BR**T**EC

BRITEC

Citizen Science Toolkit

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Executive summary

The purpose of the BRITEC Citizen Science Toolkit is to offer schools, teachers and universities or research institutions a set of tools which can be used to bring research into the classroom through establishing meaningful dialogue - first between schools and institutions involved in research, but also expanding to the engagement of other stakeholders, such as parents, industry representatives, policymakers, and representatives of the civil society.

Rather than providing ready-made protocols for the implementation of citizen science in schools, the toolkit is designed to be used as an instrument for reflection on possible pathways of engaging schools and researchers in co-designing citizen science projects that serve the needs of both types of both parties and looks to mobilise the support of other important stakeholders.

The toolkit contains examples of various IT tools, which could be used during the whole cycle of the creation and implementation of citizen science initiatives. In it we provide suggestions of tools for each step of a citizen science project[1]: **co-creation** (6 tools: Padlet, Google Doc, Quip, Trello, Dropbox paper, Bit.ai), **data collection** (9 tools: Science Journal, GeoODK, ODK Collect, Natura Alert, Coreo, Androsensor, Scikit-Image, WQ Platform, Cybertracker), **data transfer** (10 tools: WeTransfer, Dropbox, Google Drive, FileZilla, Firefox Send, Smash, Google Forms, SendSpace, Nextcloud, Box), **data analysis** (15 tools: SOFA Statistics, Gretl, JASP, OpenRefine, PYBOSSA, R-Studion, Anaconda, GNU PSPP, SPOTTERON, Jupyter, Spyder, Pandas, SPSS Modeler, Datawrapper, Raw graphs), **presentation of results** (7 tools: Timeline, Datamatic, Google Charts, ChartBlocks, Highcharts, Google Data Studio, Tableau Public), **sharing information** (4 tools: Mural, Elium, Slack, Nuclino) and **communication** (8 tools: Basecamp, Google Hangouts, Chanty, Rocket.Chat, Zotero, Mendeley, Slack, Microsof Teams).

Additionally, reflections on how to address research ethics and what are the roles and responsibilities of the actors involved in these types of projects are also included as part of the toolikit.

Finally, some examples of useful sources and CS networking platforms developed under various Horizon 2020 projects relevant for this purpose are given for further information.

This toolkit was prepared as a collective work of all consortium partners with useful contribution from the members of the BRITEC Pedagogical Advisory Board: Alexia Micallef Gatt, Anita Simac and Franca Sormani, and corresponds to Output 4 of the project.

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[1] The tools have been selected based on the experience of the partners and are not to be taken as excluding any other similar tools. Furthermore, suggesting these tools does not mean partners endorse or intend to promote them as the only options available in the market.

Introduction to citizen science

The main goal of the European BRITEC (Bringing Research Into The Classroom) project is to introduce research activities into schools using a citizen science approach. It is dedicated to teachers and researchers in the field of education cooperation, and is also meant to raise awareness on the value of science among local and global communities. To achieve the latter, a long-term and effective collaboration between schools and research institutions and facilities is needed.

Citizen science stands for a type of research in which volunteering, laypeople cooperate with scientists to obtain scientific data or insights. Historically, the term referred to amateur scientists, who did not cooperate with scientific institutions or did not obtain an educational degree in any particular field. Think of famous names like Benjamin Franklin, Isaac Newton or Charles Darwin for example.

Since the 1990's the term citizen science also refers to popular science activities, like science festivals, competitions, open and participatory workshops etc. which aim at promoting public awareness on science. However, in order to speak of 'citizen science', activities must not only be educational or raising awareness, but they most and for all must lead to new scientific knowledge in the form of data or new insights, following data collection or data analysis.

In their scientific paper *Citizen science as seen by scientists: methodological, ethical, and epistemological dimensions* (2014), Riesch H. and Potter C. differentiated five aspects of the research process in which laypeople could be involved as scientific volunteers: 1. research design, 2. data collection, 3. subject recruitment, 4. data analysis and interpretation, 5. publication.

The European Citizen Science Association (ECSA), an international organization that was established in July 2013 during the EU Green Week in Brussels, published their "*10 principles of citizen science" (2015) mentioning that* "citizen science projects have a genuine science outcome; both the professional scientists and the citizen scientists benefit from taking part".

The advantages of implementing citizen science methods in professional scientific processes are the effective support for the researchers in terms of collecting or/and processing a lot of data, (which is a very time-consuming activity), the engaging way of promoting science among non-scientists, and the possibility to train AI models that might be used in the future for scientific purposes.

Scientific volunteers involved in research processes might benefit from citizen science, as it strongly democratizes science. The citizen science approach gives them insights in the scientific process and control over its direction, which may positively affect the levels of science literacy of local communities.

One of the main focus points for BRITEC is co-creation. This term originates from the business world where "customer participation in production" was described for the first time in academic work back in the 1970's. In the field of science, it represents the attitude of involving laypeople in the research process, encouraging them to be active participants of it in all stages.

