THE OPEN SCIENCE GUIDE OF GUIDES

OPEN SCIENCE AND

Open Access Publishing

Knowledge Justice

Citizen Science

Data Science

By Simon W. , Ina B. et al

BIM-224 SoSe 2021

The Open Science Guide of Guides

Knowledge justice, Open Access Publishing, Data Science, and Citizen Science

von HsH. BIM-224, Open Knowledge, summer term 2021, Blümel

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Foreword

Open Science has become an indispensable part of modern science. There are several definitions of "openness" in relation to different aspects of science - the Open Definition sets out principles as follows “Open means anyone can freely access, use, modify, and share for any purpose (subject, at most, to requirements that preserve provenance and openness).” **Practical guides** for the implementation of those principles in different areas such as research data or publishing are of great importance because they can be used right away.

In this compendium, we compile important guides with their specific features and fields of application. The book was written as part of a student seminar at the Hanover University of Applied Sciences and Arts.

Open Science and Knowledge Justice

Contributors: Kaan Ilgaz, Ümit Günes, My Linh Nguyen Thi, Lorenzo Vassao

Tags / topics: Knowledge Justice; equality; equity; justice

Equity vs. Equality: What's the Difference?

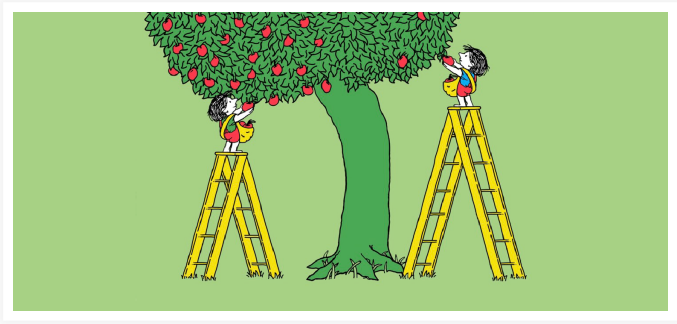

Image: Source- "Addressing Imbalance," by Tony Ruth for the 2019 Design in Tech Report.

Guide name: Equity vs. Equality: What's the Difference? (MPH@GW, the George Washington University 2020)

Target group: public health masters students, health community, policy and system designers.

Type: Guide for Masters course.

Summary: The guide is an introduction to the difference between equality and equity. Firstly it explains the difference in terms of how society hands out resources and opportunities using the USA 1960 example *The Giving Tree* is an American children's picture book written and illustrated by Shel Silverstein. The core idea being that society is not a natural system and has inbuilt rewards that prioritize social groups.

> *Equity is a solution for addressing imbalanced social systems. Justice can take equity one step further by fixing the systems in a way that leads to long-term, sustainable, equitable access for generations to come.*

The guide then shows example recommendations from leading health institutions and how thes define the topic: for example here with The World Health Organization (WHO) and how equity is defined; US Centers for Disease Control and Prevention (CDC) refers to health equity; and here as the Race Matters Institute desribes.

The guide then shows examples of how equality and equity differ in policy, for example:

> Equality - A city cuts the budget for 25 community centers by reducing the operational hours for all centers by the same amount at the same times.
> Equity - The city determines which times and how many hours communities actually need to use their community centers and reduces hours for centers that aren't used as frequently.

Short case studies of programs are described and given a list of additional resources.

Knowledge Justice: Disrupting Library and Information Studies through Critical Race Theory

