

# Needs assessment & future foresight report on Citizen Science

Digital Citizen Science NOW: Network, transform, grow  
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[www.citizensciencenow.org](http://www.citizensciencenow.org)

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**Title:** Needs assessment and future foresight report on Citizen Science

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# Executive Summary

Through its potential to bridge science, society, and policy, Citizen Science is in a unique position to help generate responsible research, innovations, and policies in relation to societal challenges. While there are resources provided to researchers and practitioners on how to tap into the potential of Citizen Science, the knowledge and skills needs of the citizens, citizen science practitioners and many other social actors to achieve such participation is frequently overlooked. Needs assessment & future foresight report of the Erasmus+ project “Digital Citizen Science: Network, transfOrm, groW” aimed to address this gap via providing insights concerning citizens’ behaviours, motivations, and change signals on Citizen Science at the European level.

The report captures and delivers on the needs assessment research and findings that is generated via futures design principles. Accordingly, the research phase started with horizon scanning exercise, that involved collection of future signals & best practices, followed by the launch and implementation of a design-led survey, interviews, and a sensemaking session to identify, validate, and build insights from the research results. The sensemaking led into the future foresight building, that produced 17 future trends in citizen participation in citizen science, that is clustered under the following three domains:

**(i) Local networks and resources:** How and where citizens connect with networks and stakeholders on local and national level is changing. Successful networks create a sense of belonging and requires to learn and unlearn new practices, adopt new narratives and focus on building trust.

**(ii) Shifting values, attitudes and citizen competencies:** New societal values are driving new behaviours and expectations. Looking into the future, it is not only technological changes, but even more shifting values and aspirations that will impact the landscape. We see a shift in the core competencies, such as research skills, and the intention of Citizen Science, to an increased focus on what Citizen Science can bring to society.

**(iii) Online & offline capacity building platforms:** With an increase in digitalisation, data and connectivity, new digital tools and approaches are emerging to make Citizen Science become more accessible. New hybrid realities are already a reality and digital formats that can create new possibilities for engaging and interacting with research, as well as involving new groups of citizens.



## Executive Summary

In the light of the findings and the competence needs identified, the Citizen Science training resources will be built upon the considerations highlighted in the above major domains, and linked insights. The training resources will take a situated approach that will ensure knowledge co-production that takes advantage of citizens' local knowledge; alignment of training resources with the service and offerings of local public institutions, such as e.g. municipalities, museums, libraries; and consideration of local societal and/or environmental challenges to be the starting point of Citizen Science research investigations.

To address shifting values and competencies, the resources will integrate methodologies that is suitable for co-design during joint research processes; Open Data and data sharing specificities; and insights from the best practices of Citizen Science engagement. Finally, tapping into the potential of online and offline platforms for capacity building, the resources will explore strategies for the inclusion of specific groups (e.g., elderly or lower-income), and exploitation of social media by the citizens for more than data collection purposes. This might involve finding ways on how the citizens can raise awareness in their own local community on different topics of concern, collect data, interpret data, disseminate the knowledge they co-created and be able to trigger evidence based collective action.



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# 1. Introduction





# 1. Introduction.

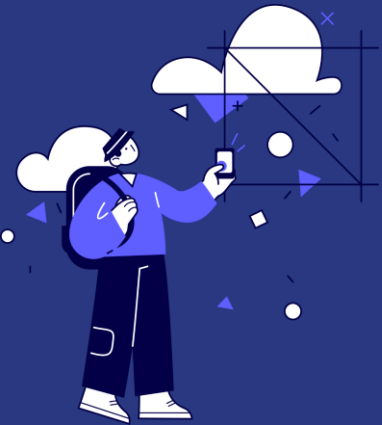
Funded for the period February 2022-November 2023, the Erasmus+ Cooperation Partnership project “Digital Citizen Science: Network, transfOrm, groW” (for short “Citizen Science NOW”) aims to foster widening of citizen participation in Citizen Science and promote sustainable Citizen Science development by digitizing adult Citizen Science training experiences, and empowering citizens with essential Citizen Science skills and competencies.

The project brings together three universities (Münster University of Applied Sciences, the University of Twente, and the University of Barcelona), a future foresight institute (Bespoke), and a global-operating quality assurance body focusing on recognizing engagement and entrepreneurship in Higher Education (ACEEU), based on four European countries. The two major project outputs include a Future Foresight Report that informs about adult citizens’ competency needs required for their active participation in Citizen Science and a set of online capacity-building training materials that will serve primarily the needs of citizens, as well as the universities and public organizations that promote a co-creation approach to Citizen Science.

The first section discusses relevant background information about the project and how to address the existing challenges, alongside the approaches concerning the project outcomes. Next, the report presents the overall methodology used in the report, explains different research tactics, and gives an overview of the needs and expectations of Digital Citizen Science; and future themes that might determine the capacity and creation of sustainable structures for active participation in Citizen Science.

The following section summarizes findings from surveys and interviews concerning citizens’ behaviors, motivations, and change signals on Citizen Science at the European level, allowing it to explore citizens, regional/local adults- and higher educators’ needs and expectations of regional Citizen Science development. As a result, the outcomes of surveys, interviews, and fruitful discussions during a Sense-Making Workshop allowed partners to gain more comprehensive insights into developing sustainable Citizen Science structures at local and regional levels to build approved digital training materials for citizens.

# 2. Rationale behind the project







## 2.1. Background of the Project.

Citizen Science driven by Responsible Research and Innovation (RRI) policies of the European Commission and the emphasis on civic engagement as the Third Mission of universities has gained momentum in the EU regions. While there is increased attention to Citizen Science, knowledge, and resources tend to be created in silos, unidirectional, and in the form of "transfer" than "co-creation" with citizens. Previous research has shown that the causes of the challenges are manifold.

There are significant silos among universities, adult educators, and citizens which hinder the integration of Citizen Science into the mainstream education systems, and result in low awareness of Citizen Science among adult citizens [1]. Finally, geographical distances, social distances (e.g., the COVID-19 pandemic), and time constraints hamper citizens' access to opportunities to actively participate in Citizen Science projects.

The challenges our societies face, ranging from climate change, food security, health, and wellbeing, require knowledge beyond any academic discipline and sector. Citizen science, through its potential to bridge science, society, and policy, is in a unique position to play a role in helping generate responsible research, innovations, and policies in relation to societal challenges.

While there are resources provided to researchers and practitioners on how to tap into the potential of Citizen Science, the knowledge and skills needs of the citizens and citizen science practitioners to achieve such participation are frequently overlooked. Our project builds on the premise that citizens need to be empowered to bridge this gap, via capacity-building tools and resources, developed in self-learning or guided formats addressed to new generation of researchers, citizen science practitioners, civil society organizations, public administrations involved, and of course citizens themselves.



## 2.2. What Was the Initial Challenge?

In the context of Germany, Citizen Science experts express concerns, about the need for increased awareness and change in the perceptions of citizens as research and scientific assistants to active co-creators of knowledge [2]. Despite its long history of Citizen Science, Germany struggles with creating synergies across its Citizen Science-providing institutions and enabling bidirectional channels among citizens and the existing Citizen Science ecosystems. The Green Paper (2020) explicitly states that in order to maximize the citizens' participation in tackling societal challenges, existing networks should be strengthened; Citizen Science should be integrated into existing university structures, and infrastructures should be established for new forms of citizen involvement in scientific research.

Given their similar maturity levels with Citizen Science in their own regions (Enschede, Barcelona), partner universities shared similar challenges in their Citizen Science ecosystems regarding citizen engagement and co-creation for their own lifelong learning journeys. Given this background, 'Citizen Science NOW', short for 'Citizen Science: Network, transORM, groW' (Citizen Science NOW) aims to foster EU citizens' engagement with, and access to Citizen Science by establishing

sustainable local Citizen Science community networks; digitalizing adult Citizen Science through co-creation of hands-on societal challenge projects with citizens themselves; and empowering citizens with the essential competence and skills they need to actively initiate or engage in Citizen Science projects.

Many adults have limited choices, resources, and time for high-quality upskilling offers once they enter the job market. While mass open online courses (MOOCs) are popular nowadays as an alternative to professional development, their retention and completion rates remains low. Hence, adults need blended learning offers that are: flexible & accessible – adapted to their busy schedules, and locations, and of low cost; meaningful - allow them to acquire practical information & skills relevant to their life and work, and fun - satisfy their social needs and curiosity through experimenting and informal learning experiences. Thus, our project aims to produce tools to help motivate and enable adult learners with different backgrounds to build up lifelong learning habits and empower them with skills and key competencies necessary to be resilient and adaptable in the face of change.



## 2.3 Our Suggested Solution.

While targeting capacity building for citizens, the project encourages local and regional stakeholders from adult education (e.g., adult learning centers, libraries, local authorities), representatives of cultural initiatives (e.g. street art festivals) and people with fewer opportunities (NGOs of disability, mental health, exclusion), and HEIs (e.g., academics and students) to jointly contribute to more inclusive Citizen Science ecosystems.

We envision building a set of training materials for a Citizen Science where citizens can actively be involved in all steps of a Citizen Science research project and thus bring them more opportunities to become key (and eventually leading) actors in a Citizen Science research. Needs thus exceed crowdsourcing data gathering protocols which might be very project specific. We opt here for a transversal vision and start from the hypothesis that more attention is required to reinforce other aspects related to democratic and civic values within Citizen Science practices in their broadest sense. If participation is aimed to become more intense and larger, ethical and privacy competencies can be very relevant in these training materials as well. Ethical and privacy issues can harm trust building and strong ties among participants and stakeholders in a Citizen Science project.

These issues are often related to digital and mobile-based tools and competencies in this context might also be key. Scientific literacy can help to better formulate research questions within a Citizen Science project or can bring confidence to critically revise and to effectively contribute to the data interpretation process in a Citizen Science project which in turn can lead to citizens' empowerment.

A set of training materials in this sense are however not only oriented to citizens. Other stakeholders mentioned above need to be committed to this general vision of a more co-created Citizen Science and a Citizen Science able to empower citizens. They will also need to have the right materials able to respond to this major task. To further elaborate this initial vision within the consortium we have dedicated a strong effort to identify key references and key examples that can serve as a guide. Also, we also designed a set of interviews and a survey for different stakeholder representatives to help us to contrast our hypothesis and better specify key challenges and anticipate some of the obstacles.

[1] Vohland et al., 2021

[2] Green Paper Citizen Science Strategy 2020 for Germany

# 3. Methodology





## Overarching Methodology used in PR1.

PR1 is the first Project Result (PR) and focuses on research activities and aims to provide an overview of (1) Citizens' and academics' needs and expectations on (digital) Citizen Science; and (2) develop future foresight that guides the potential and creation of sustainable structures for active Citizen Science Involvement.

Within PR1, we want to create an overview and understand the status-quos of existing practices within the Citizen Science in different cultural contexts of partner organisations with a strong focus on the citizen lens. More specifically, we want to identify future opportunities for the Citizen Science sector and understand.

The findings of PR1 will serve as the basis for developing new guidelines and frameworks for sustainable Citizen Science structure development. In addition, the results of PR1 aims to fuel PR3, where a certified digital training program will be designed that equips citizens with the capacity to flourish and thrive in Citizen Science projects.