Martin Hirschnitz-Garbers from the Ecology Institute in Berlin describes in his paper *Co-creation in sustainability science. Challenges and potential ways forward in implementing co-creation in European research and innovation funding* (full text available on: https://www.ecologic.eu/sites/files/publication/2018/2723-recreate-pb9-co-creation-in-sustainability-science.pdf) what the main goal of co-creation is: "To improve and foster the participation of end-users (customers in the private sector; citizens in the public sector) by actively involving them in innovation processes". Mauser et al. (2013 [25]; p. 427)[2] published a figure in their article *Co-creation of societally relevant knowledge for solving real-world problems in sustainability science,* presenting co-creation as a step by step process divided in two main stages: co-design and co-production.

Citizen Science Tools

In the BRITEC project we focus on both the co-design and co-production stages. We distinguish seven main stages, which may organize scientific collaboration in an effective way: co-creation, data collection, data transfer, data analysis, presentation of results, sharing information and communication, and we provide a list of useful tools (see full list in the final section of this document), which may be used by teachers to successfully go through every step with their students.

Step 1: Co-creation

This is the brainstorming phase: we identify concerns that may be alive among us, indicating research questions we are looking the answers for, gathering ideas, and describing the type of data we are going to collect.

Some tools can be particularly useful in data co-creation step:

- Padlet (padlet.com): allows you to create an online post-it board that you can share with any user who has the unique Padlet link. It can be used by researchers and teachers during the co-creation of a CS project. Teachers can add their own ideas, comment and/or rate the other ideas in real-time.
- Trello (trello.com): is a collaboration tool that organizes projects (or groups of tasks) into boards. You can see what's being worked on, who's working on what, and where something is in a process, in the form of a schedule. Trello could be used by researchers

and teachers to co-create and describe workflows in their project, or a scientific protocol to be used by pupils.

In the final section of this document, 6 tools useful for the **co-creation** process are presented: Padlet, Google Doc, Quip, Trello, Dropbox paper, Bit.ai.

Step 2: Data collection

In this step we design our methods of obtaining data. We can assign the collection of certain types of data to specific (groups of) participants, determine the amount of samples, deadlines, tools etc.

Some tools that can be useful in data collection are:

- Natura alert (landsense.eu): allows you to pinpoint the location of threats to biodiversity and habitat changes (occurring in Important Bird Areas (IBAs) around the world and Natura 2000 sites in the European Union). It is a good solution for projects that require geopositioning of the recollected data (like plant samples or animal photos).
- Coreo (coreo.io): is a data collection platform. It provides a framework to create mobile apps in a simple way, while providing an integrated set of server tools at the same time.
- Cybertracker (cybertracker.org): is the tool for GPS field data collection. You can use it on a smartphone or mobile device to record any type of observation.

In the final section of this report, 9 tools useful for **data collection** are presented: Science Journal, GeoODK, ODK Collect, Natura Alert, Coreo, Androsensor, Scikit-Image, WQ Platform, Cybertracker.

Step 3: Data transfer

This step is all about transferring collected data to the scientists involved in the project and others, if necessary. The tools used should be intuitive enough to fulfil that step fast and effectively.

Some tools useful for data transfer are:

- WeTransfer (wetransfer.com): is an internet-based computer file transfer service. Large files up to 2GB can be shared for free. Suitable for transferring any data, including scientific.
- Google Drive (drive.google.com): is a file storage and synchronisation service and a good place to back up and access all files from any device. You can easily invite others to view, edit, or leave comments on any file or document.

In the final section of this document, 10 tools useful for **data transfer** are presented: WeTransfer, Dropbox, Google Drive, FileZilla, Firefox Send, Smash, Google Forms, SendSpace, Nextcloud, Box.

Step 4: Data analysis

This step is very important in the whole process – detailed and well conducted analysis may help you get the answers for your research questions created in Step 1. Using different tools will make your work more effective.

Some tools useful in data analysis are:

- SOFA Statistics (sofastatistics.com): is a statistical analysis software, which supports multiple data file formats as tab-separated values (TSV), comma-separated values (CSV), Excel files, Open Office Calc and Gnumeric files, and reads the Google spreadsheets online files. SOFA supports many statistical operations, offers chart and graph options, and advanced automated reporting.
- GNU PSPP (gnu.org/software/pspp): is an open-source program for statistical analysis of sampled data that can facilitate descriptive statistics, T-tests, linear and logistic regression, measures of association, cluster analysis, reliability and factor analysis, non-parametric tests etc.

In the final section of this report, 15 tools useful for **data analysis** are presented: SOFA Statistics, Gretl, JASP, OpenRefine, PYBOSSA, R-Studion, Anaconda, GNU PSPP, SPOTTERON, Jupyter, Spyder, Pandas, SPSS Modeler, Datawrapper, Raw graphs.

Step 5: Presentation of results

In this step you present the results of your findings to the audience. There are a few things worth to think about: to whom do you address your presentation?, what output do you expect?, what form would be the most understandable?, what social or policy impact will your findings have? etc. There are many tools that can help to present your findings in an interesting and engaging way.