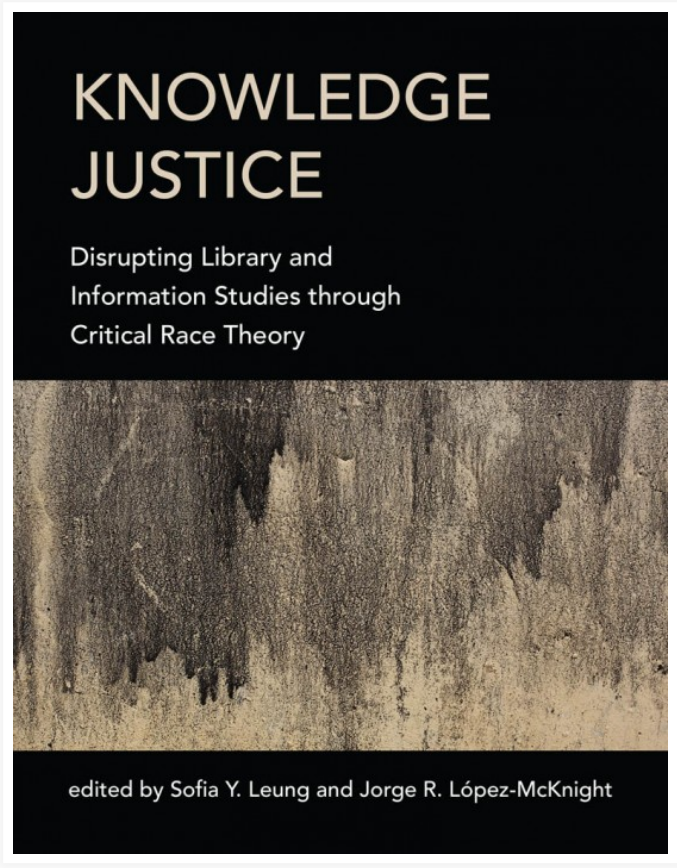

Image: Cover 'Knowledge Justice: Disrupting Library and Information Studies through Critical Race Theory'.

Guide name: *Knowledge Justice: Disrupting Library and Information Studies through Critical Race Theory* (Leung and López-McKnight 2021)

Target group: The target audience of this book are people who want to research basic information and the possibilities of Open Science. Furthermore, Open Science should be accessible to everyone and everyone should have equal rights.

Type: Recommendations for Practice, LIS study.

Summary: In Knowledge Justice, scholars from various ethnic backgrounds draw on critical race theory to challenge the fundamental principles, values and assumptions of library and information science in the United States. This is intended to lead the profession to understand how "white" supremacy affects practices, services, curricula, spaces, and policies.

The authors describe that a misconception of the neutrality and objectivity of library and information science comes from the influence of the different ethnicities of scholars. Through in-depth analyzes of library and archival collections, scholarly communication, power hierarchies, epistemic domination, children's libraries, teaching and learning, digital humanities, and the education system, Knowledge Justice calls for the abolition of so-called "white supremacy" in order to create racial justice for every group of people.

GENDER in OPEN SCIENCE & OPEN INNOVATION

Image: Cover 'Report on Strategic Advice for Enhancing the Gender Dimension of Open Science and Innovation Policy'.

Guide name: GENDER in OPEN SCIENCE & OPEN INNOVATION (Gender Action 2018) and *Report on Strategic Advice for Enhancing the Gender Dimension of Open Science and Innovation Policy* (Institute of Sociology, of the Czech Academy of Sciences, and Prague, 2019 2019)

Target group: researchers, research institutions, policy makers.

Type: Briefing Paper, In depth report.

Summary: The briefing paper and the longer report are part of an ongoing EU Horizon research project in the European Research

Area (ERA) on gender equality in research and specifically Open Science. The research project is called Gender Action. see: http://genderaction.eu/.

As of 2018 the research group found no mention of gender equality in EU Open Science policy.

> “Existing policy documents and studies on OS&OI, including those by the EC, reveals zero attention to gender equality” GENDERACTION OS&OI Report

The briefing paper goes on to make five recommendations aimed at the European Commission and EU Council.

The follow up report Report on 'Strategic Advice for Enhancing the Gender Dimension of Open Science and Innovation Policy' 'is a fifty page indepth study and set of recommendations for Open Science and Open Innovation.

Practical Guide to Improving Gender Equality in Research Organizations

Image: Cover 'Practical Guide to Improving Gender Equality in Research Organizations'.

Guide name: *Practical Guide to Improving Gender Equality in Research Organizations* (Science Europe)

Target group: Introductory: no previous knowledge is required.

Type: report and guide.

Summary: The guide is written to inform research managers how to manage 'gender and diversity' questions in peer review, management, and grant awards.

The guide outlines issues, gives examples, and provides information on further literature or resources.

This practical guide authored by Science Europe covers the topics "How to Avoid Unconscious Bias in Peer Review Processes", "How to Monitor Gender Equality" and "How to improve Grant Management Practices" in order to approach gender equality in research organizations as these play a fundamental role addressing gender inequality within their own systems but also in wider society.

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https://www.fosteropenscience.eu/content/practical-guide-improving-gender-equality-research-organisations.