The overarching methodology is designed in such a way, that it uses signals of change and best practices to identify and can inform us, what works well now and what aspects might be relevant when designing a digital training program. We are using future design principles to collectively do the research. Furthermore, there is second layer of research, that aims to inform us on the needs and expectations of academics and citizens, utilizing tools such as interviews and a survey.

All in all, the overall phrases within PR1 are:

Phase 1: Research

Phase 2: Sensemaking

Phase 3: Future Foresight Building

Phase 4: Finalize Report



Development Phases

Activities



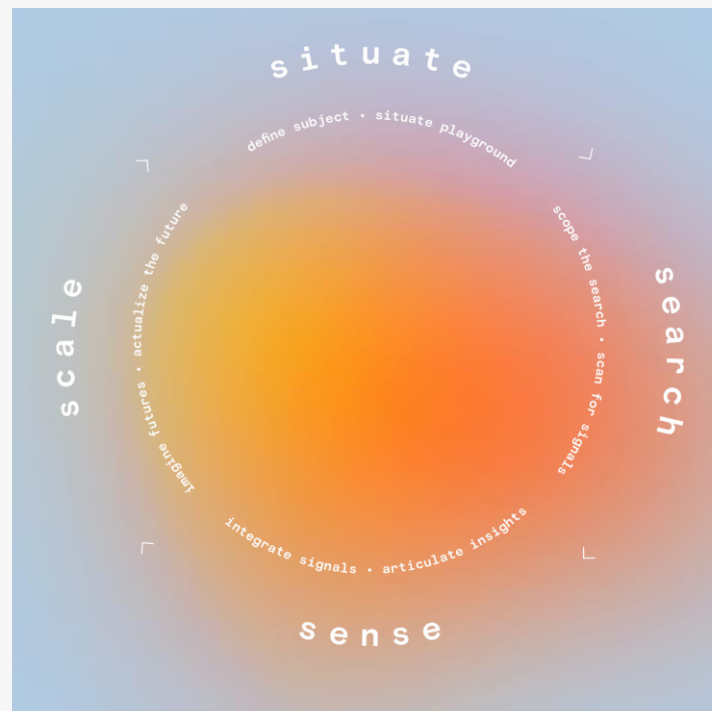
Image: Visual overview of overarching Methodology used in PR1.



## 3.1 Futures Design.

The project is structured around Bespoke's Futures Design methodology. Bespoke is a Copenhagen-based design studio that helps organisations uncover their future landscapes by scanning the industries and detecting new trends and tendencies that may impact their organization in the future.

Bespoke's Futures Design methodology builds on interdisciplinary thinking and doing by integrating tools from strategic foresight, design thinking, and social sciences.



We worked with Futures Design as our guiding structure as well as using Bespoke's Horizon Software

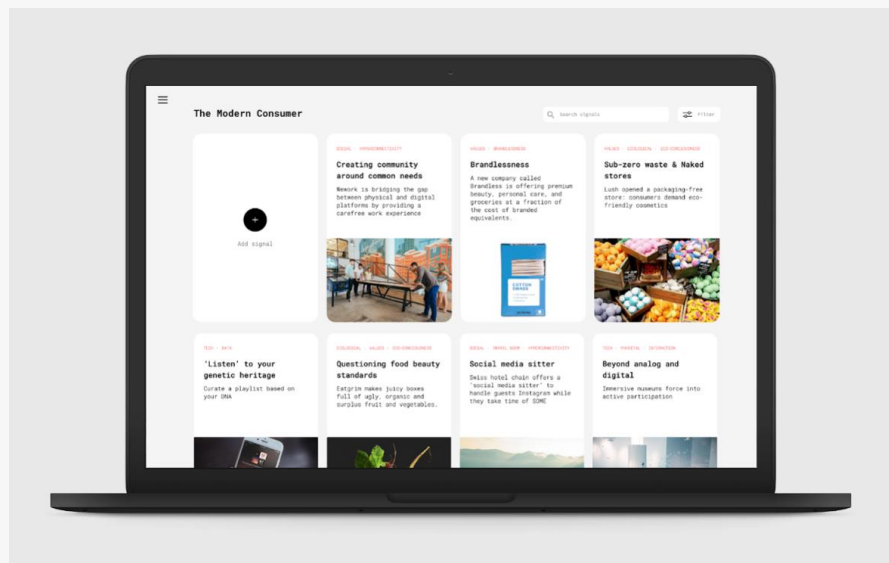


## 3.2 Futures Design Methodology.

With the use of Futures Design Methodology from Bespoke, the focus was put on the following activities

- + Scoping Session with Consortium
- + Horizon Scanning
- + Best practices Research
- + Creating Pre-insights
- + Co-creation session with Consortium

Everyone in the project had access to the Horizon software: our collective knowledge bank. By offering our software Horizon as a key collaborative tool for collecting signals that can be accessed by everyone involved in the project.



**Image:** All partners were onboarded to software Horizon as a key collaborative tool for collecting signals that can be accessed by everyone involved in the project. Horizon is a collective “living knowledge library” consisting of signals relevant to the research subject.







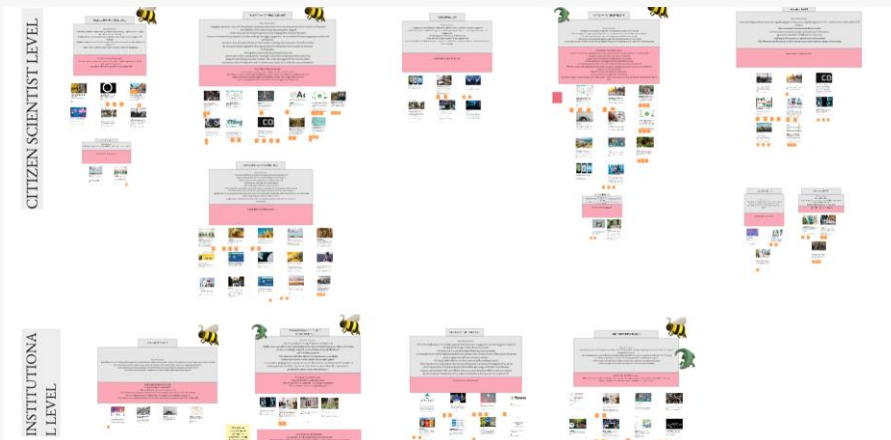


## 3.5 Pre-Insights.

The first pre-insights were developed by Bespoke to pre-summarise research from activities A1 and fuel activities A2 and A3 and to understand what could possibly be investigated further in the process. The insights were categorised into two levels:

**CITIZEN SCIENTIST LEVEL** - Insight in citizen scientists need, pains, gains. The pre-insights are focusing on the dimensions that tackle directly users' participation, engagement and technological solutions facilitating aforementioned.

**INSTITUTIONAL LEVEL** - Insight that emphasizes the systemic level from EU perspective, and availability of open tools and software for the Citizen Science projects.



**Image:** Half-way the research phase, a co-creation session was facilitated by Bespoke, using MIRO as a collaborative tool to share the early impressions of what came out of the research done by the consortium. Above a screenshot of the various themes and topics that emerged.



## 3.6 Survey.

The online survey aims to collect data on the expectations, drivers (motivations), and barriers of citizens, adult educators, academics from Higher Education Institutions (HEI), and students to initiate/participate in Citizen Science projects in partner countries.

This research activity was essential in creating a better understanding in identifying which competences and capabilities are needed now and in the future. What digital training formats are necessary for tackling ambiguous challenges in modern society?

Each partner conducted more than 100+ surveys covering all target groups, including citizens, adult educators, and Higher Education Institution academics/students.





## 3.7 Interviews.

Interviews were conducted in parallel with the survey. Each partner conducted interviews with five HEI or adult educators to gather needs and expectations. This process allowed us to identify what works or not and the possible competencies and knowledge gaps and future Citizen Science offerings. In addition, five adult citizens were interviewed to assess local needs and expectations regarding Citizen Science structure, and training focusing on regional focuses.

After the desk study, survey and interview were accomplished, a workshop was designed and facilitated by Bespoke with the consortium. In a 3-hour workshop, data was reviewed and we discussed what it all meant for our project. Collaboratively, we made sense of all the data and prioritized and integrated all the research to articulate insights, define potential and draw conclusions. The results of this meaningful workshop were then translated into initial conclusions and ideas on future training, that can find in Chapter 7.





## 3.8 Sensemaking.

There was a collective future sensemaking workshop to facilitate a discussion among the consortium partners to synthesize the collected information, insights and themes. The activities supported the consortium into identifying and building insights to create to sense the potential & recommendations for sustainable Citizen Science development.

During a 3-hour, online sense-making workshop with the whole consortium, we will discuss how signals and themes could shape the future of Citizen Science Organisations. We will share insights and validate findings, articulate insights and define opportunities.

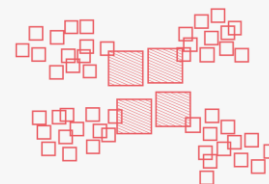
The collaborative work of the sensemaking workshop led to foresight and insights (to be found in chapter 6) and can guide and inform the development of PR3.

### Stage 1:

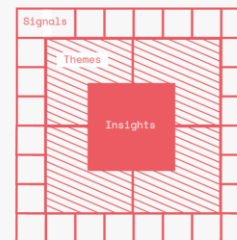
Each partner's independent research outcomes



### Stage 2: Categorising findings



### Stage 3: Articulating insights findings across newly found themes



**Image:** Overview of Bespoke's sense making process - to find patterns and connections between the different signals of change in order to articulate insights.

# 4. Status Quo Best Practices





## 4.1 What is ‘Best Practices’

Best Practices is part of desk research (PR1A1 / Conducting desk research on Citizen Science status quos and good practices) and aims to gain a deeper understanding of what works, the barriers, challenges and training approach for Citizen Science by looking at the Best Practice from different perspectives and regions.

### Criteria to select the Best Practices

Partners received a guideline on how to select their Best Practices through 5 different criteria that would constitute a good practice. Each criteria was developed by the set of guiding questions that will help to unfold different aspects of the Best Practice. The questions serve as a starting point and reflection space. Partners were asked to analyze their Best Practice throughout these various lenses/criteria and share key reflections and learnings of this particular best practice in relation to criteria. What did we learn? What were the main challenges or barriers? Key ideas emerging that we can bring further into the project?

Criteria to select best practices guidelines will follow that includes:

- Cr. 1: Project addresses societal challenges
- Cr. 2: Use of technology or digital tools
- Cr. 3: Sits within relevant networks and stakeholders on local and national level
- Cr. 4: Focused on engaging a wider audience
- Cr. 5: What is the degree of participation?

The partners had to fill up at least 3 criteria out of 5 to evaluate whether it is a sufficient best practice. In the end of the process, each of the partners had to contribute with at least 15 scan cards.

In this report, we selected three Best Practices per criteria, that can serve as inspiration.





## 4.2 Criteria.

### Criteria 1: Addressing a Challenge

This criterion discusses how the Best Practice example is tackling a challenge, either that may be a societal/planetary challenge, or even readdressing the structure of Citizen Science.