Some tools useful for the presentation of results are:

- Google Charts (developers.google.com/chart): is an interactive web service that creates graphical charts from user-supplied information. Google Charts provides a wide variety of charts: line charts, spline charts, area charts, bar charts, pie charts etc., which can be embedded in any web page.
- Tableau Public (public.tableau.com): allows you to create interactive visualisations without coding, to embed them in a personal website, blog, or on social media. You can e.g., create stories to tell a data narrative, provide context, demonstrate how decisions relate to outcomes.

In the final section of this document, 7 tools that are useful for the **presentation of results** are listed: Timeline, Datamatic, Google Charts, ChartBlocks, Highcharts, Google Data Studio, Tableau Public.

Step 6: Sharing information

This step logically completes the previous stage and comprises ways of sharing your findings with a bigger audience.

Some tools useful for sharing information are:

- Mural (mural.co): is an online collaboration and data sharing tool, that uses a visual whiteboard interface. It is great for brainstorm sessions and contains a lot of templates for different team exercises, but it also has the capacity to store documents, hyperlinks, images and comments, and it has voting opportunities. The tool can be used to create interactive lessons with students, or interactive workshops between researchers and teachers or students.
- Slack (slack.com): is a channel-based messaging platform. Another easy-to-use communication platform for small teams (teachers-researchers).

In the final section of this report, 4 tools that are useful for **sharing information** are presented: Mural, Elium, Slack and Nuclino.

Step 7: Communication

The last step of the process focuses on communication used for sharing thoughts with other project participants, organising online meetings (workshops, webinars, etc.) or giving feedback on the scientific project.

Some tools that are useful in the communication phase are:

- Basecamp (basecamp.com): is a platform for collaboration and project management. Basecamp is a suitable communication platform for small teams (teachers-researchers).
- Google Hangouts (hangouts.google.com): is a cross-platform messaging app. Hangouts allows conversations between two or more users. The service can be accessed online through the Gmail or Google+ websites, or through mobile apps available for Android and iOS.

In the final section of this report, 8 tools that are useful for **communication** are presented: Basecamp, Google Hangouts, Chanty, Rocket.Chat, Zotero, Mendeley, Slack and Microsof Teams.

Ethical Issues

Although citizen science is a splendid vehicle for promoting science in education while also bringing many benefits to society, there are some ethical issues connected with it that should not be omitted.

Data quality

The first problem concerns data quality and integrity. The data collected by citizens may not meet scientific standards[3]. If the quality of data and research integrity is not satisfactory, the validity of the whole project is affected. Citizen science projects may have more issues with data quality because citizens probably have not had training in scientific data management or research integrity, and therefore may not understand how to collect, record, or manage data properly[4]. They could make systematic errors that adversely impact the quality of the data[5]. Worse yet, they might even fabricate or falsify data to meet deadlines or achieve specific goals.

Therefore, scientists should consider some measures, which could be taken to increase the probability of obtaining good quality data. First, it is advisable to provide citizens with appropriate training on the methodology of data collection and operation of scientific devices or measuring tools and/or applications. It is also crucial to provide citizens with detailed information on the research topic and make sure that they understand the scientific idea behind the project.

During the ongoing CS research scientists can review the data to find unusual findings that may point to potential problems, allowing them to ask citizens questions about the process to check if they correctly followed the instructions and guidelines. After completing the research, the scientists can review the data again to ensure that it meets scientific standards. They may need to discard or correct data that they believe have been collected improperly[6].

Data sharing and intellectual property

The second problem concerns data sharing and intellectual property. Data collected by citizen scientists should be made available to the public after the process is completed. Data that includes confidential information concerning human research subjects, or humans, should be de-identified prior to sharing[7]. Project participants should be informed about the type of data

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[3]   Riesch, H., Potter, C., 2014. Citizen science as seen by scientists: methodological, ethical, and epistemological dimensions. Public Underst. Sci. 23 (1), 107– 120.

[4]   Resnik, D., Elliott, K., Miller, A., 2015. A framework for addressing ethical issues in citizen science. Environmental Science & Polisy 54 pp. 475-481

[5]   Dickinson, J.L., Zuckerberg, B., Bonter, D.N., 2010. Citizen science as an ecological research tool: challenges and benefits. Annu. Rev. Ecol. Evol. Syst. 41, 149–172.

[6]   See p. 2

[7]   Shamoo, A.E., Resnik, D.B., 2015. Responsible Conduct of Research, 3rd ed. Oxford University Press, New York.

used in the study, and may want to have some control over how it is shared and used. The same applies to data ownership: the intellectual property issues ought to be discussed in the very beginning of the project.

Potential conflicts of interest

The third issue relates to potential conflicts of interest that might arise during project development. Such conflicts may bias research. There are financial and non-financial conflicts of interest, with the latter being more significant in citizen science since some participants who collaborate with researchers are likely to have other personal or political interests at stake.