Open Science and Open Access Publishing

Contributors: Maria Sael, Sabrina Gaab, Mohammad Al Nasouh, Edith Reschner

Tags / topics: Open Access, Open Science, Open Access Publishing, Open License, Scholarly P ublishing, APCs, Author Rights, Copyright

Open Access Publishing

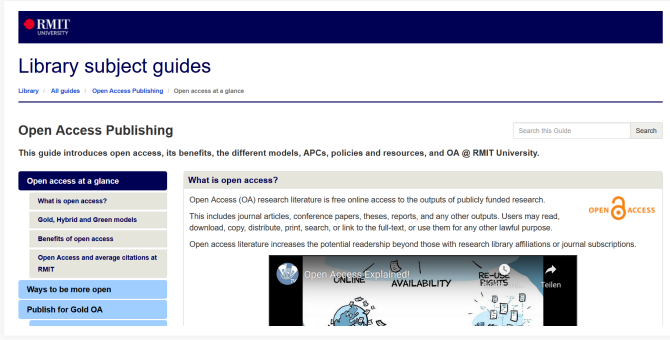

Image: Screenshot of the guide on the RMIT-Website.

Guide name: *Open Access Publishing* (Macvean 2021)

Target group: The primary audience for this guide is college students, and especially the RMIT-University students, as open source resources for educational purposes to achive academic success.

Type of guide: A guide was written by Karen Macvean and published in the online library RMIT - Global University of Technology, Design and Economics to explain everything about Open Access briefly using different exploration methods such as explanatory videos, charts, illustrations, and Text such as Step by step, checklist.

Summary: The guide explains the idea behind Open Access, its models such as Gold, Hybrid, and Green Open Access. An illustration also shows the benefits of open access in different disciplines. The difference in the citation volume of Open Access publications compared to non-Open Access publications is also shown in a diagram. Further tips on how to make research more open are listed as well as information on what preprints are, why, and how preprints can be shared are listed. The guide includes a

list of open-access resources, such as Organizations, Directories, and Tools. The guide addresses FAIR principles, policies, and ethics, data planning, storing, and sharing data. Reading this guide will help with choosing the right type of publication, be it in journal articles, books and book chapters, conference papers, or non-traditional research (NTROs). The guide also provides an overview of copyrights and Information on Article Processing Charges (APCs) that should be checked before paying a journal.

Von Open Access zu Open Science: Zum Wandel digitaler Kulturen der wissenschaftlichen Kommunikation

Image: Cover "Von Open Access zu Open Science".

Guide name: *Von Open Access zu Open Science: Zum Wandel digitaler Kulturen der wissenschaftlichen Kommunikation* (Heise 2018)

Target group: open accesss and open science community.

Type of guide: With the help of an experiment, this handbook presents the chances of and barriers to Open Access.

Summary: The call for free access to scientific research results and an opening up of the research process goes hand in hand with digitization in science. Open Access and Open Science are the key terms of this transformation process, which is euphorically welcomed by some and strongly rejected by others. Based on a quantitative survey and a reflexive experiment, the book provides insight into the current debates on the opportunities as well as the obstacles of opening up science.

Understanding Open Access. When, why, & how to make your work openly accessible

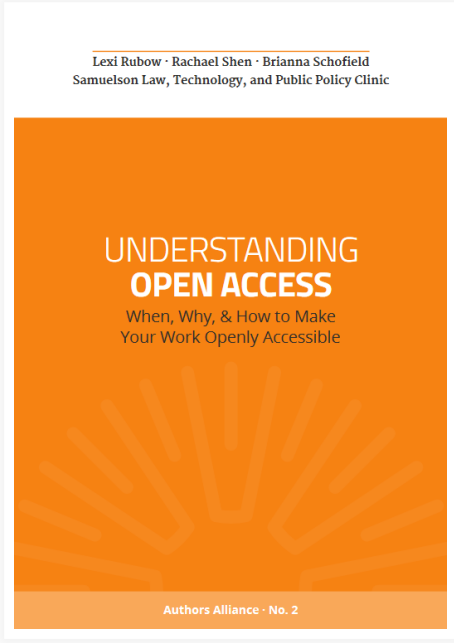

Image: Cover 'Understanding Open Access. When, why, & how to make your work openly accessible'.