- + How is this case study approaching a particular societal challenge? Is it well defined?
- + How relevant is the societal challenge in framing and development of this Citizen Science project?
- + Is the societal challenge the driver for the project? If yes/no, why? Is it relevant for the participants and level of participation?
- + Does the chosen topic imply any challenges/barriers?

### Criteria 2: Use of Technology

This criterion is based on technology as the key element. Whether it may be an app for the Citizen Science participant to use to share knowledge or a platform to connect the citizen and the academic research community, technology is what links the people together or where these researches are shared.

- + What are the technological support offered to the participants/actors/users of the project?
- + What role does the technological use play in the project?
- + How is the technology helping/hindering the training or/and gathering data?
- + What are the biggest challenges when applying the technology? Why?
- + Is the technology applied personalised to the target audience of the project?

### Criteria 3: Networking the relevant stakeholders

This criterion demonstrates the key stakeholders in Citizen Science and the coordination of these stakeholders is well managed. The different organizations use a collaborative method to tackle this research, allowing for a greater impact based on their research, as well as making it easier for information sharing among the partners.

- + Which existing network/stakeholders take part in this project (within partner's country context)?
- + What is the structure of the addressed network?
- + How approachable is the network/actor?
- + Is the organisation collaborating with other existing organisations or entities?
- + What is the cultural context of this particular network or/and country and region? Does it influence the project's structures?

### Criteria 4: Focus on Engaging a Wider Audience

This criterion has the goal to include communities that have been marginalized in the research of Citizen Science. The best practices show different ways that are addressing this exclusion of minority communities and that are implementing new ways to create a more inclusive environment for the people to take part in the research.

- + Who is the target audience primarily addressed by the Best Practice project?
- + What are the main challenges and barriers for the target audience to partake in the project? Why?
- + What are the ways of support for this particular target group (e.g. translations, extra facilitation, language help, etc)?

### Criteria 5: Degree of Participation

This final criterion was imposed to put the participation of the citizens at the forefront of the research. As citizen science is based on a bottom-up research approach, it is important to reassure that the research is conducted through the participation of the citizens rather than a top-down approach. The best practice example demonstrates the participation of the people in the research for a more realistic conclusion and the creation of a solution.

- + How much influence do the citizens have on the project? In which area of the project and why?
- + What purpose does the participation serve? How is it reinforced/hindered?
- + How is the participation level influence engagement and popularity of the project within particular target audience? Why?



# Best Practice: Hooikoorts Radar

**Description:** Hooikoorts Radar

**Criteria:** Addressing a challenge

Hooikoorts Radar is a volunteer network in the Netherlands that is set up to get reliable information on the allergic effects of hay fever. Individuals can register into the volunteer network by making reports whenever they get symptoms of hay fever. The goals of the researchers are to increase knowledge about when and where people in the Netherlands have hay fever symptoms, to find out which level of pollen concentration generates which symptoms, and knowledge about the biological, environmental, medical, and socio-economic factors that cause hay fever symptoms and improve the ability of people who suffer from symptoms to deal with a high concentration of pollen.

## What can we learn?

Data gathering by citizens allows the most urgent issues to be introduced in research, as well as to lead to further research based on these findings by scientific researchers.

**Source:** <https://hooikoortsradar.nl/>

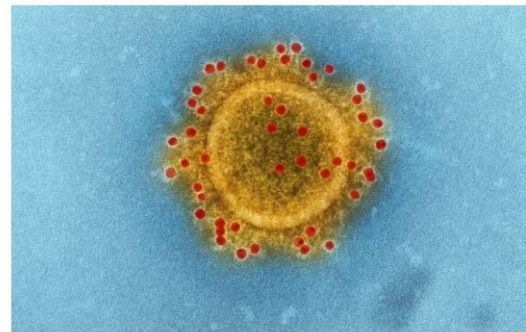


Photo by: <https://unsplash.com/photos/8SP7qfG83c>

TECHNOLOGICAL USE MARGINALISED AUDIENCE DEGREE OF PARTICIPATION NETHERLANDS UT

## Allergieradar/Hooikoortsradar – Bringing Hay Fever Into Picture

Measuring allergical complaints of hay fever by citizen reporting

Allergieradar (old name)/Hooikoortsradar (new name) is a volunteer network in the Netherlands that is set up to get reliable information of the allergical effects of hay fever. Individuals can register into the volunteer network by making reports whenever they get symptoms of hay fever. The researchers who have set up this project have found that the amount and level of reports does coincide with the appearance of grass pollen in the air. This supplies the researchers with a relatively easy way of investigating the appearance of hay fever symptoms. The goals of the researchers are to increase knowledge about when and where people in the Netherlands have hay fever symptoms, to find out which level of pollen concentration generates which symptoms, knowledge about the biological, environmental, medical and socio-economic factors that cause hay fever symptoms, and improve the ability of people who suffer from symptoms to deal with a high concentration of pollen.

### Relevance

#### 1. Participation

Similarly to the ISpex project, citizens are involved in the data collection stage. Whenever they get symptoms of hay fever, they can report it on the Hooikoortsradar (formerly known as Allergieradar). Combined, these reports give the researchers raw data, which enables them to create charts and maps with [...]

Created by Jansen Vink on Jun 14th, 2022  
Source: Hooikoortsradar informeert over hooikoorts en pollenverwachtingen  
Source: Hooikoorts betrouwbaar te meten via 'Allergieradar' - Medicalfacts.nl

Good Practices



## Best Practice: MICS

**Description:** MICS (Measuring Impacts of Citizen Science)

**Criteria:** Addressing a challenge

MICS started as a way to measure and visualize the impact that citizens' contribution to citizen science research has. This project tries to demonstrate the impact that Citizen Science has and to further encourage people into conducting more Citizen Science projects. This tool can further be used by the institutions, which will allow the policymakers to utilize the research data and to be then used to tackle the issues at hand.

### What can we learn?

Visualising the contributions and the effect that it has on research from the contributions is needed to make sure to show the citizens how their research is helping.

**Source:** <https://earthwatch.org.uk/our-science/research-projects/mics>



Photo by: Nadr 172717

ADDRESSED CHALLENGE EU RELEVANT NETWORK ACEU

### ADDRESSED CHALLENGES / Measuring Impact of Citizen Science

Developing metrics and instruments to evaluate citizen-science impacts on the environment and society

Research projects in the four sites (in the UK, Italy, Hungary and Romania) are currently studying how nature-based solutions can support urban and rural ecosystems. These sites will work together to explore the co-creation of citizen science in regions with differing needs, contexts and approaches to environmental management, using various levels of citizen science application. In some of the sites selected, MICS adopts the FreshWater Watch method, through which volunteers monitor nitrates and phosphates in freshwater ecosystems.

MICS tools measuring citizen science's impacts could make communicating the benefits of nature-based solutions easier, leading to increased funding and uptake for these interventions.

More generally, the MICS project aims to measure the broader impacts of citizen science on the environment, society, economy, and governance.

MICS will create a platform that could assess the impact of any citizen science project, whether it is at [...]

#### Relevance

##### 1. Addressed Challenge

Citizen-science projects related stakeholders, especially project leaders and policymakers, face the challenge of assessing citizen science's impacts on the environment and society. The MICS project aims to [...]

Created by Nicole Bedoya on Apr 29th, 2022  
Source: MICS  
Source: Home

Good Practices



# Best Practice: Environmental Citizen Science

**Description:** Environmental Citizen Science

**Criteria:** Addressing a challenge

Environmental Citizen Science brings us a comprehensive overview of Environmental Citizen Science and different approaches to Environmental Citizen Science. The module discusses an approach to environmental projects. Earthwatch is an international environmental charity that engages people in research, based on a model of citizen science. Earthwatch brings people and professional scientists together, delivering transformational experiences around the world, to promote the understanding and action necessary for a sustainable environment. The organization runs three types of projects: expedition model, corporate, and public projects. The expedition approaches are usually 8-12 days in length in wildlife or Arctic's edge to observe and work with a scientist in the field; train in specialist techniques; gain skills and the trip can be combined with a holiday trip. Public and corporate are usually involved in "mass public participation" and participants are primarily self-selecting.

## What can we learn?

Although Citizen Science is based on the contributions of the citizen mainly, it is beneficial for the citizen to also have access to work with professional researchers to learn more about their topics and how they can contribute further.

**Source:** <https://openupsci.wixsite.com/citizensciencecourse/environmental-citizen-science>



GLOBAL | ADDRESSED CHALLENGE | MUAS

### **ADDRESSED CHALLENGES/ Environmental Citizen Science**

Overview of the variety of environmental areas where citizen science can play an important role

The course brings to us a comprehensive overview of Environmental Citizen Science and different Approach to Environmental Citizen Science. The module started off with an introduction lecture from Muki Haklay. Alan Jones from Earthwatch then continued with the topic of approach to environmental project. Earthwatch is an international environmental charity, engaging people in research, based on a model of citizen science. Earthwatch brings people and professional scientists together, deliver transformational experiences around the world, to promote the understanding and action necessary for a sustainable environment. The organisation runs three types of projects: 'expedition model' projects, corporate projects and public projects. The expedition approach are usually 8-12 days in length in wildlife or arctic's edge in order to observe and work with a scientist in the field; train in specialist techniques; gain skills and the trip can be combined with a holiday trip. Public and corporate are usually involved "mass public participation" and participants are largely self-selecting.

#### **Relevance**

- Three approaches to environmental citizen science projects are: 'expedition model' projects, corporate projects and public projects
- Environmental citizen science is a well-established and extensive area of citizen science
- There is a clear trend in types of projects during different periods [...]

Created by Minh Anh Tran on Apr 19th, 2022  
Source: Environmental Citizen Science | CitizenScienceCourse

Good Practices



# Best Practice: WeGovNow

**Description:** WeGovNow

**Criteria:** Use of Technology

WeGovNow is a Research and Innovation Action focused on local government civic participation, aiming to use state-of-the-art digital technologies in community engagement platforms to involve citizens in decision-making processes within their local neighborhood. WeGovNow taps into emerging technologies to effectively support the transition from 'e-Government' (citizen as a customer) to 'We-Government' (citizen as a partner), enabling a new type of interactivity in the co-production of citizen-center services and the co-development of strategic approaches to community development. An inclusive and accessible for all citizens platform will allow people to report problems and suggest improvements, discuss their relevance, explore ways to fix issues through collective action, find solutions to compensate for resource shortages affecting the quality of publicly provided services, debate topics of strategic nature, and develop and vote upon concrete suggestions for local policy action.

## What can we learn?

There is a need for an inclusive platform for the citizens to be able to work directly with the government, to be able to make valuable contributions, as well as make their voices heard.