Either the scientists or project participants might represent different institutions, organizations, have incompatible attitudes towards the investigated problem. To avoid potential conflicts and misunderstandings the cooperation in that field should be properly formalized. A common strategy for dealing with such conflicts is disclosure[8].

Exploitation

The fourth issue is exploitation. Although participation in citizen science projects is very often voluntary, the work should be properly acknowledged (e.g. by mentioning their names in publications, preparing dedicated participation certificates etc.), and their work, results and knowledge should not be used for other purposes than those defined in the beginning of the project. To avoid exploitation participants of the CS initiative should give consent (preferably in written form), so that no one should be harmed nor have a feeling of inequity.

Citizen science platforms and chosen projects

In this section you will find information on six important and widely used citizen science platforms and European projects. They might be useful for further inspiration and development of future CS initiatives.

EU-Citizen.Science online platform (EU-Cit.Sci)

If you are looking for more information on citizen science initiatives and resources, you may find these on the **EU-Citizen.Science online platform** (https://eu-citizen.science) for sharing knowledge, tools, training, and resources for citizen science. The platform is part of the EU-Citizen.Science project, which is funded by the European Commission within the Horizon2020 programme.

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[8]   Elliott, K., Resnik, D., 2014. Science, policy, and the transparency of values. Environ. Health Perspect. 122 (7), 647–650.

The vision behind the platform is to serve as a Knowledge Hub, in aid of the mainstreaming of citizen science, and build on the growing impact of citizens participating in research across the full range of scientific enquiry.

On this platform you will find:

- Resources that are useful for citizen science practitioners
- Projects that are engaging the public in research via citizen science activities
- Training resources and materials for citizen science as a practice
- Organisations that are involved in citizen science projects and CS-research
- an Events calendar
- Community Forums for questions, conversations and collaboration with the rest of the community.

European Citizen Science Association (ECSA)

ECSA's mission (https://ecsa.citizen-science.net) is to connect citizens and science, to promote sustainable development through citizen science, and to ensure that citizen science contributes to policy processes. ECSA wants to establish citizen science as a recognized, promoted, and funded approach, one that fosters scientific literacy and the democratization of science.

ECSA sees citizen science as an open, inclusive approach. They support the exploration of how citizen science should be understood and practised, and they help to shape different aspects of the citizen science movement, in Europe and around the world. Ultimately, this will lead to a better understanding of citizen science and support the use of its outcomes in decision-making.

Citizen Science Association (CSA)

The Citizen Science Association (CSA; https://www.citizenscience.org/) is a member-driven organization that connects people from a wide range of experiences around one shared purpose: advancing knowledge through research and monitoring done by, for, and with members of the public. With increased attention to citizen science, CSA brings depth to how citizen science is understood both as a form of public engagement and as research, and shines a light on the integrity and complexity of the practice[9]. CSA organises biennial conferences,

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[9] https://www.citizenscience.org/about-3/

webinars and working groups and offers newsletters and discussions lists. It is also a publisher of peer reviewed Journal "Citizen Science: Theory and Practice."

Zooniverse

The Zooniverse (https://www.zooniverse.org) is the world's largest and most popular platform for people-powered research. This research is made possible by volunteers — more than a million people around the world who come together to assist professional researchers. The goal is to enable research that would not be possible, or practical, otherwise[10]. Zooniverse projects are constructed with the aim of converting volunteers' efforts into measurable results. In some cases, Zooniverse volunteers have even made completely unexpected and scientifically significant discoveries.

Investigating Citizen Science – CS TRACK

The aim of CS Track (https://cstrack.eu/) is to broaden our knowledge about citizen science and the impact citizen science activities can have. CS Track will do this by investigating a large and diverse set of citizen science activities, disseminating good practices and formulating knowledge-based policy recommendations in order to maximise the potential benefit of Citizen Science activities on individual citizens, organisations, and society at large[11].

The planned outputs include among other.:

- A Citizen Science Community Platform, which will include data analysis and training resources to enhance users' skills and competences in the interpretation of data emerging from CS activities (expected availability: mid-2021).

- Analysis of CS practice - the analysis of what constitutes success in citizen science projects.

- A set of analytical tools - An open source archive containing analytics software (in languages such as R and Python) and visualisation tools for extracting information from citizen science related documents on websites and in social media together with documentation (installation, APIs). Applications of the analytics tools will be made available to non-programmers on the multi-lingual community platform.

SPOTTERON Citizen Science Platform

SPOTTERON (https://www.spotteron.net/) is a fully customizable solution for citizen science initiatives, environment protection and volunteer monitoring projects. It can be fully adapted

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[10] https://www.zooniverse.org/about
[11] https://cstrack.eu/about/

to users' needs. All projects powered by SPOTTERON feature their own custom Smartphone Apps for iOS and Android and an interactive embeddable map application for the website. The service is offered commercially.