Guide name: *Understanding Open Access. When, why, & how to make your work openly accessible* (Rubow, Shen, and Samuelson Law, Technology, and Public Policy Clinic 2015)

Target group: The guide is for authors of all backgrounds, fields, and disciplines, from the sciences to the humanities.

Type of guide: This guide is the product of extensive interviews with authors, publishers, and institutional representatives who shared their perspectives on open access options in today's

publishing environment. The information, strategies, and examples included in this guide reflect the collective wisdom of these interviewees.

The basic structure of this step-by-step guide traces the process of how an author would decide whether and how to make a work openly accessible. Therefore, this design is intended to help with each step of the decision-making-process when thinking about Open Access Publishing.

Summary: This Guide provides a scholarly author-oriented look at the ins and outs of open access publishing. It addresses common concerns about what "open access" means, how institutional open access requirements work, and why authors might consider making their work openly accessible online. Furthermore, it provides the reader with real-life strategies and tools that can be used to work with publishers, institutions and funders.

Following the Introduction, there are three more sections at hand: Section II addresses the trade-off of whether to make the work openly accessible or not. Section III then explains how to do so by giving advices on how "open" to make the work, where to make it openly availabe to the public and also how to secure the right to use third-party content in the later openly accessible work. Also included are strategies on how to make the work openly accessible while also publishing it through a conventional publisher. Finally, the guide concludes with Section IV, a window on the future of open access.

Open Access publizieren – Fragen & Antworten

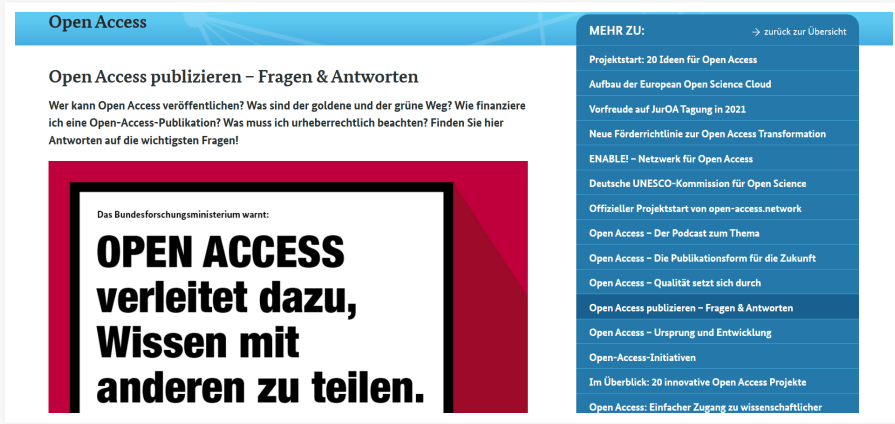

Image: Website for resrouces 'Open Access publizieren – Fragen & Antworten'.

Guide name: *Open Access publizieren – Fragen & Antworten* (Bundesministerium für Bildung und Forschung 2021)

Target group: This guide is for visitors who have questions about the topic of Open Access (OA). These visitors can be academics, authors who want to publish their publications on OA or regular visitors such as students, private visitors etc. who want to learn more about the topic of Open Access publishing.

Type of guide: Website giving an overview of important questions and answers on Open Access publications.

Summary: This guide answers important questions about the topic of Open Access (OA). Firstly, it discusses who can publish OA. Secondly, it explains the two publication Roads: "Gold" Road and "Green" Road. It also mentions how OA journals are financed and explains the costs of an OA publication. In addition, the two options "OA journals" and "repositories" on OA publishing are

mentioned. OA affords the possibility to make the knowledge generated as accessible and usable as possible for readers and other researchers. This guide therefore mentions how to find research results on OA. Furthermore, the topic of copyright is addressed. Moreover This guide contains a short video mentioning the advantages of OA. Firstly, scientists are noticed internationally. Secondly, knowledge is shared across the world etc. The video additionally discusses the quality of OA publications and points out that there are an increasing number of authors who publish their work on OA.

