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# Characteristics of Citizen Science

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# Needs for characteristics

- Requests from different stakeholders: policy, scientists, partners on the EU-Citizen.Science project, Open Science Policy Platform (OSPP)
- Need to accommodate a wide range of definitions and emerging criteria that are created for a specific platform, call, or regulation
- Aim: provide a set of characteristics that **can** be part of a citizen science project, and let people choose which set is fit for their purpose



# The Characteristics



It's challenging to have one common definition

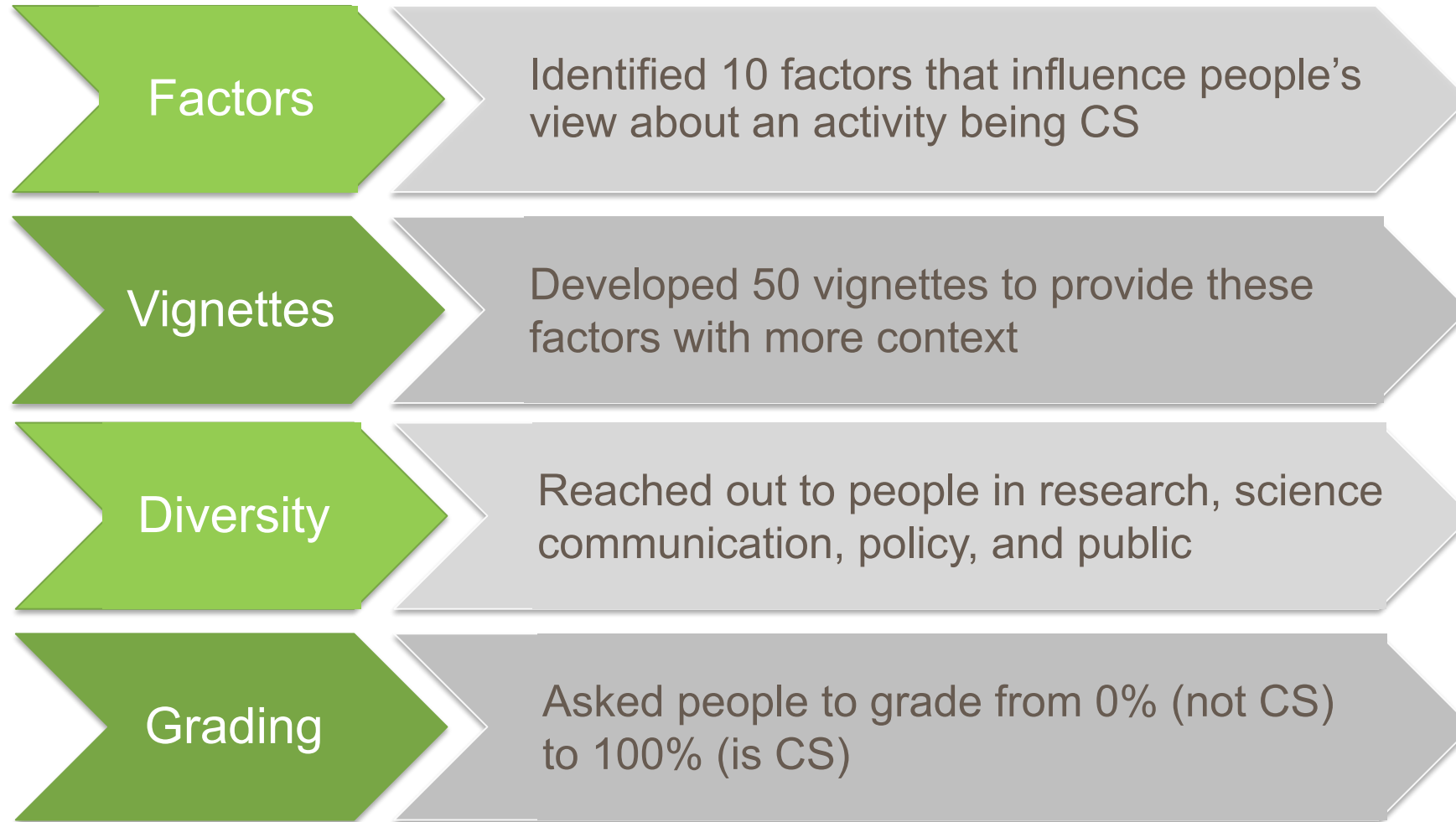


There is need for common ground



There should be a pluralistic understanding

# Methodology



# Factors of CS

- Development of 10 factors and 60 sub-factors
- Potential ambiguity about the classification of a project

1 Activeness – 2 Compensation – 3 Purpose of activity –  
 4 Purpose of Knowledge production – 5 Professionalism –  
 6 Training – 7 Data sharing – 8 Leadership –  
 9 Scientific field – 10 Involvement in research process