Additional sources of information

- 10 principles of citizen science (ECSA): https://ecsa.citizen-science.net/wp-content/uploads/2020/02/ecsa_ten_principles_of_citizen_science.pdf
- Citizen Science Quality Assurance & Documentation Handbook: https://www.epa.gov/sites/production/files/2019-03/documents/508_csqapphandbook_3_5_19_mmedits.pdf
- Guide to citizen science – developing, implementing and evaluating citizen science to study biodiversity and the environment in the UK: https://www.nhm.ac.uk/content/dam/nhmwww/take-part/Citizenscience/citizen-science-guide.pdf
- Citizen science for all. A Guide for citizen science practitioners: https://www.buergerschaffenwissen.de/sites/default/files/grid/2017/11/20/handreichunga5_engl_web.pdf
- A manual for citizen scientists starting or participating in data collection and environmental monitoring projects, available at: https://citizenscienceguide.com/sites/default/files/images/Citizen%20Science%20Manual%20March%202019%20_FULL%20VERSION_0.pdf
- Citizen science guide – Quality assurance: https://citizenscienceguide.com/sites/default/files/images/Citizen%20Science%20Manual%20March%202019%20_FULL%20VERSION_0.pdf
- Communication in citizen science: A practical guide to communication and engagement in citizen science. Veeckman et al. 2019, Scivil. https://www.scivil.be/sites/default/files/paragraph/files/2020-01/Scivil%20Communication%20Guide.pdf
- Getting Started with citizen science: website of Scivil, the Flemish knowledge center for citizen science: https://www.scivil.be/en/getting-started
- Citizen Science Project Builder web-based tool from the Citizen Science Center in Zurich and Citizen Cyberlab: https://lab.citizenscience.ch/en/about

List of tools useful

for Citizen Science

Step 1. CO-CREATION PROCESS

BRITEC

BRINGING RESEARCH INTO THE CLASSROOM

PADLET

ABOUT

With padlet you can create an online post-it board that you can share with any user with the unique Padlet link. In the open license there is a limitation regarding the number of padlets created by one user. For more information go to: www.padlet.com

DESCRIPTION

Padlet allows you to insert ideas either anonymously or with your name. Users provide ideas by adding a virtual sticky note. They can also add comments to these ideas, and can vote for, or rate the ideas on the virtual whiteboard. Whoever has the link, can see all the ideas gathered on the board immediately. You may work collaboratively on the padlet from any place.

- ✓ Web-based tool for co-creation process
- ✓ Available languages: Multilingual
- ✓ Format of collected data: text, hyperlinks, comments, rating (voting).
- ✓ Free to use

INSTRUCTION

Padlet is user-friendly and relatively easy to use and create your own walls. Adding feedback to an existing padlet is easy. Moreover, a bunch of video tutorials are available on the YouTube channel: https://www.youtube.com/padlet For more information go to: https://jn.padlet.com/

USE IN CITIZEN SCIENCE

Padlet can be used by researchers and teachers during the co-creation of the project. Teachers can comment and/or rate the ideas. They may add their own ideas. All other users can see all comments immediately.

GOOGLE DOCS

ABOUT

Google Docs is one of the most widely known tools for collaborative editing of documents. Google account is required in order to use Google Docs. For more information go to: **https://www.google.com/intl/eng/docs/about/**

DESCRIPTION

Google's collaboration tools include its Docs and Sheets services, which are designed to allow teams to edit files at the same time and save all their changes automatically online.

- ✓ Web-based tool for co-creation process
- ✓ Available languages: Multilingual
- ✓ Format of collected data: text with graphics, links, tables, comments.
- ✓ It is a part of a free, web-based Google Docs suite offered by Google within its Google Drive service

INSTRUCTION

After having created a Google account, you can start uploading or creating documents in Google Docs. You can share it with other users by sending them the link to the document. For more information, go to: https://support.google.com/docs

USE IN CITIZEN SCIENCE

Google Docs could be used by researchers and teachers to co-create a description of their project workflow, project or a scientific protocol to be used by pupils. All users can edit the same online file either at the same time, or at their own pace in separate moments.
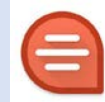
QUIP

ABOUT

Quip is Salesforce's productivity platform that transforms the way teams work together, delivering modern collaboration securely and simply across any device. For more information go to: https://quip.com/.

DESCRIPTION

Quip is a platform in which members of a team can save documents, spreadsheets, task lists and chats in one place. Files of different types can be imported, and worked on 'live'. import and work live on different file types. Edits are saved automatically and its chat, comment and checklist features make collaboration easy.

- ✓ Mobile application & web-based platform for co-creation process
- ✓ Available languages: English
- ✓ Format of collected data: text, spreadsheets, slides, task lists, chat function
- ✓ Paid license

INSTRUCTION

Support is provided on the website https://www.quipsupport.com/hc/en-us in form of FAQs, Guides (instruction manual) and self-guided courses. For more go to: https://www.quipsupport.com/hc/en-us/categories/201457866-Quip-Guides

USE IN CITIZEN SCIENCE

Quip could be used by researchers and teachers to co-create a description of their joint project,or the scientific protocol to be used by pupils. All users can edit the same online file either at the same time, or at their own pace in separate moments .