**Source:** <https://www.geog.ucl.ac.uk/research/research-centres/excites/projects/wegovnow>



Photo by: Kristin Wilson

GLOBAL TECHNOLOGICAL USE ACEU

## Technological Use/ WeGovNow

Collective and participative approaches for addressing local policy challenges

WeGovNow is a Research and Innovation Action focused on local government civic participation, aiming to use state-of-the-art digital technologies in community engagement platforms to involve citizens in decision-making processes within their local neighborhood. WeGovNow taps into emerging technologies for effectively supporting the transition from 'e-Government' (citizen as a customer) to 'We-Government' (citizen as a partner), enabling a new type of interactivity in the co-production of citizen-center services and the co-development of strategic approaches to community development. An inclusive and accessible for all citizens platform will allow people to report problems and suggest improvements, discuss their relevance, explore ways to fix issues through collective action, find solutions to compensate for resource shortages affecting the quality of publicly provided services, debate topics of strategic nature, and develop and vote upon concrete suggestions for local policy action.

## Relevance

Technological Use

WeGovNow project focuses on civic participation in local government, with digital technologies playing a key role. The project involves a set of innovative technologies integrated within a unified citizen [...]

Created by Nicole Bedoya on Apr 25th, 2022  
Source: Details - empatica  
Source: WeGovNow - UCL Department of Geography

Good Practices



# Best Practice: LandSense

**Description:** LandSense

**Criteria:** Use of Technology

LandSense is based on the idea of Land Cover and Land Use, which is the combination of monitoring the surface of the land and how the land is used. LandSense is a platform that uses satellite images of citizens to transform the current approach to environmental decision-making. Through their platforms, citizens can not only upload the satellite images that they have captured but also use them as a way to create solutions. This allows these data to be generated as an open source, as well as implement a monitoring system for less cost.

## What can we learn?

Collaborating with citizens that already personally hold a technology needed for a research project, such as satellite images, in this case, allows complicated research to be conducted easier in a more budget-friendly way.

**Source:** <https://eu-citizen.science/project/29>



Photo by: <https://iunplash.com/photos/wfWvOvireZU>

TECHNOLOGICAL USE GLOBAL MUAS

## TECHNOLOGICAL USE/ Sharing acquired knowledge

Platform that assists data sharing process

Data sharing is a very important part of citizen observatories, and as the number of citizen-generated data is constantly increasing, it also becomes more and more important to ensure that the data is easily findable, accessible, comparable, and reusable in the future. The course indicated an example of LandSense and the engagement platform for openly sharing data that the organisation has been using. The data from the different citizen science campaigns are hosted with the various project organisations but are accessible on the platform. This also helps ensure that access to the data can be sustained beyond the lifetime of the project. LandSense strives towards the FAIR data principles and FAIR stands for findable, accessible, interoperable, and reusable data. Citizen Observatories in WeObserve shared their data using platforms such as the LandSense Engagement Platform. This contains all the data from the various campaigns that have been run with Geo-Wiki, an older land cover/land use crowdsourcing platform. It also includes data collected through LandSense campaigns, such as data on green space quality in Vienna and Amsterdam, and data on habitat threats found [...]

### Relevance

The platform can be relevant to future citizen science projects in terms of data sharing process

Created by Minh Anh Tran on Apr 19th, 2022  
Source: [www.futurelearn.com](http://www.futurelearn.com)

Good Practices





# Best Practice: CoAct for Mental Health

**Description:** CoAct for Mental Health

**Criteria:** Use of Technology

CoAct for Mental Health is a citizen social science project. Citizen social science involves citizens who share a social concern as co-researchers and co-actors of the research. In this case, the co-researchers are people with lived experience in mental health or family members. The use of new technological tools (a Telegram chatbot) is interesting as it is adapting existing technology rather than creating a new one. Technological use is fundamental in the project as it helps to talk individually about a very delicate topic with your mobile phone and as it helps to scale up a set of conversations that are generally not shared on a wider level. The technology also provides some bias and elder people found some difficulties to use the chatbot.

## What can we learn?

Platforms that make contributions to research, especially when concerning sensitive topics such as mental health, allow people to take part in the research while still maintaining their anonymity. This creates value within the contributor as they feel part of the research and contribute to a cause while still being able to keep themselves safe.

**Source:** <https://coactuem.ub.edu/>



Photo by: <https://unsplash.com/photos/nkupVMAOP-U>

TECHNOLOGICAL USE MARGINALISED AUDIENCE DEGREE OF PARTICIPATION EUROPE UNIVERSITAT DE BARCELONA

## CoActuem per la Salut Mental

The codesign of a Telegram chatbot to give voice to an underserved group and by using newest technologies

CoAct for Mental Health is a citizen social science project. Citizen social science involves citizens who share a social concern as co-researchers and co-actors of the research. In this case, the co-researchers are people with lived experience in mental health, or family members.

### Relevance

The use of new technological tools (a Telegram chatbot) is interesting as it is adapting existing technology rather than creating new one. Technological use is fundamental in the project as it helps to talk individually about a very delicate topic with your own mobile phone and as it helps to scale up set of conversations which are generally not shared in a wider level. The technology also provides some bias [...]

Created by Josep Pirelló on May 9th, 2022  
Source: CoActuem per la Salut Mental

Good Practices



# Best Practice: Step Change Project

**Description:** Step Change Project

**Criteria:** Networking the Relevant Stakeholders

The Step Change Project is a project that draws the expertise of 11 partners from 8 different countries to increase the mutual responsiveness of science and society while boosting the capacity of scientific investigation over phenomena that cannot be seized entirely within conventional disciplinary boundaries. The project stems from the idea that citizen science can play an even broader societal and scientific role than is generally acknowledged. The project's overall objective is to explore the potential of citizen science and formulate recommendations and instruments for better cementing this approach within R&I institutions and changing researchers' mindsets on its value. The project will implement five Citizen Science Initiatives (CSIs) in health, energy, and the environment. The CSIs will tackle wildlife conservation issues in Slovenia, non-alcoholic fatty liver disease in the UK, energy communities in Germany, infectious disease outbreak preparedness in Italy, and off-grid renewable energy in agriculture in Uganda.

## What can we learn?

Collective research across different countries allows the result from research to be translated effectively into information that can be used, making it easier and faster for innovation to be implemented.

**Source:** <https://stepchangeproject.eu/>



Photo by: NASA on Unsplash.com

RELEVANT NETWORK ACEEU EUROPE

## Relevant Network / Step change project

A project connecting 11 partners through five Citizen Science Initiatives and four Horizontal Activities

The STEP CHANGE project (Science Transformation in Europe through Citizens Involvement in Health, Conservation and Energy Research) was launched in March 2021. It will draw on the expertise of 11 partners from 7 European countries and Uganda to increase the mutual responsiveness of science and society while boosting the capacity of scientific investigation over phenomena that cannot be seized entirely within conventional disciplinary boundaries.

The project assumes that citizen science can play an even broader societal and scientific role than is generally acknowledged. The project's overall objective is to explore the potential of citizen science and formulate recommendations and instruments for better cementing this approach within R&I institutions and changing researchers' mindsets on its value.

STEP CHANGE will implement five Citizen Science Initiatives (CSIs) in health, energy and the environment. [...]

### Relevance

Relevant Network

STEP CHANGE project connects 11 partners through 5 Citizen Science Initiatives and 4 Horizontal Activities, with each partner leading in different initiatives and activities. [...]

Created by Nicole Bedoya on May 28th, 2022  
Source: Home - Step Change Project

Good Practices





# Best Practice: RRI2SCALE

**Description:** RRI2SCALE

**Criteria:** Networking the Relevant Stakeholders

RRI2SCALE empowers the pilots' regional ecosystems and boosts democratic processes in their R&I (Research and Innovation) development trajectory through a complex, multi-dimensional stakeholder engagement strategy. The project's ultimate goal is to deliver the RRI (Responsible Research and Innovation) principles to their current regional ecosystems, thus accomplishing sustainable and inclusive institutional evolution in the governance structures. To put it simply: the project seeks to implant RRI practices and norms in the design of regional innovation strategies. The process operationalizes in the triple interconnected field of “smart cities – smart transport – smart energy”, which are essential for sustainable growth. Our testbed sites offer wide coverage at the European level in terms of socio-cultural, economic, and political characteristics, thus maximizing the project's replication potential.

## What can we learn?

Implementation of regional co-contribution allows the information that has been gathered to be implemented on a wider scale from the exchange of information.

**Source:** <https://www.utwente.nl/en/designlab/projects/overview-projects/rri2scale/>



Photo by: <https://unsplash.com/photos/FyCjvYFGPq>

RELEVANT NETWORK UT

### RELEVANT NETWORK / Connecting to regional networks

Promoting responsibility and sustainability in R&I through citizen participation

One of the most pressing issues that European regions face is how to introduce and develop Research and Innovation (R&I) regional policies that promote sustainable development and achieve societal inclusion and citizen participation, under a framework of democratic governance. The issue is not easy to be dealt with since, in our modern morally fragmented societies, every societal agent has their own values and perceptions regarding what sustainable and ethical regional R&I implies. The question is simple but critical: how can every stakeholder who is impacted by these changes become empowered and thus actively co-shape regional R&I policies? How to achieve regional innovation that is governed by the principles of Responsible Research and Innovation (RRI) and leaves nobody behind?

The aim of RRI2SCALE Project is to directly address this social dilemma in four pilot European regions: Vestland (Norway), Overijssel (Netherlands), Kriti (Greece) and Galicia (Spain). RRI2SCALE empowers the pilots' regional ecosystems and boosts democratic processes in their R&I development trajectory through [...]

#### Relevance

The initiative connects new practices with the 'current regional ecosystems', which fits with addressing relevant existing networks. According to their website, they aim to achieve this by creating a sustainable and inclusive institutional evolution in the governance structures of the pilot regions. With the goal to create a new democratic model of governance in regional R&I ecosystems. They conduct [...]

Created by: Jochem Vink on Apr 26th, 2022  
Source: rri2scale.eu  
Source: rri2scale.eu

Good Practices



# Best Practice: Global Citizen Science Partnership

**Description:** Global Citizen Science Partnership

**Criteria:** Networking the Relevant Stakeholders

The Global Citizen Science Partnership brings together networks of citizen science researchers and practitioners to promote and advance citizen science for a sustainable world. GCSP brings together existing networks of citizen science researchers and practitioners with advisory boards representing policy, business, and community-based perspectives.

## What can we learn?

A partnership bringing actors from different domains of citizen science allows a broader look at the issues of climate change and the implementation of sustainability across them.

**Source:** <http://www.globalcitizenscience.org/>



Photo by: <https://unsplash.com/photos/KRELSZKXKTM>

AUSTRALIA RELEVANT NETWORK UNIVERSITAT DE BARCELONA

## Global Citizen Science Partnership

Global network on sustainability and citizen science born in Australia

The GCSP brings together networks of citizen science researchers and practitioners to promote and advance citizen science for a sustainable world.

### Relevance

A global network of CS, it is also interesting how they face the notion of becoming global. Several global projects can be found and which can serve as inspiration when imagining the training materials. I honestly do not know much about the network but I really like how it was created, in a much more bottom-up manner with no constraints in relation to national (which may differ strongly across countries) [...]