Vignettes table (case descriptions)

Authors: Mukl Haklay, Susanne Hecker, Dilek Fraisl, Barbara Kieslinger, Gerid Hager, Christian Nold, Lionel Deveaux

Table 1 - list of factors for the vignettes, with those with higher controversy potential highlighted in yellow

Factor	Type	Categories and explanation
1 Activeness	Categorical	<b>1.1 Active</b> - requires full cognitive engagement during participation <b>1.2 Semi-active</b> - limited cognitive engagement (responding to short alerts in a micro-task) <b>1.3 Passive</b> - no engagement beyond setup
2 Compensation	Categorical	<b>2.1 Volunteer</b> - unpaid participation <b>2.2 Expenses</b> - only expenses are paid <b>2.3 Small incentives</b> - minimal payment or partial payment which is indirect to the activity (e.g. for coordinating, providing bikes for community-based monitoring that can be used for other purposes) <b>2.4 Payment for the activity</b> <b>2.5 Crowdfunding</b> - small payment for tasks <b>2.6 Subscription fee</b> - when participants pay to participate in a project <b>2.7 Student</b> - compulsory part of studies
3 Purpose	Categorical	<b>3.1 Scientific/research</b> - scientific or research focused project <b>3.2 Policy outcome</b> - e.g. environmental management monitoring, action, or other policy actions <b>3.3 Public engagement</b> - the main purpose is engagement (bioblitz) <b>3.4 Education</b> - focus on education outcomes <b>3.5 Game</b> - focus on gaming environment <b>3.6 Reuse of social media</b> - reuse of images or other information that was submitted in social media
4 Purpose of Knowledge production	Categorical	<b>4.1 Scientific discovery</b> - producing a scientific paper <b>4.2 Scientific management</b> - producing data for policy <b>4.3 Personal discovery</b> - personal level learning <b>4.4 Local knowledge sharing</b> - sharing local lay knowledge within the community (not necessarily with researchers)

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# Vignette example - Erik

*“Erik is a teacher in Uppsala, Sweden. For the past 15 years, he is running a weather station that is part of the Weather Underground’s Personal Weather Station Network with over 250,000 participants who share their observation data, just like Erik. In return for the data sharing, the company is providing tech support, data management services and customised, free-of-charge access to forecasts. The company uses the data to produce a global weather forecast as a commercial service.”*

Factors considered: 1.1, 2.1, 3.2, **4.6**, 5.1, 6.1, **7.4**, **8.4**, 9.2, 10.5

## Potentially controversial:

**4.6:** Purpose of Knowledge production - Commercial knowledge for commercial applications

**7.4:** Data sharing - Commercially aggregated data that is collected by commercial actors

**8.4:** Leadership - led by a commercial company

# Vignette or case study research

- Factorial study is a survey method and technique that uses vignettes to explore individuals' beliefs and judgments.
- Creation of 50 examples of research activities (vignettes) with some involvement of the public in one form or another
- Based on the literature on citizen science and public engagement in science, some created specifically for this study

Brauer PM, Hanning RM, Arocha JF, et al. (2009) Creating case scenarios or vignettes using factorial study design methods. *Journal of Advanced Nursing* 65 (9): pp. 1937-1945.

Brenner M. (2013) Development of a factorial survey to explore restricting a child's movement for a clinical procedure. *Nurse researcher* 21 (2).

Taylor BJ. (2006) Factorial surveys: Using vignettes to study professional judgement. *British Journal of Social Work* 36 (7): pp. 1187-1207.



# Structure of survey

50 vignettes – 40 with different factors, 5 clear citizen science, 5 clear not-citizen science (as per literature)

Survey design as crowdsourcing – accepting 1 or more answers, randomised order

Survey run – mid December 2019

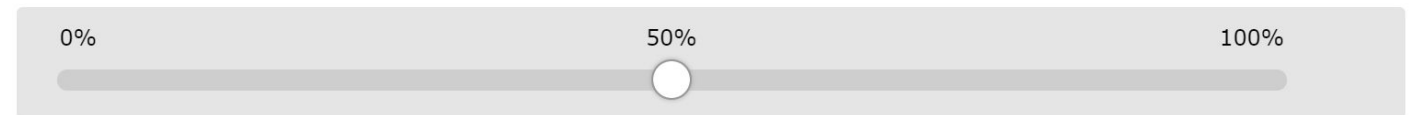
## Would you call this a citizen science activity?

Sandra from Birmingham, England, recently had her first child. On a forum that is dedicated to issues of using detergents with cloth nappies, she found a group of other young parents on Facebook, and together they are carrying out a double-blind test of different detergents and their impact on nappies. The results of the study are shared widely through a medical charity and can influence the National Health Service recommendations for using these nappies.

\* How confident are you about judging this case?