TRELLO

ABOUT

Trello is a collaboration tool that organizes your projects into boards. In one glance, Trello tells you what's being worked on, who's working on what, and where something is in a process. For more information go to: https://trello.com/

DESCRIPTION

Trello has an intriguing interface that resembles solitaire (you can even drag task cards across columns, just like you would when playing cards). It's easy to learn and works well for monitoring projects and assigning tasks.

- ✓ Web-based tool for co-creation process
- ✓ Available languages: Multilingual
- ✓ Format of collected data: text, graphics, links
- ✓ Free to use

INSTRUCTION

Trello prepared manuals on how to create and delete boards, how to upload resources and how to manage the cards inside the board. For more information, go to: https://help.trello.com/

USE IN CITIZEN SCIENCE

Trello could be used by researchers and teachers to co-create a description of their project, or a scientific protocol to be used by pupils. All users may edit files simultaneously and get access to all cards. Moreover, the tool can also be used for collecting the data.

Erasmus+

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DROPBOX PAPER

ABOUT

Dropbox Paper, or just Paper, is a collaborative document editing service developed by Dropbox. For more information go to: https://www.dropbox.com/en/paper

DESCRIPTION

Dropbox Paper is a workspace that brings creation and coordination together in one place. It helps to edit a document simultaneously, but also to collect ideas and visuals from all users, exchange ideas in real time and get feedback.

- ✓ Web-based tool for co-creation process
- ✓ Available languages: Multilingual
- ✓ Format of collected data: text, graphics, videos, full documents.
- ✓ Free to use

INSTRUCTION

Dropbox has a help center with many articles and FAQ. For instructions go to: https://www.dropbox.com/paper?_tk=lp&oqa=guideanc

USE IN CITIZEN SCIENCE

Dropbox Paper could be used by researchers and teachers to co-create a description of the pilot or a scientific protocol. It could also be used for an online brainstorm sessions. Moreover, the tool may be used for collecting the data.

BIT.AI

ABOUT

Built for teams and individuals to create, collaborate, and organize all your work in one place from anywhere in the world. Create fast dynamic notes, documents, wikis, knowledge bases, projects, client deliverables, training guides and client portals, while integrating across the apps you work with. For more go to: https://bit.ai/

DESCRIPTION

Bit.ai is a document collaboration platform that helps teams and individuals create interactive workplace documents, manage digital content & track document engagement.

- ✓ Web-based tool for co-creation process
- ✓ Available languages: English
- ✓ Format of collected data: text, images, zip files, tables, code
- ✓ Free plan is available only for small teams (up to 5 persons) and for limited file size (up to 5 MB).

INSTRUCTION

To create your collaboration platform you can use a template. There are quick start video tutorials (8 videos) available on their website: https://bit.ai/bit-academy#quick-start
For more information, go to: https://bit.ai/bit-academy

USE IN CITIZEN SCIENCE

BIT.AI could be used by researchers and teachers to co-create a description of the pilot or a scientific protocol to be used by pupils. All users may add their files, comments simultaneously and have access to the content library.

Step 2. DATA COLLECTION

SCIENCE JOURNAL

ABOUT

Science Journal transforms your phone, tablet, and Chromebook into a science notebook that encourages students to explore their world. As they conduct eye-opening experiments, they'll record observations and make new, exciting discoveries.

DESCRIPTION

Students can measure their experiment results, take quality photos and jot down important notes. Device sensors can be used to measure light, sound, and movement. Students can also compare results, and even set triggers to tell the app when to record.

- ✓ Mobile application for data collection
- ✓ Available languages: Multilingual
- ✓ Format of collected data: many formats
- ✓ Free to use

INSTRUCTION

For instructions go to:
https://support.google.com/sciencejournal/answer/9091153?hl=en&ref_topic=9091058

USE IN CITIZEN SCIENCE

For some types of citizen science, people's mobile phones can be a terrific instrument for measurements or logging. Science journal seems to be the tool that allows for storage and exchange of data measured by a mobile phone's sensor.

GeoODK

ABOUT

GeoODK provides a way to collect and store geo-referenced information, along with a suite of tools to visualize, analyze and manipulate ground data for specific needs.

DESCRIPTION

It enables an understanding of the data for decision-making, research, business, disaster management, agriculture and more. As a multi-dimensional application, GeoODK's goal is to provide an open source platform that can be expanded to address current and future needs of data collection.

- ✓ Application for data collection
- ✓ Available languages: English
- ✓ Format of collected data: Geo-localized information (XLSForm)
- ✓ Open source

INSTRUCTION

For instructions go to: http://geoodk.com/about.html

ADDITIONAL INFORMATION

This is a set of tools, containing a mobile-application, a web -server and a web application to display results. For more details about its functionalities, including comparison with other map-based crowdsourcing platforms, you can read Lamoureux & Fast (2019): http://ceur-ws.org/Vol-2323/SKI-Canada-2019-7-4-1.pdf.