Open-Access-Publikationsworkflow für akademische Bücher

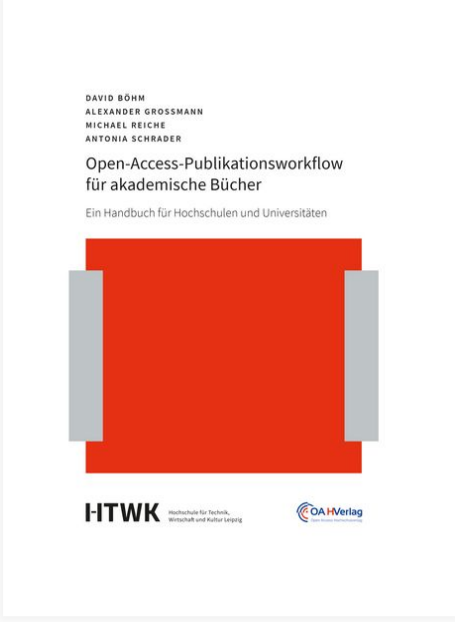

Image: Cover 'Open-Access-Publikationsworkflow für akademische Bücher'.

Guide name: Open-Access-Publikationsworkflow für akademische Bücher (Böhm et al. 2020)

Target group: This guide is for universities that want to publish their publications both as Open Access and printed books.

Type of guide: This is a book presenting a workflow for producing and publishing academic books in digital form on Open Access and as a printed book.

Summary: The immediate, transparent and sustainable dissemination of verifiable scientific results is one of the essential requirements for scientific communication and infrastructure. Open Access, i.e. the open and free use of scientific literature, is the basic prerequisite for this. Colleges and universities are usually the institutions where scientists generate new research results and prepare them for publication in book form. In addition to traditional academic publishers, more and more university presses are therefore publishing academic publications. In the present manual a sustainable and ideal workflow for producing and publishing academic books is presented. That workflow enables universities to publish their publications both as Open Access and printed books in a state-of-theart way and without any restrictions regarding the license, the variety of formats, print run etc. This workflow model will be demonstrated as a proof of concept using selected case studies and reflects the current state of technical and economic technical and economic possibilities in the publishing sector. On the basis of the case studies, the time, costs and personnel involved were also recorded, so that other higher education institutions and universities can be given pointers for the necessary investments in founding and operating their own OA university publishing houses are provided.

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Open Science and Data Science

Contributors: Falkewitz, Philip; Görzen, Linda; Matern, Johannes; Shahbazi, Kian

Tags / topics: Data Science; Machine Learning; Big Data; Python; Best practices; Reproducible research

Big Data and Open Science Data

Image: Cover, 'Big Data and Open Science Data'.

Guide name: *Big Data and Open Science Data* (Gutierrez 2015)

Type: step-by-step, instructions.

Target group: Data researchers who are looking for a roadmap on Open Science Data.

Summary: This article is about Big Data research and its content sharing. The goal here is to disclose benefits to support the promotion of Open Science. The article describes the problem of the high volume of Big Data and thus opacity, as well as the positive effect of data sharing of such data volumes. The article is divided into four sections.

1. problem definition

2. state of research
3. advantages of Open Science
4. future outlook

Perspectives on open science and scientific data sharing

Image: Publication website 'Perspectives on open science and scientific data sharing: an interdisciplinary workshop'.

Guide name: Perspectives on open science and scientific data sharing: an interdisciplinary workshop (Destro Bisol et al. 2014)

Type: step-by-step, instructions, workshop.

Target group: scholars and researchers of all scientific domains who are looking to share or access open data.

Summary: This article is looking at Open Data and Open Science in general, and does not focus on a specific domain. The goal behind it is to promote communication and interaction between scholars who are working with (open access) papers. The content consists of summaries of presentations from a meeting. The article is structured in four issues:

1. The establishment of a common framework and a general discussion about principles of open data, values and opportunities.

2. Insights about scientific practices, especially how the open data movement is developing in specific scientific domains.
3. A case study of homan genomic, which was one of the first big shared documents, which demonstrated the boundaries between large scale data sharing, the boundaries of openness and protection of individual data.
4. A discussion about the public communication fo science and the role of the public in it. This point includes proposals for initiatives on open science. These are integrating a top-down initiative by the gevernments, institutions and journals, in combination with a bottom-up approch von the community. Popularizing the benefits is also a propsal, which is being made, which includes explaining the benefits.

Support Your Data

Image; Article website 'Support Your Data: A Research Data Management Guide for Researchers'.

Guide name: *Support Your Data: A Research Data Management Guide for Researchers* (Borghi 2018)

Type: Toolset for self-assessment, series of short guides.

Target group: Researchers working in different institutional and disciplinary contexts.