Created by Josep Pirelló on May 9th, 2022  
Source: Global Citizen Science Partnership

Good Practices



# Best Practice: Extreme Citizen Science

**Description: Extreme Citizen Science**

**Criteria: Focus on Engaging a Wider Audience**

The first example is the Extreme Citizen Science: Analysis and Visualisation (ECSAnVis) project. This project is a five-year project funded by the European Research Council. The project aims to develop geographical analysis and visualization tools that can be used successfully by non-literate people and any other community in culturally appropriate practices that further fit their needs and social techniques. The project builds on the work that started with the Extreme Citizen Science funding and the ongoing effort toward assisting indigenous communities in knowledge co-production practices to address problems and issues that are critical to them in some of the most crucial environments on Earth.

## What can we learn?

The creation of tools to be used for accommodating a population is a necessity when conducting Citizen Science within that community.

**Source:** <https://www.geog.ucl.ac.uk/research/research-centres/excites/projects/extreme-citizen-science-analysis-and-visualisation-ecsanvis>



Photo by: Shane Rounce

GLOBAL TECHNOLOGICAL USE MARGINALISED AUDIENCE ACEEU UK

## **MARGINALIZED AUDIENCE / Extreme Citizen Science: Analysis and Visualization (ECSAnVis)**

ExCiteS tools and methods

Extreme Citizen Science: Analysis and Visualization (ECSAnVis) is a five-year project funded by the European Research Council. The project aims to develop geographical analysis and visualization tools that can be used successfully by non-literate people and any other community in culturally appropriate practices that further fit their needs and social techniques. The project builds on the work that started with the Extreme Citizen Science funding and the ongoing effort toward assisting indigenous communities in knowledge co-production practices to address problems and issues that are critical to them in some of the most crucial environments on Earth.

ECSAnVis builds on the EPSRC-funded ExCiteS project (2011-2016), which demonstrated how non-literate people and those with limited technical literacy could successfully participate in formulating research questions and collecting the data that is important to them. [...]

### **Relevance**

Technological Use & Marginalized Audience

ECSAnVis employs highly visualised and participatory APPs and software, including Sapelli, Geokey and Community Maps, to empower and engage indigenous people in local environmental management. [...]

Created by Nicole Beleya on Apr 29th, 2022.  
Source: Extreme Citizen Science: Analysis and Visualisation (ECSAnVis) — UCL Department of Geography  
Source: Extreme Citizen Science: Analysis and Visualisation (ECSAnVis)

Good Practices



# Best Practice: Informed Consent Report by CoAct EU project

**Description:** Informed Consent Report by CoAct EU project

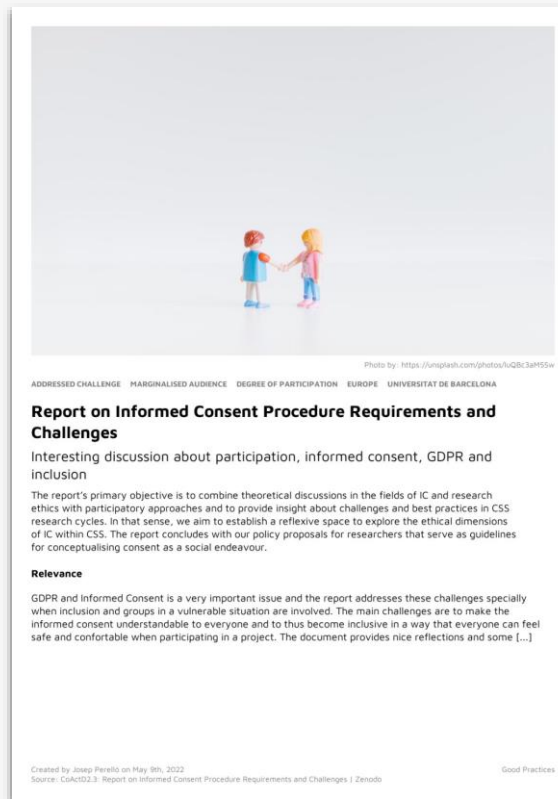
**Criteria:** Focus on Engaging a Wider Audience

GDPR and Informed Consent are very important issues and the report addresses these challenges especially when inclusion and groups in a vulnerable situation are involved and this has been explored by the CoAct EU project. The main challenges are to make informed consent understandable to everyone and to thus become inclusive in a way that everyone can feel safe and comfortable when participating in a project. The report demonstrates that informed consent, although a discussion necessary when conducting research, is sometimes neglected due to the lack of literacy from the participants, urging the implementation of a more accessible understanding of consent.

## What can we learn?

What we learn: Making the way to conduct research accessible is necessary for the opinions as well as the contribution of these researches to be done by the groups that are in a vulnerable position, as well as those that were not included in conducting research. These marginalized voices will bring new perspectives that were hidden or not discussed up until now.

Source: <https://zenodo.org/record/6078642#.Y0UUCuzMK3K>





# Best Practice: Scientific Dialogic Gatherings from Science Lit

**Description:** Scientific Dialogic Gatherings from Science Lit

**Criteria:** Focus on Engaging a Wider Audience

In Scientific Dialogic Gatherings (SDGs) from Science Lit, the participants of non-formal adult education offerings read, reflect on, and discuss scientific work. As a learning method, SDGs use the dynamic of dialogue to establish a foundation for an educational practice that is both empowering and inclusionary. Accordingly, the method of SDGs is introduced from both a theoretical and a practical perspective. The interactive guide explains how to involve the target group, how to organize the courses to be successful, and so on. SDGs are aimed at promoting collective learning through dialogue. Everyone can participate in these dialogues, regardless of their age, gender or culture. The participation of people with low education levels, though, is favored, to generate a more enriching and inclusive environment. Through this participation, the participants acquire scientific knowledge, as well as the ability to argue while respecting each other.

## What can we learn?

There is a need for a safe space in which marginalized groups that were excluded up until now can join and learn how to conduct research.

**Source:** <http://www.sciencelit.eu/outputs/interactive-guide-on-scientific-literacy-for-adult-education/>



MUAS MARGINALISED AUDIENCE EU

## **MARGINALISED AUDIENCE/ Guidelines for interactive guideline** Manual on organizing Scientific Dialogic Gatherings (SDGs)

In Scientific Dialogic Gatherings (SDGs), the participants of non-formal adult education offerings read, reflect on, and discuss scientific work. As a learning method, SDGs use the dynamic of dialogue in order to establish a foundation for educational practice that is both empowering and inclusionary. Accordingly, the method of SDGs is introduced from both a theoretical and a practical perspective. The interactive guide explains how to involve the target group, how to organize the courses in order to be successful and so on.

In Scientific Dialogic Gatherings (SDGs), the participants read and reflect on scientific works and articles. SDGs are aimed at promoting collective learning through dialogue. Everyone can participate in these dialogues, regardless of their age, gender or culture. The participation of people with low education levels, though, is favoured, with the goal of generating a more enriching and inclusive environment. Through this participation, the participants acquire scientific knowledge, as well as the ability to argue while [...]

### **Relevance**

This guide is designed for any institution interested in organizing SDGs to supply them with in-depth information about its principles and its implementation. It generates both the egalitarian relations and positive interdependence to ensure that participants are empowered to raise questions and hypotheses that will lead to creation of joint knowledge. SDGs can be a relevant method for future project. t generates [...]

Created by Minh Anh Tran on Apr 18th, 2022  
Source: Interactive Guide on Scientific Literacy for Adult Education – Science Literacy for all  
Source: group of people sitting on green grass field during daytime photo – Free image on Unsplash

Good Practices



# Best Practice: TOPFIT Citizenlab

**Description:** TOPFIT Citizenlab

**Criteria:** Degree of Participation

At the TOPFIT Citizenlab, citizens, healthcare professionals, and companies work together with scientists to develop and implement technological innovations for health and health care. They do this by developing a citizen science methodology in which citizens, usually people who are the subject of health care (i.e. patients). The citizens get involved in various stages of scientific research, such as data collection, results reporting, et cetera. The TOPFIT CitizenLab allows the real voice of people to be implemented in the development of healthcare, leading to a more organic way of coming to a solution to a health problem.

## What can we learn?

The involvement of citizens in the shaping of the research that will be conducted allows the patient to have a say in how health equipment or technology is developed making sure that they are the most relevant things that are created.

**Source:** <https://www.topfitcitizenlab.nl/>



Photo by: <https://unsplash.com/photos/KCC3eWln8KY>

TECHNOLOGICAL USE    ADDRESSED CHALLENGE    TECHNOLOGICAL USE    DEGREE OF PARTICIPATION    UT

### **TOPFIT CitizenLab: Citizen science for health care**

Improving the health of citizens of Twente by involving them in science

In the TOPFIT Citizenlab, citizens, health care professionals, and companies work together with scientists to develop and implement technological innovations for health and health care. They do this by developing a citizen science methodology in which citizens, usually people who are the subject of health care (i.e. patients). The citizens get involved at various stages of scientific research, such as data collection, results reporting, et cetera.

#### **Relevance**

1. Technological use. In the TOPFIT CitizenLab, there is a sublab called Nieuwe Technologie (New Technologies). Technologies are useful, especially in the context of healthcare and well-being. The question therefore is how technologies can help advance the goals of healthcare and well-being in the region of Twente. In the sublab 'Prevention', the initiators want to assess the digital capacities of [...]

Created by: Jansen Vink on Jun 8th, 2022  
Source: [www.topfitcitizenlab.nl](https://www.topfitcitizenlab.nl/)  
Source: TOPFIT Citizenlab | Hogeschool Saxon

Good Practices



# Best Practice: Gearing Up for Discovery

**Description:** Gearing Up for Discovery course

**Criteria:** Degree of Participation

Gearing Up for Discovery course by EdX focuses on helping communities, organizations, and individuals make a difference in local public and environmental health by developing citizen science projects. Classes use various instructional methods, including short lectures, activities, interviews, and quizzes. Moreover, the discussion forum allows you to search for and talk about different topics throughout the course. They expect learners to use this forum as a supportive learning environment. Therefore, staff will monitor the forum regularly and ask questions as quickly as possible if posted to the Discussion forum's 'General Class Questions' section.

## What can we learn?

By having a discussion forum within a class, it allows us to put forward the idea that Citizen Science is based on the contributions of the people, making it more only a place to learn from the professor but each other as well.

**Source:** <https://www.edx.org/course/citizen-science-gearing-up-for-discovery>



Photo by: Agnieszka Boeska

GLOBAL USA DEGREE OF PARTICIPATION ACEEU

## DEGREE OF PARTICIPATION / Citizen Science: Gearing Up for Discovery

Course of building skills in any non-scientist aiming to implement or participate in a citizen science project

Science is for everyone, and citizen science and community-engaged research have demonstrated that non-scientists can contribute to advancing health and wellness in communities. This course focuses on helping communities, organizations, and individuals make a difference in local public and environmental health by developing citizen science projects.

Classes use various instructional methods, including short lectures, activities, interviews, and quizzes. Moreover, the discussion forum allows you to search for and talk about different topics throughout the course. They expect learners to use this forum as a supportive learning environment. Therefore, staff will monitor the forum regularly and ask questions as quickly as possible if posted to the Discussion forum's 'General Class Questions' section.

Learning outcomes: [...]