USE IN CITIZEN SCIENCE

GeoODK has been used by the University of Maryland, USA in several projects. Amongst many (see https://glam.umd.edu/project/geographical-open-data-kit-geoodk), the project VIIRS Active Fire is an example (http://viirsfire.geog.umd.edu/?q=viirs-af-table-data).

Erasmus+

BRITEC

ODK Collect

ABOUT

The ODK community produces free and open-source software for collecting, managing, and using data in resource-constrained environments. It is a replacement for paper forms with support for geo-locations, images, audio clips, video clips and barcodes, as well as numerical and textual answers.

DESCRIPTION

ODK Collect can evaluate complex logic to control the display prompts and to impose constraints on their responses; it also supports groups of repetitive questions and data collection in multiple languages.

- ✓ Mobile application for data collection
- ✓ Available languages: English
- ✓ Format of collected data: Several formats
- ✓ Open source

INSTRUCTION

ODK Collect is designed to work out of touch with a cellular network / Wi-Fi during the data collection effort. Once back in the network coverage, the completed forms can be copied out of the device or sent to a server (you control) for analysis. For instructions go to: https://docs.getodk.org/collect-intro/

USE IN CITIZEN SCIENCE

Any project requiring geopositioning when recollecting data, as for instance plants samples, or animal photos, would benefit of this type of tool.

NATURA ALERT

ABOUT

Natura Alert will allow you to pinpoint the location of threats to biodiversity and habitat changes. The threats of particular interest are those occurring in Important Bird Areas (IBAs) around the world and Natura 2000 sites in the European Union.

DESCRIPTION

Share your observations with the wider community and help to map the state of the most valuable sites around the world! Download mobile app to quickly record your observations in the field or use the web app to discover more functionalities, such as visualizing reports from other users, creating dashboards and downloading your own reports.

- ✓ Mobile application for data collection
- ✓ Available languages: English
- ✓ Format of collected data: several formats
- ✓ Free to use

INSTRUCTION

For instructions go to: https://landsense.eu/Project/LEP

USE IN CITIZEN SCIENCE

Any project requiring geopositioning when recollecting data, as for instance plants samples, or animal photos, would benefit of this type of tool.

COREO

ABOUT

Coreo is the end-to-end data collection platform for anyone, regardless of technical knowhow.

DESCRIPTION

Coreo is a framework designed to allow you to design easily your data collection app for your project.
- ✓ Platform for data collection
- ✓ Available languages: English
- ✓ Format of collected data: several formats
- ✓ Paid license

INSTRUCTION

For instructions go to: https://coreo.io/case-study/

USE IN CITIZEN SCIENCE

This is a data collection platform. It provides a framework to create mobile apps in a simple way, while providing an integrated set of server tools at the same time. Any project requiring data collection through a mobile platform can make use of this.

ANDROSENSOR

ABOUT

Andro Sensor is an all-in-one diagnostic tool that lets you know everything about your device's status.

DESCRIPTION

Andro Sensor supports all the sensors an android device can have and it will tell you which of them are not supported by your hardware.
- ✓ Mobile application for data collection
- ✓ Available languages: English
- ✓ Format of collected data: many formats
- ✓ Free to use

INSTRUCTION

For instructions go to:
https://play.google.com/store/apps/details?id=com.snipesense.androsensor&hl=es_419

USE IN CITIZEN SCIENCE

This is an app which is designed to use the sensors of android smartphones to collect data. Some examples may be accelerometer readings, (incl. linear acceleration and gravity sensors), gyroscope readings, light sensor value, ambient magnetic field values, device orientation, proximity sensor readings, pressure sensor (barometer), relative humidity sensor, temperature readings, battery status, voltage, temperature and health, sound level meter (decibel). Any project which requires this type of measures may use this tool.

SCIKIT-IMAGE

ABOUT

Scikit-image is an open-source image processing library for the Python programming language. It includes algorithms for segmentation, geometric transformations, color space manipulation, analysis, filtering, morphology, feature detection, and more. Image processing in Python.

DESCRIPTION

Scikit-image is a collection of algorithms for image processing. It is available free of charge and free of restriction. It prides high-quality, peer-reviewed code, written by an active community of volunteers.

- ✓ Tool for data collection
- ✓ Available languages: English
- ✓ Format of collected data: Image formats
- ✓ Open source

INSTRUCTION

For instructions go to: https://scikit-image.org/docs/stable/user_guide.html

USE IN CITIZEN SCIENCE

This is a library designed to process images in a computer in a simple way. Classifying plats or animal pictures uploaded by volunteers may be a simple example of use.

WQ PLATFROM

ABOUT

WQ is a software framework designed to facilitate the development of robust, offline-capable mobile / web apps.

DESCRIPTION

The original use case for WQ is mobile data collection, whether by professional environmental monitoring staff or by volunteers in e.g. citizen science and mobile crowdsourcing projects. However, WQ is also useful as a platform for building a variety of mobile-first websites and CRUD applications.

