (2009)

• **Contributory projects**
  • Designed by scientists
  • Members of the public primarily contribute data

• **Collaborative projects**
  • Designed by scientists
  • Members of the public primarily contribute data, but also help to refine project design, analyze data, or disseminate findings

• **Co-created projects**
  • Designed by scientists and members of the public working together
  • At least some of the public participants are actively involved in most or all steps of the scientific process

Range of citizen science

contributory  collaborative  co-created  collaborative  contributory
Snapshot Serengeti

https://www.zooniverse.org/projects/zooniverse/snapshot-serengeti/classify
https://www.zooniverse.org
Beweisstück Unterhose
MEER LEZEN

Groene kavels, rode wegen, zwarte kruispunten

Wetenschappelijke toelichting

Waarom een groene bol niet beter is dan een rode

NO₂ - CONCENTRATIE (µg/m³)

0  20  40  60+

WAT MOET U WETEN OM DEZE KAART TE BEGRIJPEN?
Generic Lab Equipment

To start up an independent and open lab it is crucial to get affordable lab equipment. Most of the tools we use are do it yourself (DIY) and open source and are built from widely available and recycled parts found in consumer products such as DVD drives,
Gaudilabs
Snapshot Serengeti
Evidence Panties
Air quality
Roles in citizen science

• Who is affected by our research question?

• What kind of knowledge do they have?

• What are their interests?

→ What role are they playing in our project?
Beweisstück Unterhose

Farmers (organic and non-organic)

Private gardeners

Federal and regional administration

Foundations

Celebrities

catta

Agroscope and University of Zurich

Media
Scientists:
• Learn more about the condition of Swiss soils
• Provide farmers & gardeners with a method to easily measure soil biodiversity
• Awareness for soil life the importance of soil

Communication department:
• Media presence and more sympathy for Agroscope

Federal and regional administration
Foundations
Media
Agroscope and University of Zurich

https://www.catta.ch/unterhose
Beweisstücke

- As much yield as possible
- As little effort as possible
- Know how to improve in a simple way
- Not to disclose too much data

Farmers (organic and non-organic)

Private gardeners

Federal and regional administration

Foundations

Media

Agroscope and University of Zurich

https://www.catta.ch/unterhose
• Fun
• Learn something new about their garden
• Tips on how to improve the soil
• Completely different language and terminology than farmers
Beweisstück Unterhose

- Do interesting projects
- Earn some money

Farmers (organic and non-organic)

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Media

University of Zurich

https://www.catta.ch/unterhose

• Do interesting projects
• Earn some money
Beweisstück Unterhose

- Celebrities
- catta
- Farmers (organic and non-organic)
- Private gardeners
- Federal and regional administration
- Foundations
- Media
- Agroscope and University of Zurich

- Something with (or without) underwear
- Celebrities

https://www.catta.ch/unterhose
Beweisstück Unterhose

Farmers (organic and non-organic)

Private gardeners

Federal and regional administration

Foundations

Celebrities

catta

Agroscope and University of Zurich

Media

Be seen with a sympathetic and meaningful project
Beweisstück Unterhose

- Farmers (organic and non-organic)
- Private gardeners
- Federal and regional administration
- Foundations
- Celebrities
- catta
- Agroscope and University of Zurich

• All important information summarized as briefly as possible
• Recommendations for action
Beweisstück Unterhose

- Diversely financed
- Value for science and for raising public awareness
- Addresses various topics of Agenda2030
- Participatory approach from beginning on

Farmers (organic and non-organic)

Private gardeners

Federal and regional administration

Foundations

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Agroscope and University of Zurich

Media
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Private gardeners
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https://www.catta.ch/unterhose
Citizen science is not only a method but also a culture.
Chances for citizen science?
Chances

1. More acceptance and understanding of a problem
2. Bringing innovative ideas to science
3. Forms of knowledge from society
4. Science stepping down from the ivory tower
5. Critical questioning of scientific results
6. Better transfer of research results into practice
7. More transparency in research and development
8. Contribute local and practical knowledge
9. Change of perspective
Chances

1. More acceptance and understanding of a problem
Chances

2. Bringing innovative ideas to science
Chances

3. Forms of knowledge from society
Chances

4. Science stepping down from the ivory tower
Chances

5. Critical questioning of scientific or other official results
Chances

6. Better transfer of research results into practice

Datensammlung
Erhoben werden die Daten unter anderem zu Alltagsthemen, Lebensqualität, Therapieformen und Behandlungen direkt durch die Betroffenen oder Angehörigen selbst. Sie tragen ihre Daten mittels der halbjährlichen Fragebögen selber ein und ermöglichen dem MS Register so eine reiche Datengrundlage und ein enormes Forschungspotenzial.

Geschützte Daten
Die Daten werden verschlüsselt und in einer gesicherten Informatikumgebung der Universität Zürich gespeichert. Identifizierbare Informationen werden aus den Daten entfernt, so dass keine Rückschlüsse auf die Person möglich sind.

Wissensgemeinschaft
MS-Betroffene sind MS-Experten. Ihr großes Wissen ist von enormen Wert und durch die Vernetzung von Betroffenen und Fachpersonen entsteht so eine wichtige Wissensgemeinschaft. Ärzte und Therapeuten sind mit ihrem Wissen gefragt, doch insbesondere Betroffene sollen sich als Teil der Forschungsgemeinschaft verstehen.