Summary: Researchers are faced with rapidly evolving expectations about how to manage and share their data, code and other research materials. To help them meet these expectations

and generally manage and share their data more effectively, there are series of tools called Support Your Data.

These tools include a rubric designed to allow researchers to self-assess their current data management practices.

Included are self-assessments of their current data management practices and a series of short guides that provide actionable information on how to improve practices based on need or desire. These are designed to be easily adapted to the needs of researchers working in different institutional and disciplinary contexts.

Recommendations for open data science

Image: Article website 'Recommendations for open data science'.

Guide name: Recommendations for open data science (Gymrek and Farjoun 2016)

Type: Instructions for action.

Target group: Life sciences, but also most other scientific disciplines.

Summary: The authors criticise that the computational analyses used in research are usually not published with the research results. This makes the research results non-transparent and

difficult to understand. This practice needs to change in the sense of the open science movement. For this purpose, scientific communities should follow the guidelines presented:

1. The tool software used should be made available or cited in public repositories.
2. Make pipelines available or cite them in public repositories
3. Teach data science to researchers
4. Publishers and reviewers must enforce reproducibility of computations

The authors refer to life science. However, the instructions for action can be applied to most other scientific disciplines.

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Open Science and Citizen Science

Contrubtors: Franziska Ahlborn; Mary Sermus

Tags / topics: Citizen Science; Citizen Science to monitor biodiversity; Citizen Science to study biodiversity and the environment in the UK; Citizen Science and public understandig

Citizen science for all - A guide for citizen science practitioners

Image: Cover 'Citizen Science for All'.

Guide name: *Citizen Science for All* (*Citizen Science for All. A Guide for Citizen Science Practitioners* 2016)

Target Group: This guide is primarily intended for those initiating citizen science projects, but also for anyone participating in such projects.

Type: Guide with practical instructions.

Parts: Part 1: The Practice of Citizen Science describes the Practice of Citizen Science in Germany. Part 2: The Landscape of Citizen Science presents the possible uses of this participatory approach in various research disciplines and fields.

Summary: This guide describes how Citizen Science is practiced in Germany and how this participatory approach can be used in different research disciplines and thematic areas - such as

education, nature protection or the humanities. The guide is addressed primarily to initiators of Citizen Science projects, but also to all those who participate in such projects. This includes scientists working in research institutions who want to work with citizens, but also individuals and community groups such as independent scientific groups and associations. This guide is the result of intensive collaboration between a wide range of stakeholders in the citizen science community in the Citizens Create Knowledge Project (BürGEr schaffen WISSen, GEWISS). It is based on insights gained at dialogue forums and other events. Some stories about the projects were received from workshop participants at the Citizen Science Forum in March 2016.

Citizens Create Knowledge – Knowledge Creates Citizens (BürGEr schaffen WISSen – Wissen schafft Bürger, GEWISS) is a capacity-building programme aimed at strengthening citizen science in Germany.

Choosing and Using Citizen Science - A guide to when and how to use citizen science to monitor biodiversity and the environment

Guide name: *Choosing and Using Citizen Science* (Pocock et al. 2014)

Target Group: people who are considering whether a citizen science approach can contribute to their work.

Type: Decision-framwork scheme for selecting and using citizen science. This guide does not cover the practical details of developing a citizen science project.

Parts: This guide should help people to discover: 1. whether citizen science is suitable for your proposed project, and; 2. what

type of citizen science is most appropriate for you to adopt. Decision framework will help people to more clearly understand the potential opportunities and limitations of citizen science.

Summary: Citizen science can be a very useful "tool" for research and monitoring. There are many different ways to involve volunteers in real science activities. This variety can be very larg for those trying to organize citizen science activities, and citizen science will not always be the most appropriate or optimal approach for research or monitoring.Here is a guide to support people considering a citizen science approach, especially (but not necessarily limited to) biodiversity and environmental monitoring in the UK. It will help you decide whether citizen science can be useful, and help you decide which broad citizen science approach is most appropriate for your issue or activity.