- It is easy to decide       It is somewhat complex to decide       I find it difficult to decide

\* To what degree would you identify this as citizen science?



How would you call this activity? **(optional)**

Why did you give that rating? **(optional)**

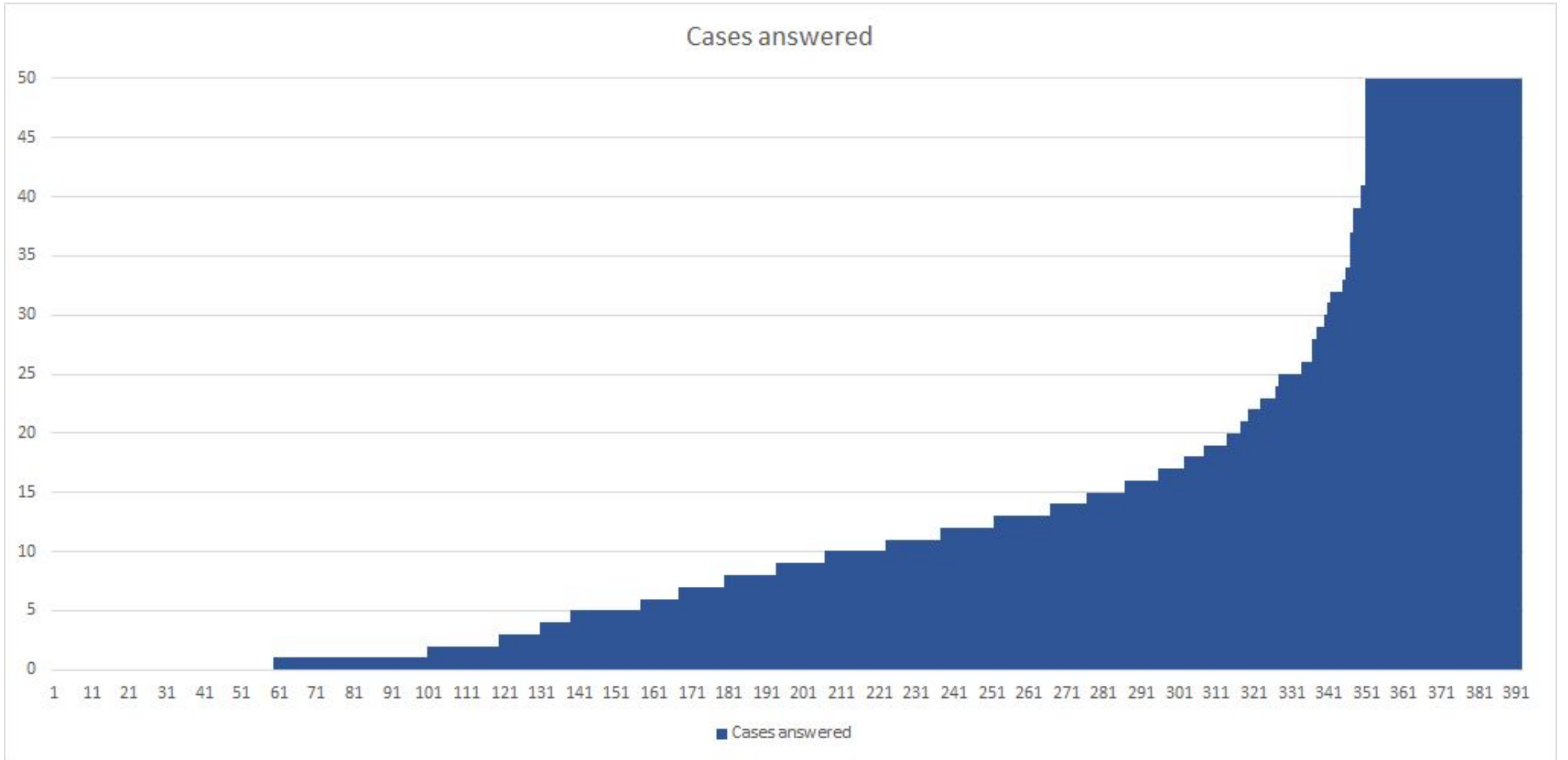


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# Results

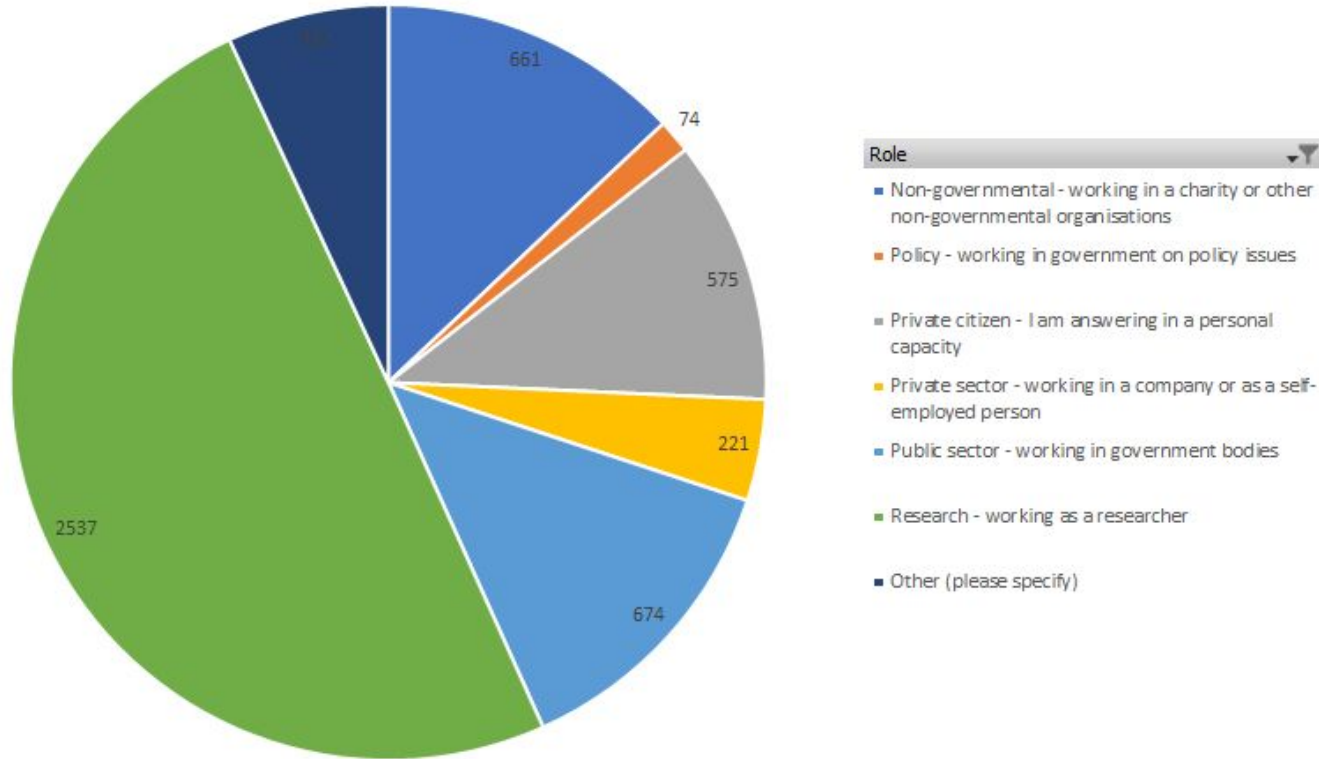
Outcomes of the study

# Responses (n= 392)



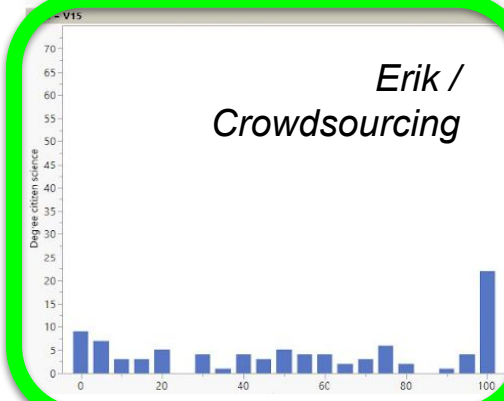
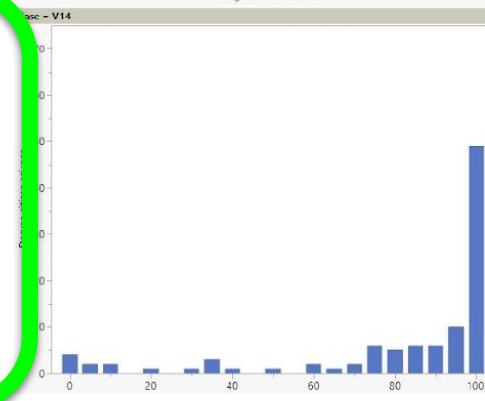