Sensibilisierung
Mit den so gewonnen Daten lassen sich typische Verläufe erkennen, vergleichen und bestenfalls neue Erkenntnisse gewinnen. All diese Informationen helfen, das Verständnis für MS Betroffene und ihre Situation in der Gesellschaft und bei Entscheidungsträgern zu fördern.

Nutzen für Betroffene
Alle Teilnehmenden erhalten Informationen über die von ihnen bereitgestellten Daten, die ihnen helfen können, mehr über ihre Gesundheit zu erfahren.

https://www.multiplesklerose.ch/de/das-schweizer-ms-register/
Chances

7. More transparency in research and development

The National Socialists (Nazis) persecuted and murdered millions of people. Help us enter the names of those who suffered and died in the largest online archive on Nazi persecution.
Chances

8. Contribute local and practical knowledge

Aufgabe 3
Verorten

100%

Verorten Sie die Bilder auf einer Landkarte. Diese wird auf der Startseite laufend aktualisiert.

https://crowdsourcing.onb.ac.at/oesterreich-aus-der-luft
Chances

9. Change of perspective

Chances

1. More acceptance and understanding of a problem
2. Bringing innovative ideas to science
3. Forms of knowledge from society
4. Science stepping down from the ivory tower
5. Critical questioning of scientific results
6. Better transfer of research results into practice
7. More transparency in research and development
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9. Change of perspective
Challenges for citizen science?
Challenges

1. Quality requirements
2. Data protection and ethical aspects
3. Finding enough volunteers and keeping them in line
4. Recognition for amateur researchers
5. Time
6. Financing
Challenges

1. Quality requirements

**EVERY NAME COUNTS STATISTICS**

- 47% Complete
- 9,488 Volunteers
- 175,303 Classifications
- 82,357 Subjects
- 39,224 Completed Subjects
Challenges

1. **Quality requirements**
   - Plan well: What exactly is the citizen scientists task?
   - Training and testing volunteers
   - Using standardized equipment
   - Having experts validate the data produced by volunteers
   - Having multiple volunteers make independent measurements of the same thing
   - Producing a large amount of data, to use statistics to increase data quality
Challenges

2. Data protection and ethical aspects
Challenges

3. Finding enough volunteers and keeping them in line
Challenges

4. Recognition for amateur researchers

https://www.researchgate.net/publication/337693475_Authorship_Protocols_Must_Change_to_Credit_Citizen_Scientists

Authorship Protocols Must Change to Credit Citizen Scientists

Georgia Ward-Fear, 1,3,*
Gregory B. Pauly, 2,3,*
Jann E. Vendetti, 2
and Richard Shine 1

The sociopolitical nature of research is changing and so must our protocols for authorship. Citizen scientists are often excluded from authorship because they cannot meet rigid journal criteria. To address this, we propose a new concept: allowing nonprofessional scientists to be credited as authors under a collective identity (‘group coauthorship’).
Challenges

5. Time
Challenges

6. Financing

STIFTUNG MERCATOR SCHWEIZ

PARTIZIPATIVE WISSENSCHAFT
Wir fördern die verstärkte Beteiligung der breiten Bevölkerung an der Wissenschaft und eine Wissenschaft, die sich um gesellschaftliche Fragen kümmert.

Die Wissenschaft beeinflusst nahezu alle unsere Lebensbereiche. Und die Erwartungen an die Wissenschaft steigen: Sie soll neues Wissen schaffen, zur Lösung aktueller Herausforderungen beitragen und einen Nutzen für unsere Gesellschaft haben. In vielen gesellschaftlichen Bereichen gibt es heute Partizipationsmöglichkeiten für interessierte Bürgerinnen und Bürger. Doch in der Wissenschaft, die einen grossen Einfluss auf die Entwicklung der Gesellschaft hat, bestehen diese noch kaum: Wie kann die Bevölkerung ihre Fragen und Anliegen in die Wissenschaft tragen? Wie lässt sich nicht-wissenschaftliches Wissen in wissenschaftliche...
Before you start, ask yourself:

• Is your project suited for citizen science at all?
• Are you open to other views/opinions?
• Who are the citizens you want to work with? Can you contact them? How many are there?
• Who to collaborate with?
• What roles/tasks does everyone have?
• Do you have time enough to set up your project in a participatory way?
Resources

Open source tool for analyzing data sets online with volunteers: [https://lab.citizenscience.ch/](https://lab.citizenscience.ch/)

10 principles of citizen science: [https://osf.io/ugy4t/](https://osf.io/ugy4t/)

Participatory science academy: [https://www.pwa.uzh.ch/en.html](https://www.pwa.uzh.ch/en.html)

Citizen science project platforms:

**Switzerland:**
www.schweiz-forscht.ch

**Germany:**
www.buergerschaffenwissen.de

**Austria:**
www.citizen-science.at

**EU:**
eu-citizen.science

**Zooniverse:**
www.zooniverse.org

**USA nature:**
www.inaturalist.org
Questions?

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