Guide to Citizen Science - developing, implementing and evaluating citizen science to study biodiversity and the environment in the UK

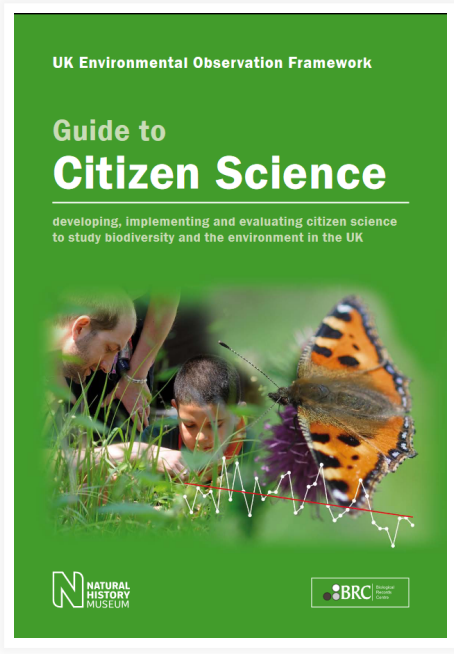


Image: Cover 'Guide to Citizen Science'.

Guide name: *Guide to Citizen Science* (Tweddle et al. 2012)

Target Group: People who have been involved in Citizen Science and people who are new to this field of science within the UK.

Type: Guide for a specific Citizen Science domain of application, written by scientists at the Biological Records Centre und he natural History Museum Angela Marmint Centre for UK

Biodiversity, on behalf of the UK Environmental Observtion Framework.

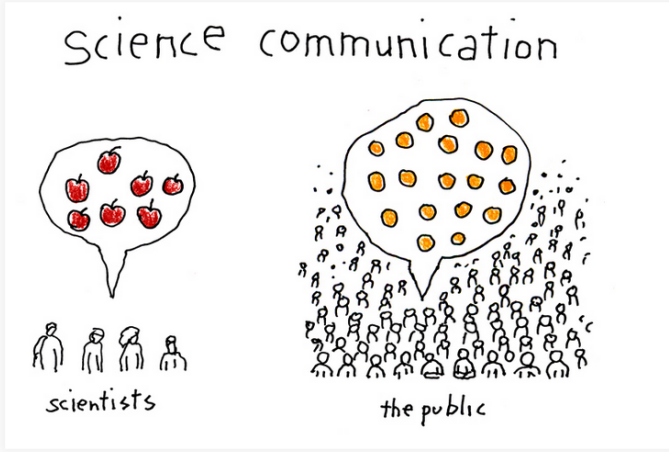
Parts: The guide helps citizen who are interested in starting a project (or have already been involved in Citizen Science) step-by-step through the whole process, giving tips and examples of Citizen Science projects.

Summary: Much of the UK's understanding of its flora and fauna today is based on the engagement of natural scientists. Citizen Science initiatives to collect environmental data range from crowd-sourcing activities to small groups of volunteer experts collecting and analysing environmental data and sharing their findings with others. Given the different methods of collecting data, it is important that they are well planned and executed. This will not only help science, but also promote environmental awareness among citizens.

This Guide explains the different approaches to Citizen Science, the first steps to building a team, defining goals, funding the project and finding participants. It guides through the different phases of such a project: the development phase, the live phase and the phase of analysing the data, interpreting it and reporting the results.

It is based on information collected and analysed as part of the UK-EOF funded project "Understanding Citizen Science & Environmental Monitoring".

Can Citizen Science enhance the public understanding of Science?



Cartoon by Tom Dunne

Guide name: *Can Citizen Science enhance the public understanding of Science?* (Bonney et al. 2015)

Target Audience: Researchers, those who are interested to learn the accomplishments of Citizen Science.

Type: Theoretical research work, written by four scientists Rick Bonney, Tina B. Phillips, Heidi L. and Jody W. Enck.

Parts: The research paper studies the reason why citizen science has become so widespread, explores the accomplishments of Citizen Science its the different categories and the four categories in which effort and resources are needed for projects to expand their influence.

Summary: The publication provides strong evidence that the scientific outcomes of Citizen Science are well documented, especially for data collection and processing projects. Furthermore

Citizen Science achieves knowledge growth about scientific knowledge and processes among its participants, increases public awareness on the diversity of scientific research, and gives deeper meaning to participants' hobbies.

Citizen Science can contribute positively to social well-being by influencing the issues being addressed and giving people a voice in local environmental decisions. To achieve this, Citizen Science projects require efforts in these four areas: (1) project design, (2) outcome measurement, (3) engaging new audiences, and (4) new research directions.

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