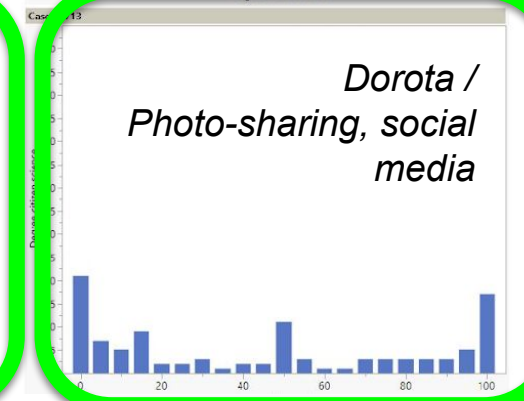
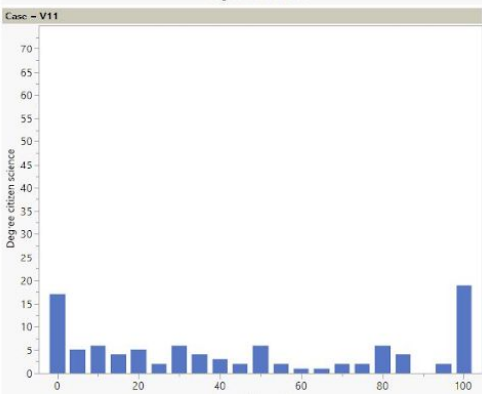
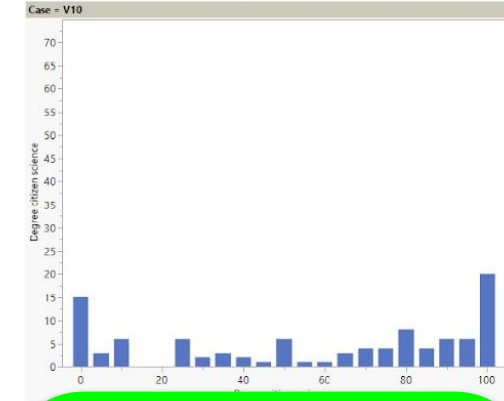
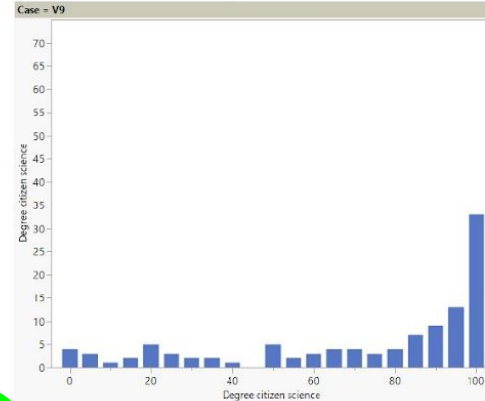
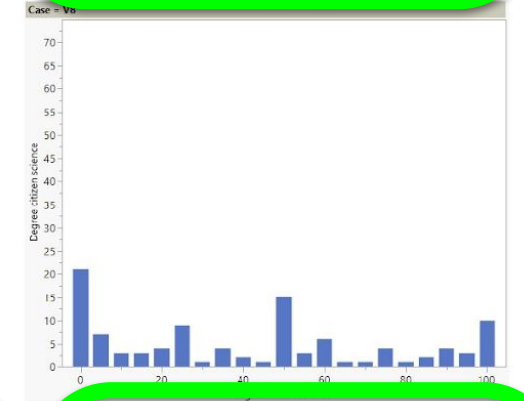
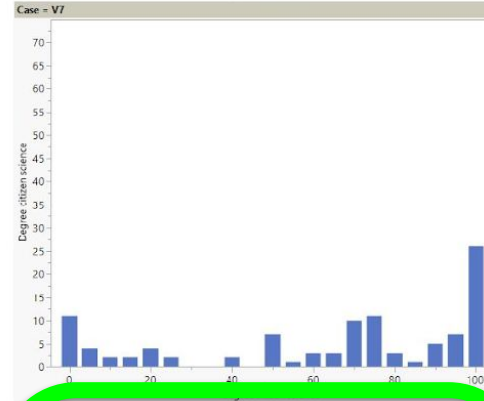