### Relevance

The 5-module course is asynchronous and self-paced, with approximately 15 hours of content and activities. The course covers:

- 1) Citizen science overview
- 2) Project planning [...]

Created by Nicole Bedoya on Apr 25th, 2022  
Source: Citizen Science: Gearing Up for Discovery | edX

Good Practices





# Best Practice: Keeping Volunteer Engaged

**Description:** Keeping Volunteer Engaged

**Criteria:** Degree of Participation

'Keeping Volunteer Engaged' module is taught in the course 'Citizen Science Projects: How to Make a Difference' by the University of Dundee. One of the tips is to imagine yourself as a part of a citizen project and question what the motivation would be. It is important to remember that participants have different motivations. During the design phase of the project, it is vital to think about how the project relates to participants and what extent. If the participants see the impact of the problem monitored by the project in their daily life, for example, if "their" river is polluted, they are more likely to take ownership of the project and stay engaged. One of the strongest motivators for participants is the desire to make a difference or impact the targeted issue. When the campaign has kicked off make sure that you are sharing any developments towards this goal, especially as a picture starts to emerge from the data. Encourage participants to share their experiences, especially any improvements or innovations that they have come up with themselves.

## What can we learn?

By giving value to the participants for their contributions, it makes them willing to create an environment that encourages them to push further, and to see the impact that their research has brought them.

**Source:** <https://www.futurelearn.com/courses/weobserve-the-earth/4/register?return=b792q0f3>



Photo by: <https://unsplash.com/photos/7uG0yY1U0I>

GLOBAL MUAS DEGREE OF PARTICIPATION

## DEGREE OF PARTICIPATION/ Keeping Volunteer Engaged

### Tips on how to keep participants engaged

It's essential to keep motivation high when collecting data. Without engaged volunteers, citizen science can't work. Motivated participants who find meaning and value in their efforts are more likely to generate robust data sets. Motivated participants also promote projects more, and thus achieve more impact. One of the tips is to imagine yourself as a part of a citizen project and question what the motivation would be.

It's important to remember that participants have different motivations. During the design phase of the project, it is vital to think about how the project relates to participants and to what extent. If the participants see the impact of the problem monitored by the project in their daily life, for example if "their" river is polluted, they are more likely to take ownership of the project and stay engaged.

One of the strongest motivators for participants is the desire to make a difference or impact on the target issue. When the campaign has kicked off make sure that you are sharing any developments towards [...]

### Relevance

The course mentioned some projects that successfully kept the participants engaged and how they did it as a lesson for future project.

Created by Minh Anh Tran on Apr 19th, 2022  
Source: [www.futurelearn.com](http://www.futurelearn.com)

Good Practices





## 4.3 What We Can Learn?

The Best Practices can give us inspiration and some initial indications and ideas on the the different dimensions and guidelines that could be incorporated.

- By Citizen Science addressing real-life challenges, Citizen Science gains more importance and relevance to work with citizens and gather force.
- The use of technology allows easier access to contributing to Citizen Sciences, as well as to sharing the research.
- Networking with the relevant stakeholders allows the information to be shared across borders, making the impact of Citizen Science research greater and widely applicable.
- Involving a wider audience allows more diverse research entry points in domains that were untouched due to lack of inclusion, expanding the potential that Citizen Science can bring to minority communities.

- Maintaining citizens' engagement in their research makes sure that the research remains citizen-based and not research that is conducted by only academic researchers, allowing new voices and ideas to be shared that were not previously thought of.

Although these are jumping off points, they show the wide range of aspects that Citizen Science could and should be touching upon when constructing an engaging research project.

# 5. Status Quo Needs: Interview & Survey





## 5.1 Approach

As discussed in Chapter 3. Methodology, key insights we gained from the desk research on emerging practices in Citizen Science, in other words, “signals”, and combined with findings from the best-case practices guided us to identify our research questions. The signals were clustered in 3 dimensions of Citizen Science that need to be taken into consideration, namely the status-quo of local ecosystem/networks for citizen engagement in Citizen Science; future opportunities for digital capacity building among citizens; and competence needs for the citizens’ engagement in Citizen Science. This was followed up by the development of survey and interview guidelines prepared by the consortium.

We expect to learn from their areas of curiosity/interest, competencies they needed in engaging in research, barriers to engaging in research, suggestions for future digital engagement, and capacity building. In our research, a mixed research methodology is used to answer the following questions:

- How and to what extent existing local Citizen Science networks are supporting citizens in their involvement with Citizen Science?
- What digital training formats are necessary for wider groups of citizens to build the capacity to get involved in Citizen Science?
- What are the competencies and capabilities that are needed now for Citizen Science and what will be the relevant ones in the future?



## Target groups

In this project, 3 different target groups were defined, as stated below:

**TG1:** citizen scientists (selection - a diverse group of citizens), who:

- may or may not have been involved in a Citizen Science project as a participant, or acted as a non-professional scientist, activist, or a contributor

**TG2:** Citizen Science org. researcher, representative, and practitioners, who are:

- researcher and/ or practitioner of Citizen Science based in a public, non-governmental, or Citizen Science organization, and/ OR representatives of public, non-governmental, or Citizen Science organization

In TG2, we divided the group into two smaller sub-target groups, which include:

TG 2.1: Researcher and/or practitioner of Citizen Science based in public, non-governmental, or Citizen Science organization

TG 2.2: Representative of public, non-governmental, or Citizen Science organization

**TG3:** HEI Citizen Science researchers and practitioners, who are:

- researcher and/ or practitioners of Citizen Science based in a Higher Education Institution



## Data collection and analysis

30 interviews were conducted in three countries; Spain, Germany, and the Netherlands, while the survey was launched on an international scale, with a concentration of results from European countries.

At the time of the analysis, about 400 respondents were reached. The survey was conducted in the Qualtrics platform and offered in 5 languages (German, Spanish, Catalan, Dutch, and English). Interviews have taken place both face-to-face and online with the representatives of three target groups, in English and local languages, with final transcriptions produced in English.

For the analysis, a coding scheme was created to analyze the interview results, with the help of the Monitor Board ([csn.monitorboard.nl](https://csn.monitorboard.nl)) and Excel. Survey results were analyzed via Qualtrics' own tools and Excel.

The interview questions were designed in semi-structured form, while with the survey questions, we used a mix of a single choice, multiple choice, open text answers, and matrix table questions.



## 5.2 Survey synthesis

- **Capacity Building**
- **Competencies**
- **Local Ecosystems**



## Capacity Building

HEI researchers and practitioners and citizen scientists agreed that an in-presence workshop is the most used form of capacity building, followed by webinars, and use of external literature and sources. In terms of digital Citizen Science capacity-building format, Citizen Science organisation researchers and practitioners mentioned that thematic workshops, teaching sessions, webinars, or networking events are highly recommended.

For the purpose of widening the Citizen Science opportunities for diverse groups, HEI researchers and practitioners offered some digital capacity-building formats, mostly in the form of webinars, conferences, or newsletters. Some participants mentioned that having a forum or virtual assistant would be very practical for increasing diversity and inclusion. In addition to this, organizations are suggested to provide a favorable conditions for the citizens to get access to such tools and platforms, including MOOCs, and receive support both technically and financially from the organizations.

Citizen Science organisation researchers and practitioners shared potential capacity-building ideas, such as coaching sessions in different languages, networking events, and virtual helpers. The importance of data practices and data quality in Citizen Science projects were emphasized in open answers, and citizens should be trained for it properly with the use of action toolkits and different resources. Last but not least, Citizen Science organisation representatives suggested working on simplifying digital tools, offering online courses, blogs, online participatory interfaces, and training spaces in schools.



## Competencies

Citizens' motivation to join a Citizen Science project can impact the scale of their participation and the outcome of the projects. The majority of the citizen scientists who took the survey agreed that the topic motivates them to be part of Citizen Science projects when they find the themes interesting or concerning. Some other participants stated that they would like to challenge themselves.

In order to find out what competencies and capabilities are required for citizen scientists to participate in Citizen Science projects, we formed a close-ended question regarding the participant's opinions for all target groups. In addition to this, we tried to explore future competencies from the perspective of researchers from Citizen Science organisation representatives, researchers, and practitioners, also citizen scientists.

Civic competencies, media literacy, and digital literacy were chosen to be the most important capabilities when it comes to successfully participating in a Citizen Science project.

Regarding the predictions on future competence needs, survey takers marked soft skills like communication skills and local knowledge as important for the citizens to learn, while hard skills such as STEM competencies, interpreting, and mathematics skills were also considered essential. While researchers and representatives of Citizen Science organizations agree hard skills and soft skills have similar importance for participation in Citizen Science projects. However, many participants across target groups stated the importance of treating all citizens the same way, even if some of them might not have the required competencies to join a Citizen Science project, as it is the principle of Citizen Science practices.





## Local ecosystems

To investigate the awareness of participants on organizations in their regions that enable citizens' engagement with science, a multiple-choice question was placed for HEI researchers and practitioners, and citizen scientists. Most HEI researchers and practitioners acknowledge the presence of Citizen Science organizations in the region, however, only a small number of citizens are aware of relevant Citizen Science organizations or available resources. This indicates a gap in terms of citizen support with their involvement in such projects. When it comes to the future responsibilities of HEI and Citizen Science organizations, citizen scientists hope that the organizations will take steps in making visible products for the community. Additionally, citizen scientists expect researchers to be more active in reaching out and offering opportunities regarding Citizen Science projects, as they stated to be unaware of the opportunities.

Regarding diversity and inclusion in Citizen Science, most Citizen Science researchers and practitioners from HEIs and Citizen Science organizations indicated that they were uncertain about whether the sufficient effort was placed to include a diverse group. However, there are still some survey takers that were on the brighter side and said that they have definitely taken enough effort to achieve diversity. Citizen Science organisation researchers and practitioners agree that approaching citizens with a familiar societal challenge can help raise their interest in science. Many survey takers from this category agreed that it is important to empower local citizens with resources, tools, and incentives. The majority of HEI researchers and practitioners also agreed on familiar societal challenges and the provision of tools and resources to citizens. Additionally, integrating creative elements into research design such as gamification was marked as important.

When it comes to the opportunity to engage, Citizen Science organisation researchers and practitioners are more likely to offer training workshops and hybrid scientific/science conferences to the citizens. The theme of those opportunities is mostly environmental science and public health.



## 5.3 Interview synthesis

- **Capacity Building**
- **Competencies**
- **Local Ecosystems**



## Capacity-building

Regarding the question of whether capacity-building programs are offered currently, the interviewees have responded in various ways. One of these answers is that citizens do not need to be trained, or that the goal of training is already reached by other means. One scientist has stated that “there is no specific training... it requires a two-way approach”. Another scientist ID4 has argued that “citizens develop skills through feedback with the scientists”, not stating any particular capacity-building program taking place.

Other scientists have responded in a similar way, stating that no specific training was offered, but that “having conversations with people is a learning process”, and “I believe that citizen scientists do not need to be trained.”

Furthermore, scientists also stated that there currently are no activities to “improve their skills”, but that organizing workshops could help. Also, it was important to state that the scientists think about how to organize the project in such a way that it is accessible to a general level of citizens.