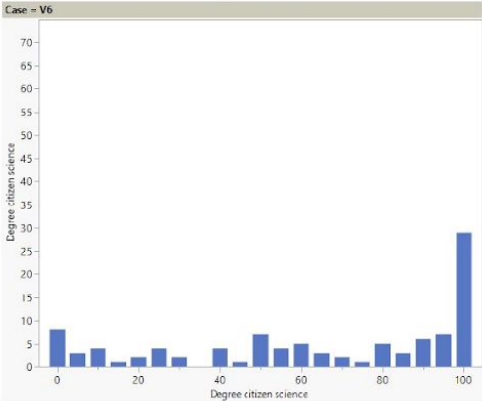
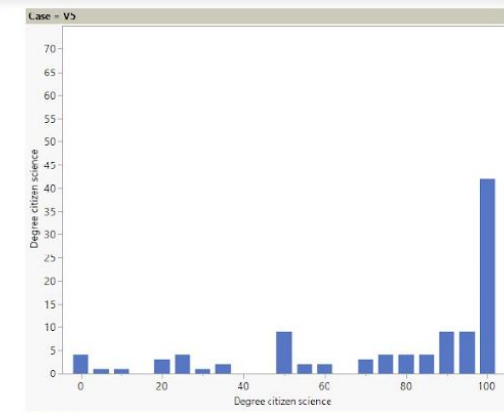
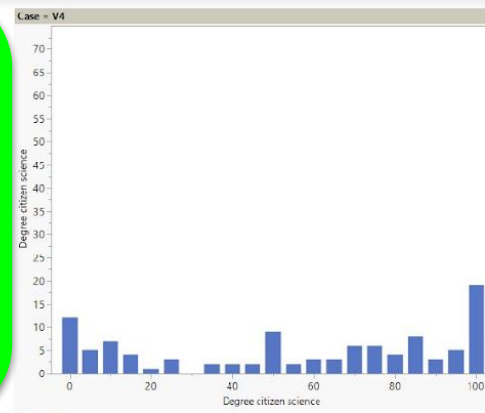
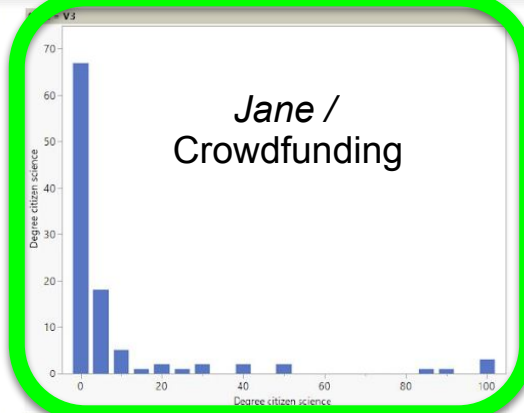
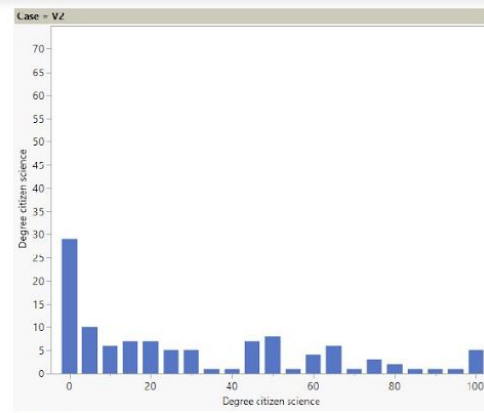
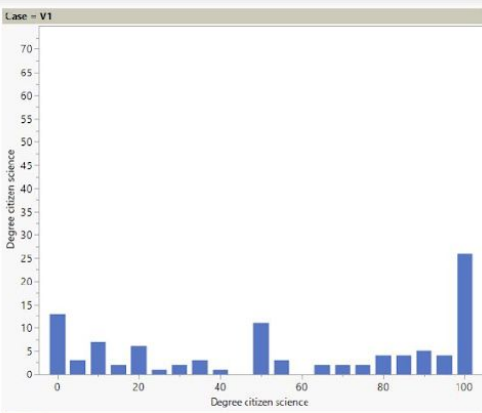
# Responses

Count of Role

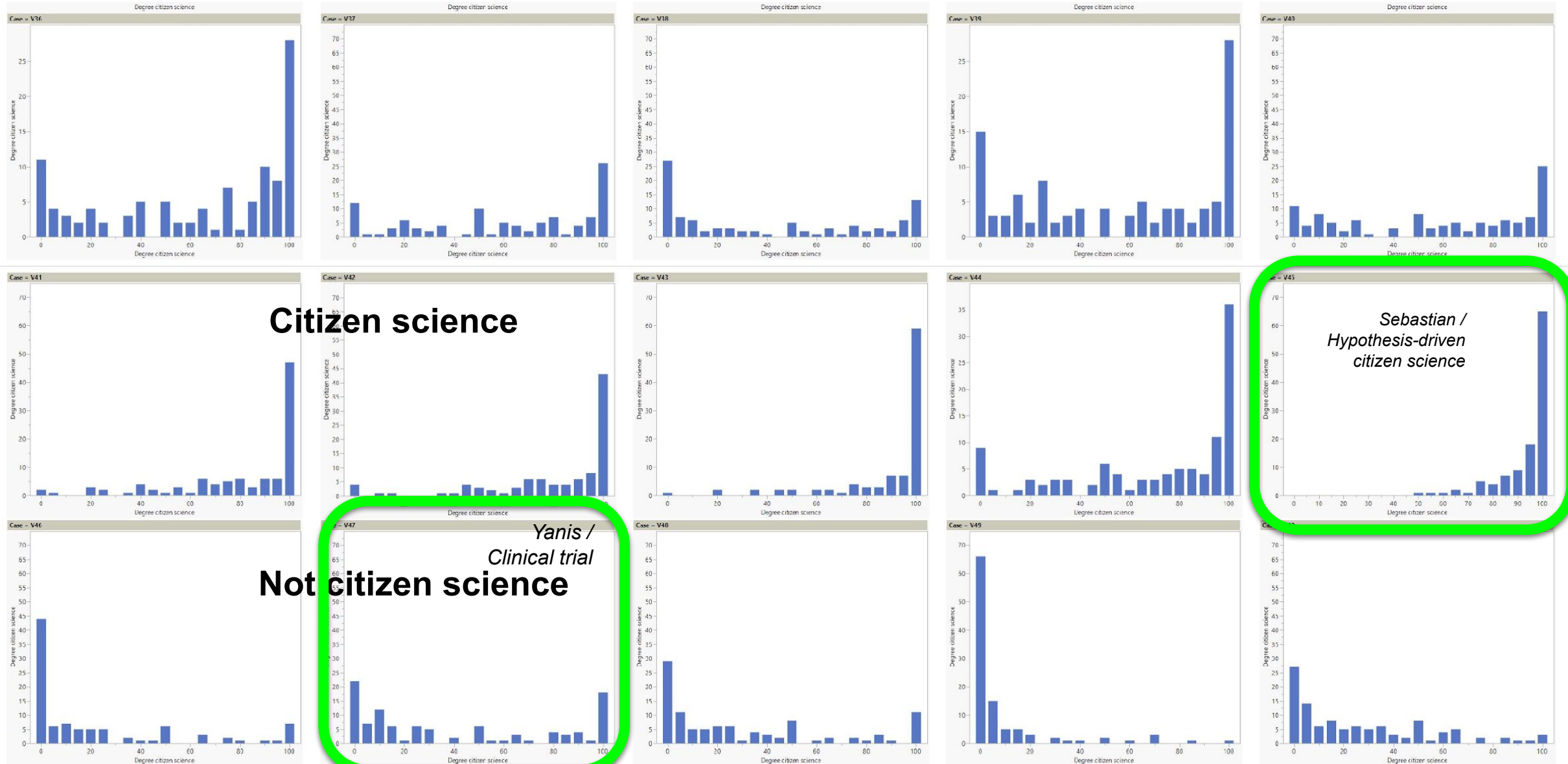


Zambia	1
Nigeria	4
Latvia	5
Brazil	7
Greece	10
Lithuania	13
Canada	14
Denmark	35
Malaysia	50
Colombia	50
South Africa	50
Romania	50
Turkey	50
Switzerland	54
Netherlands	95
Norway	113
Australia	115
Spain	118
France	131
Italy	142
Sweden	153
Belgium	173
Portugal	177
Austria	203
Germany	638
United Kingdom of Great Britain and Northern Ireland	837
United States of America	879
<b>Grand Total</b>	<b>4167</b>