Additionally, participation in Citizen Science requires both citizens and scientists to develop themselves, for them, it means “communicating differently”, and learning how to translate their own research and knowledge into something that is understandable for all kinds of citizens.

What also became apparent from the interviews, is that interviewees see capacity as a necessity for the project. As one scientist said: “we train them in terms of what they are going to need for our project”, referring to project-specific workshops. Digital literacy workshops also seem to be fruitful in this regard, according to a Citizen Science organization person. In the Sensorics project, citizens were offered initiatives to make themselves acquainted with sensor technologies, and this was seen as the most important capacity for citizens in the project. So, citizens here need to be trained in the things that they need for the specific project. To further build capacities, this should be the focus.



## Competencies

What is important to mention here is that not all boxes specified the skill sets that were detailed in the interview question form/guidelines, meaning that it depends per interview whether a detailed explanation of each skill set was given by the interviewer and interviewee. Nevertheless, many answers seem to point in the same direction. One Dutch scientist said: “I don’t think they need a specific skillset to know how to do research; those are the ones that scientists bring in... they need basic digital skills and literacy... we should be careful in doing Citizen Science by citizens in such a way that it is a bad form of science.” The same kind of message is repeated by one scientist: “in the end, everyone already has some competencies to do research. It’s not only about academic skills.”

Although there were also different answers to this theme. For example, one citizen scientist stated that having studied in higher education “definitely helps”, but that she was not aware of skills, such as “project management skills, communication skills, and digital skills for online cooperation... [being] crucial” in participating in Citizen Science.

It seems to be the case, from the interviews, that the scientists don’t see specific skill sets for citizens, and that citizens in turn are not that aware of the different skill sets they might need for participating. We see the focus on digital skills coming back in the interviews (citizen: “data protection”; citizen: “the importance of digital skills”, Citizen Science organization person: “digital literacy is important”). This also includes a general understanding of science and data interpretation as a focus according to scientists and citizens. These are pretty much general skills that seem to help citizens in their endeavors.



## Competencies

It also seems that, besides these skills, it is also important for citizens to have a certain attitude when participating in a Citizen Science project. One Citizen Science organization person said that it is important to be motivated to not just participate but to find solutions to real-life problems, wanting to understand the importance of science.

Regarding skills training, and this relates to capacity building; it seems that often the approach is to rather “create a level playfield” than train citizens to have the skills that one could require. This does not mean that the bar should be lowered to have as many as possible citizens participating, as one citizen put it, it is useful to have some background, and citizens need a level of knowledge and competence.

It seems to be the case that skills training is context-dependent and it depends on what the researchers want the citizens to do in these projects. This is repeated by one Citizen Science organization person, who stated that everyone can join in their way; citizens could just join to be the measurement pieces of research, but also be involved in project management, or organizing events. The type of skills that citizens need in such a situation is also highly dependent on what role they have.



## Local ecosystems

For the status of the local ecosystem, and the approach to a wide inclusion of citizens, the answers were pretty context-dependent. It refers to both the inclusion of citizens at all levels of research, but also the diversity of the citizen participants. Many of the Citizen Science projects that the interviewees are part of are new innovative projects, and often they take do not have inclusivity of citizens as their current main priority. In one of the profile, this was bluntly described as a financing issue by one scientist, and it takes additional effort to reach 'unusual suspects.'

Creating a level playfield, and having initiatives in neighborhoods. One Citizen Science organization person participates in local Citizen Science projects but does not live in the particular neighborhood. This person would have been more involved if this initiative took place near her residence. Using mobile or pop-up labs could help to target neighborhoods that consist of 'unusual suspects' according to two scientists. Targeting marginalized groups could also be subject to the communication strategy that is used by the Citizen Science organization or project managers because it is easier to reach people face-to-face than in a digital environment.

Concerning unusual suspects, scientists have stated the move to digital environments seems to not have a real advantage to reach this group of people. Using traditional methods probably works better. Other strategies mentioned by scientists for attracting a wide group of citizens, or a specific 'unusual suspect' target group seem to be organizing interesting workshops, collaborating with non-governmental organizations, or setting up particular projects. In one of the projects, the focus was specifically on people with a migration background suffering from a particular disease. However, this means it is not easy to develop a uniform method to attract unusual suspects. It depends on the 'generality' of a research project. Creating a project with a very specific target group might make it easier to attract participants from marginalized groups (e.g. the project with people with a migration background) rather than having a project with an aspired equal representation. One of how a 'general' project could attract a diverse range of participants, is by having a low threshold. The public library mentioned by a Citizen Science organization person is a perfect example of something that is accessible to everyone and presumably used by everyone. This could be a solution for general projects.

# 6. Foresight Building





## 6.1 Research Questions.

### Research Question:

Within the Citizen Science Now project, our scanning and research focused on exploring and understanding contemporary and future developments of Citizen Science, using the following research questions as a guideline:

- What are the drivers that will change the future landscape of Citizen Science?
- What are current and emerging behaviors and technologies in Citizen Science projects and Citizen Science digital training that can inform future direction and create a better understanding of needs?

### Secondary questions:

Additionally, we formulated secondary research questions that we explored as well:

- + How to increase the awareness of Citizen Science among marginalized citizens and empower them?
- + How to increase access for citizens to upskill, engage with and co-create on Citizen Science projects?
- + How to alleviate the barriers of time, social and geographical distance?
- + What are strategies to positively influence the perspective of Citizen Science?
- + What does this all mean for the development of Citizen Science projects and the need for Citizen Science training?



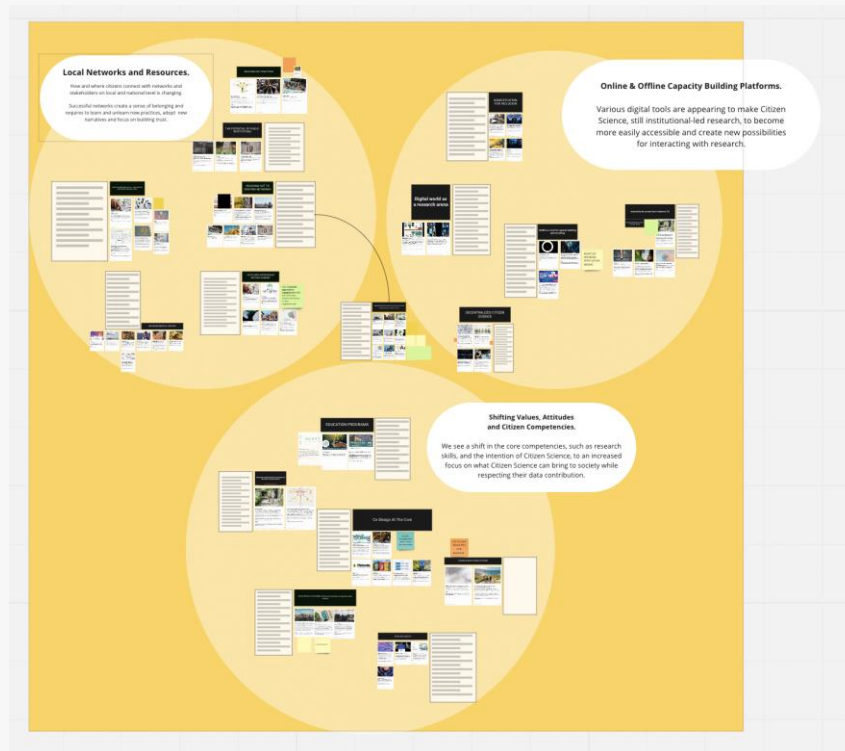


## 6.2 What Are Insights?

In the following section we will share the 17 insights we have identified through our research, followed with key signals that support them. When looking at the future of Citizen Science, three domains of change emerged whilst researching, highlighting areas of interest when looking at the Future Of Citizen Science.

Insights help us with:

- + Converging extensive research data into compelling narratives to share with other stakeholders.
- + Extrapolating and articulating the information we didn't know before the scanning
- + Articulating concise and powerful statements to reduce noise
- + Generating actionable points of departure



**Image:** Process of making insights after a collaborative workshop with the consortium happened in various iterations.



## 6.3 Domains Of Insights.

The following domains emerged whilst researching and scanning. It highlights areas of interest when looking at the **future landscape of Citizen Science**. We see the inclusivity of citizens as a core represented in all domains. With Citizen Science becoming more impactful in society, using data as a decision-making tool, it is important that all people understand the data and be comfortable using the data.

The domains are not intended to represent all topics but provide a visual overview of domains, insights, and signals shaping the “Future of Digital Citizen Science”.

We present here an overview of the insights, but for the full report, please follow this link to the full [‘Future of Citizen Science Insights’ Presentation](#).





# I. Local Networks and Resources.

How and where citizens connect with networks and stakeholders on local and national level is changing. Successful networks create a sense of belonging and requires to learn and unlearn new practices, adopt new narratives and focus on building trust.

## Trend 1.

### Spotlight On Localized Approaches.



#### What makes you feel that you belong in my city?

The Urban Resilience project goes in-depth on insights from the Urban Resilience project. By involving stakeholders from different urban organizations in a variety of participatory approaches, the project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

The project provides the design of participatory tools that provide an insight into the needs of citizens. For instance, the project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

**Reference**  
The project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

Source: Urban Resilience Institute, 2020. URL: [https://www.urbanresilienceinstitute.org/](#)

## Trend 2.

### Reach Out Beyond the Existing Networks.



#### Participatory urban development today - views and wishes

Lecture at the Downtown Conference 2019 'How strong the city? Participation to participate?' on May 20, 2019 in Mülheim an der Ruhr. The project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

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Source: Urban Resilience Institute, 2020. URL: [https://www.urbanresilienceinstitute.org/](#)

## Trend 3.

### Addressing Inclusivity Of All Voices.



#### Inclusive inclusivity in civic participation

A framework for smarter communities is the involvement of people with disabilities. The project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

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Source: Urban Resilience Institute, 2020. URL: [https://www.urbanresilienceinstitute.org/](#)

## Trend 4.

### Digital Mapping as a Collective Decision Making Tool.



#### Improved resilience through adaptation and mitigation actions

Tactical urbanism goes to the heart of what you feel about your city. The project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

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Source: Urban Resilience Institute, 2020. URL: [https://www.urbanresilienceinstitute.org/](#)

## Trend 5.

### The Potential of Public Institutions.



#### Library hosts organized CS events

The Tucson Public Library runs a People Planet Program empowering local citizens. The project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

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Source: Urban Resilience Institute, 2020. URL: [https://www.urbanresilienceinstitute.org/](#)

## Trend 6.

### Environmental Concerns Push New Research.



#### Public Lab

Public Lab is a community and a non-profit, democratizing science to address environmental issues that affect people. The project provides a platform for citizens, activists and researchers to work together on the issues that affect their city. The project is a platform for citizens, activists and researchers to work together on the issues that affect their city.

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Source: Urban Resilience Institute, 2020. URL: [https://www.urbanresilienceinstitute.org/](#)



## II. Shifting Values, Attitudes, and Citizen Competencies.

New societal values are driving new behaviours and expectations. Looking into the future, it is not only technological changes, but even more shifting values and aspirations that will impact the landscape. We see a shift in the core competencies, such as research skills, and the intention of Citizen Science, to an increased focus on what Citizen Science can bring to society.