# Responses – Ranking cases 1-15



# Responses – Ranking cases 36-50



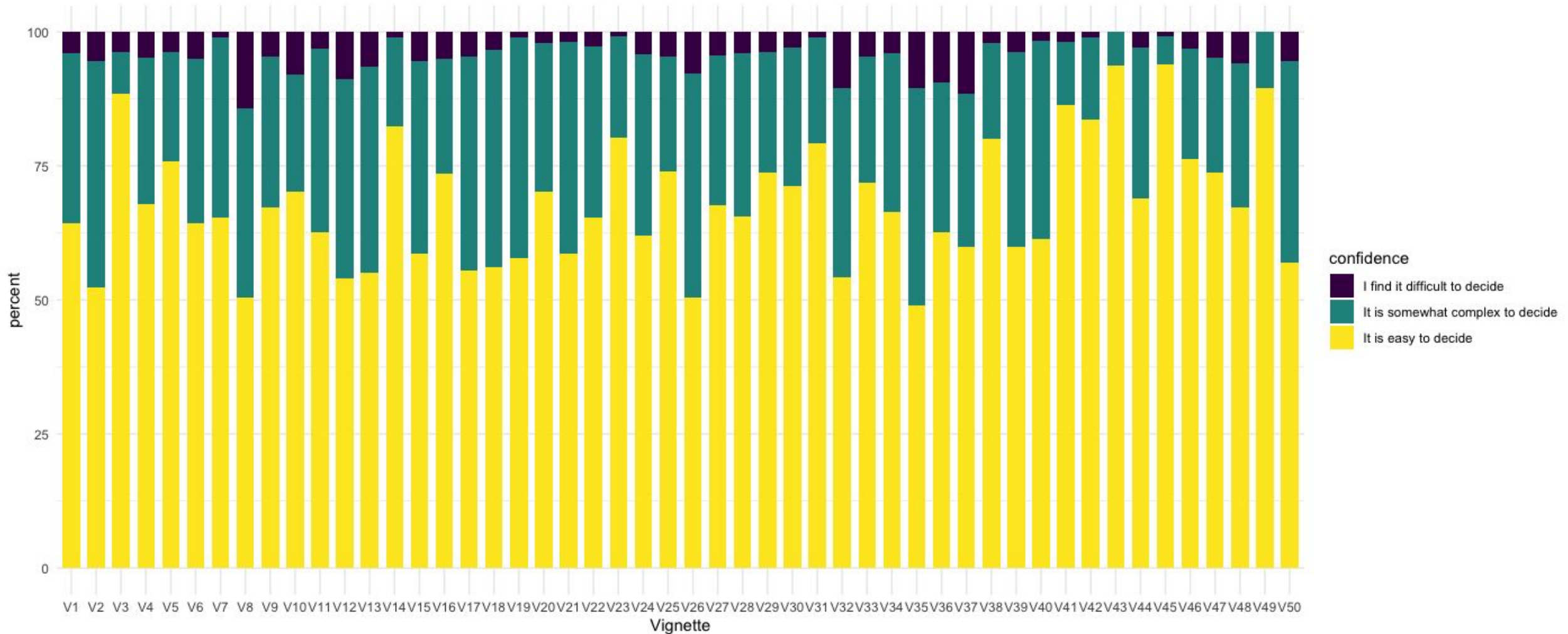
**Citizen science**

*Sebastian /  
Hypothesis-driven  
citizen science*

**Not citizen science**

*Yanis /  
Clinical trial*

# Responses – Confidence and cases





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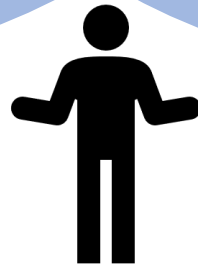
# Characteristics





Citizen  
Science

Not Citizen  
Science



# The Characteristics document

**Purpose:** the aim is not to describe everything that is citizen science but identifying the areas that require attention and guidance.

**These are broken into:** core concepts, disciplinary aspects, leadership and participation, financial aspects, and data and knowledge.



Haklay, Muki, Motion, Alice, Balázs, Bálint, Kieslinger, Barbara, Greshake Tzovaras, Bastian, Nold, Christian, ... Wehn, Uta. (2020, April 1). ECSA's Characteristics of Citizen Science. Zenodo. <http://doi.org/10.5281/zenodo.3758668>

# Core concepts

- **Here we cover terms and concepts that can influence if a project is a citizen science one.**
  - Science & Research; What counts as research;
  - intention and framing; purpose and aim
  - hypothesis-driven, monitoring, inductive, exploratory, and database creation;
  - roles and responsibilities;
  - subject or participant;
  - Ethics

Example: reference to SSHs, Medicine  
and Health research;  
10 Principles of Citizen Science

# Disciplinary aspects

**Different areas of science will have specific issues with participatory research, we pay attention to these areas.**

- Disciplinary views
- scientific/technology
- arts and humanities
- social sciences
- medical sciences and human health

Example: disciplinary methods and standards; context is important, whether there is a medical or commercial motivation

# Leadership and participation

## Who leads a project and how that influence if the project can be called citizen science?

- Individual, community-led or research-led;
- organisations (RPOs, NGOs, public);
- commercial;
- degree of engagements;
- small vs large scale;
- professionalism and voluntarism;
- science engagement and education;
- links to decision making

Example: a CS project can be conducted by an individual person, small groups or a large number of participants

# Financial aspects

**Money and its role in the project can lead to different views on what is happening.**

- Financial support for scientific research;
- payment to take part in a project;
- incentives to participate

Example: pure financial support via crowdfunding is not considered Citizen Science  
- depending on the project and culture incentive payments are considered legitimate

# Data and Knowledge

**Data and knowledge are at the core of scientific research, and there are multiple notions of them.**

- Data and knowledge generation;
- data ownership and use;
- data quality;
- local and lay knowledge sharing and application;
- opportunistic or systematic data collection;
- digital data-collection tools;
- sharing personal and medical data

Example: Citizen Science is considered part of Open Science and data should be shared. BUT: there might be good reasons (e.g. privacy issues, sensitive data) for not sharing the data openly.



# Where are the characteristics currently applied?



# Field of application

- Policy advice (e.g. EC, OSPP - Open Science Policy Platform)
- EU-Citizen.Science Plattform: part of the selection criteria for projects, resources, trainings
- national Citizen Science funding programmes (e.g. UK)
- Vignettes are included in training units
- Further analysis
- Scientific publications
  - Haklay, Muki, Motion, Alice, Balázs, Bálint, Kieslinger, Barbara, Greshake Tzovaras, Bastian, Nold, Christian, ... Wehn, Uta. (2020, April 1). ECSCA's Characteristics of Citizen Science. Zenodo. <http://doi.org/10.5281/zenodo.3758668>
  - Haklay, M., Fraisl, D., Greshake Tzovaras, B., Hecker, S., Gold, M., Hager, G., ... Vohland, K. (2020, December 31). Contours of citizen science: a vignette study. <https://doi.org/10.31235/osf.io/6u2ky>



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# Thank You!

**Contact information**

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