### Trend 1.

#### Education Programs.



**Citizen Science School: Social Dimensions in Citizen Science**

The main goal is to offer academic researchers a common space and a shared time to reflect, discuss, learn, and develop practical solutions to current social dimensions beyond a wide set of citizen science projects related to local issues and other involving groups and projects. It is a collaborative alternative to academic conferences... as a participatory research approach on engaged and directly applied to citizen science planning a social context. There are many ways to enhance the social dimensions of Citizen Science, and the other way back to the possibilities of using participatory research training program in a similar situation that can be co-researchers.

Some requirements to learn about how to engage training materials.

### Trend 2.

#### Citizen Activism.



**From Open and Citizen Science to Activism: Roles of Academic Staff**

Academic staff teach students on how to use citizen science as a form of activism. In a new research project conducted by the University of South Australia, researchers are exploring the physical and social benefits of older people (aged 50+) participating in environmental citizen science projects. Equipped with the right tools, they can be trained to help citizens by helping them to help themselves. The project aims to identify ways to provide people with support through citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.

The academic staff takes an important role in teaching the young generation how to use citizen science as a way to act for their values and research to reach the topics that concern them.

### Trend 3.

#### Benefits Beyond Research.



**Wellbeing Impact**

In a new research project conducted by the University of South Australia, researchers are exploring the physical and social benefits of older people (aged 50+) participating in environmental citizen science projects. Equipped with the right tools, they can be trained to help citizens by helping them to help themselves. The project aims to identify ways to provide people with support through citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.

This also shows that older people find these activities engaging and meaningful. They are being able to contribute to environmental science projects, build confidence, build social connections. They are not just passive participants but active contributors. They are being able to contribute to environmental science projects, build confidence, build social connections. They are not just passive participants but active contributors. They are being able to contribute to environmental science projects, build confidence, build social connections.

Researcher

The research focuses upon important questions about improving well-being and overall health for the elderly who participate in citizen science. The project aims to identify ways to provide people with support through citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.

### Trend 4.

#### Co-Design At The Core.



**Extreme citizen science gives a voice to the marginalised in remote communities**

Collaborating with indigenous communities. The extreme citizen science approach includes people who are normally excluded from citizen science. Through an ICT initiative, researchers have collaborated with a community group with the main focus on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.

Researcher

There is a growing awareness of the importance of the role of citizens in citizen science. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.

### Trend 5.

#### Ethical Consideration of Data Sharing.



**Citizens give up data in blockchain project to improve cities**

The EU-funded project Decentralised Citizen Owned Data Ecosystems will use blockchain technology to improve the cities. Citizens are given up data in blockchain project to improve cities. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.

Researcher

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### Trend 6.

#### Open Resources for Wider Community.



**Mutual learning exercise on citizen science initiatives**

Most recent input on policy and practice on CS. An interesting exercise on citizen science projects and activities, and how to improve them. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.

Researcher

This is the most recent discussion on the role of CS in Europe. It can provide some ideas. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects. The main focus is on the physical and social benefits of older people who are participating in citizen science projects.



### III. Online & Offline Capacity Building Platforms.

With an increase in digitalisation, data and connectivity, new digital tools and approaches are emerging to make Citizen Science become more accessible. New hybrid realities are already a reality and digital formats that can create new possibilities for engaging and interacting with research, as well as involving new groups of citizens.

#### Trend 1.

### Gamification for Inclusion.



**EXAMPLE / Citizens design their city through videogame**  
 Block by Block uses Minecraft to involve the community in public space planning.  
 Minecraft's easy-to-use, and simple, set of maps, backgrounds, and education tools can act as a sandbox. It's a surprisingly effective and cost-effective way to involve a diverse demographic of participants, as a format designed for rapid iteration and low barriers. Through low-threshold engagement, it's a format designed for rapid iteration and low barriers. Through low-threshold engagement, it's a format designed for rapid iteration and low barriers. Through low-threshold engagement, it's a format designed for rapid iteration and low barriers.

Source: Block by Block, 2021. URL: https://www.blockbyblock.org/

#### Trend 2.

### Digital World as a New Research Arena.



**EXAMPLE / Joining forces of AI and human intelligence for addressing climate problems**  
 Data Hackers Labo Supermarket. Discoveries how to collaborate with technology to gain better outcomes.  
 The algorithm labo is a platform that facilitates the collaboration between citizens and AI to address climate change. It's a platform that facilitates the collaboration between citizens and AI to address climate change. It's a platform that facilitates the collaboration between citizens and AI to address climate change.

Source: Data Hackers Labo Supermarket, 2021. URL: https://www.datahackerslabo.com/

#### Trend 3.

### Social Media as a Tool for Recruiting Younger Generations.



**TikTok sparking interest in science**  
 UK Institute of Physics has turned to young social-media stars to get more schoolchildren excited about the subject.  
 The Institute of Physics (IOP) wants to engage young people who have never considered formal education in physics. It's a platform that facilitates the collaboration between citizens and AI to address climate change.

Source: UK Institute of Physics, 2021. URL: https://www.iop.org/

#### Trend 4.

### Inclusivity in Tech for Digital Immigrants.

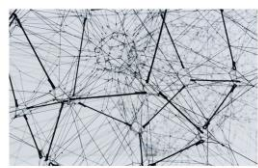


**SURVEY / A focus on simplifying digital tools in capacity building for CS**  
 The group of representatives from organizations states a need for simplifying digital tools in capacity building for CS.  
 The group of representatives from organizations states a need for simplifying digital tools in capacity building for CS. It's a platform that facilitates the collaboration between citizens and AI to address climate change.

Source: Survey, 2021. URL: https://www.survey.com/

#### Trend 5.

### Decentralised Citizen Science.



**Decentralised Science (DeSci) to fund citizen projects**  
 EarthFund propose a new way of supporting science projects.  
 The EarthFund is a platform that facilitates the collaboration between citizens and AI to address climate change. It's a platform that facilitates the collaboration between citizens and AI to address climate change.

Source: EarthFund, 2021. URL: https://www.earthfund.org/

# 7. Conclusions and Next Steps





## 7. Conclusion and Next Steps.

In the light of our findings and the competences identified, our Citizen Science training resources will be built upon the considerations highlighted in three major insights, namely the power of local networks and resources; shifting values, attitudes and citizen competencies; and potential of online & offline platforms for Citizen Science capacity building.



## 7.1 Situated approaches to Citizen Science

**Local communities** are more and more expected to voice their vision and concerns about their own contexts in Citizen Science projects. Being experts-in-the field, they can help in better framing Citizen Science research, in codesigning research to enhance and improve participation, in extending the call for participation to a wider community and collect more data or at least more adequate data to topic addressed, in interpreting data in a way that builds socially robust knowledge and in having the capacity of this knowledge to inform research and policy making. Accordingly, to take full advantage of citizen's local knowledge, different resources and new strategies are needed to further include local communities and enhance a more situated knowledge co-production within Citizen Science projects.

**The potential of public institutions** as drivers of Citizen Science is more recognized than ever before. Public institutions such as e.g. municipalities, museums, libraries are meeting points for the locals, with opportunities offered to engage with science. Accordingly, capacity building resources need to be aligned with services and offerings of such institutions, giving them visibility.

The training should also need to bring insights on how to embrace Citizen Science into their mission. It is important to include guidelines for the Citizen Science researchers and practitioners of such organisations to onboard citizens in their research projects as collaborators and on how to build new projects with different actors.

Concerns are found to be one of the key motivations for citizens to participate in science. They are often related to environmental and/or social pressing issues where some action must be taken. Thus, our situated approach to Citizen Science capacity building would primarily take a local societal challenge as a starting point, that is of concern to citizens. It might be necessary to imagine training specifically designed to local communities or local civil society organizations while public institutions that are present in these local contexts and higher education institutions or scientists might also consider specific training as well. In all cases, training of dynamics to approach each other and trust building among the different actors involved appears to be key.





## 7.2 Shifting values, attitudes and citizen competencies.

**Co-design at the core** can increase the quality of Citizen Science projects. To better consider the involvement of citizens, there is an increasing interest to enhance co-design and deliberation in all different phases of a Citizen Science research: from identifying a topic to informing policy recommendations. Skills and competencies related are thus necessary especially to those managing and leading Citizen Science projects. For instance, if they are professional scientists, they very often lack of related skills to further augment participation in Citizen Science research. Training must include a vision of the Citizen Science research phases and which methodologies suits best to have co-design at the core of the different phases of the project.

**Ethical considerations** must be deepened for Citizen Science research integrity. Citizen Science is one of the eight pillars of Open Science and Open Science is also based on Open Data and Research Integrity. However, not all Citizen Science have data open and sometimes it is indeed not advisable as they can expose their participants if this procedure is not correctly done. In this sense, it is needed to specifically explore Open Data and data sharing considering the specificities of Citizen Science projects.

Surveys and interviews are also pointing to digital and technological skills which have also to be better linked with related ethical and privacy considerations when citizen scientists are involved in a project.

**Open resources for wider community** are important to further extend Citizen Science practices. Looking at existing Best Practices, one finds out that there are very similar projects in several countries. Also, the interviews and the survey also point out that local Citizen Science networks are not widely known. Spaces for sharing experiences and methods are important and not enough developed. However, to make this possible one must start by opening and sharing resources within local communities and among global communities. Training planned must showcase good practices. Training must also encourage these sharing practices and show the big advantages of contributing to the wider community. The approach thus promote cooperative scientific research in front of a competitive scientific research.



## 7.3 Potential of online & offline platforms for capacity building.

**Gamification** can be a playful means of building competences for the new users of digital space, that would enable more effective and more sustained Citizen Science participation. Gamification in Citizen Science can help reach out to larger communities as collaborators, lower threshold of participation, and provide incentives (e.g. badges) for continuing engagement. While there might be an element of unfamiliarity with online gamification among adult participants of Citizen Science, children and young people might have higher preparedness in using and benefiting from it.

**Inclusivity in technology** among especially elderly and lower-income communities needs to be ensured to achieve diversity in Citizen Science. Capacity building could target training on how to utilize digital platforms to create and share knowledge, supported with mentors guiding the learning process. Such an approach would foster social inclusion for people at risk of digital vulnerability, via citizen empowerment and knowledge co-production. The transversal competences developed would not only help increase participation in Citizen Science projects, but also improve the quality of lives of citizens in general.

**Social media** has long been used in the Citizen Science projects to recruit, retain and train volunteers. Our research has also shown evidence on the popularity of platforms such as Facebook, Instagram and TikTok in the communication of science by the researchers. Building upon existing practices, and with the goal of citizen empowerment in mind, new training resources needs to be developed for the citizens on how they can raise awareness in their own local community on different topics of concern, collect data, and disseminate the knowledge they co-created via social media. Such an approach would especially encourage citizen activism among those who are natural community leaders, which would cascade and help engage larger communities in Citizen Science projects.

Project partners:

Science Marketing  
Science-to-Business Marketing Research Centre

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