- ✓ Tool for data collection
- ✓ Available languages: English
- ✓ Format of collected data: several formats
- ✓ Open source

INSTRUCTION

For instructions go to: https://wq.io/1.2/docs/intro

USE IN CITIZEN SCIENCE

This is a data collection platform. It provides a framework to create mobile apps in a simple way, while providing an integrated set of server tools at the same time. Any project requiring data collection through a mobile platform can make use of this.

CYBERTRACKER

ABOUT

CyberTracker is the most efficient method of GPS field data collection. You can use CyberTracker on a Smartphone or Mobile Device to record any type of observation.

DESCRIPTION

CyberTracker, which requires no programming skills, allows you to customize an Application for your own data collection needs. It enables users with no GIS skills to view and analyze their data in Tables, Maps and Graphs on a Windows PC. Data can be exported in a number file formats for advanced data analyses in other software tools, such as Excel, Esri ArcGIS, Distance Software or R Statistical software. CyberTracker also enables advanced users to connect to server databases and allows remote synchronization from Smartphones and Mobile Devices.

- ✓ Tool for data collection
- ✓ Available languages: English
- ✓ Format of collected data: Excel, csv, xml, html
- ✓ Free to use

INSTRUCTION

For instructions go to: http://www.cybertracker.org/software/getting-started

USE IN CITIZEN SCIENCE

Open source tool designed to build apps for data collection and management. Any project requiring data collection through a mobile platform can make use of this.

Step 3. DATA TRANSFER

WeTransfer

ABOUT

WeTransfer is the simplest way to send your files around the world. It is an internet-based computer file transfer service. Share large files up to 2GB for free. The paid-for WeTransfer 'Pro' allows users to send up to 20 GB at a time and offers features like password protection, profile page customization and 1 TB (1000 billion bytes) storage.

DESCRIPTION

Its use is very simple and increasingly frequent, especially because it allows you to send very large or heavy files in a very convenient, easy and 100% effective. The service allows you to send the selected items to one or more people via email only. Free users can send files of up to 2 GB. You do not need to create an account.

- ✓ Web-based tool for data transfer
- ✓ Available languages: English, Dutch, Italian, French, German, Spanish, Portuguese, Turkish, Danish, Swedish
- ✓ Format of collected data: excel format, CSV format, word format, pdf format, zip file, etc.
- ✓ Free to use

INSTRUCTION

Add your files by clicking the big + button, add the address you want to send it to, add your own email address and you are ready to go. For more instructions go to: https://wetransfer.com/help

USE IN CITIZEN SCIENCE

Suitable for transferring any data, including scientific.

DROPBOX

ABOUT

Dropbox is a file hosting service operated by the American company Dropbox, Inc., headquartered in San Francisco, California, that offers cloud storage, file synchronization, personal cloud, and client software.

DESCRIPTION

Dropbox lets anyone upload and transfer files to the cloud, and share them with anyone. Back up photos, videos, docs, and other files to cloud storage, and access files synced with any of your computers or mobile devices—from anywhere.

- ✓ Web-based tool for data transfer
- ✓ Available languages: Multilingual
- ✓ Format of collected data: excel format, csv format, word format, pdf format, zip file, photos, videos, etc.
- ✓ Free to use

INSTRUCTION

Install Dropbox on your computer; Put files in your Dropbox folder; Share a folder with friends or colleagues; Invite some friends to join Dropbox. For more instructions go to: https://help.dropbox.com/learn

USE IN CITIZEN SCIENCE

Suitable for transferring any data, including scientific.

GOOGLE DRIVE

ABOUT

Google Drive is a file storage and synchronization service developed by Google. Google Drive is a safe place to back up and access all your files from any device. Easily invite others to view, edit, or leave comments on any of your files or documents.

DESCRIPTION

Google Drive allows users to keep photos, stories, designs, drawings, recordings, videos, and more. First 15 GB of storage are free with a Google Account.
- ✓ Web-based tool for data transfer
- ✓ Available languages: Multilingual
- ✓ Format of collected data: Google Drive, Docs, Sheets, Slides, and Forms
- ✓ Free to use

INSTRUCTION

Step 1: Go to drive.google.com; Step 2: Upload or create files; Step 3: Share and organize files. For more instructions go to: https://support.google.com/drive/answer/2424384?hl=en

USE IN CITIZEN SCIENCE

Suitable for transferring any data, including scientific.

FileZilla

ABOUT

FileZilla is a File Transfer Protocol (FTP) program for file uploading and downloading to and from your FTP site, server, or host. It is available for Windows, Mac and Linux.

DESCRIPTION

The program lets you transfer files and navigate among folders, Web sites, and your computer. This software enables you to perform multiple file transfers simultaneously.
- ✓ Web-based tool for data transfer
- ✓ Available languages: English
- ✓ Format of collected data: excel format, csv format, word format, pdf format, zip file, etc.
- ✓ Open source

INSTRUCTION

Download the latest version of FileZilla (https://filezilla-project.org/download.php?type=client) and follow the instructions. For more instructions go to:
https://www.youtube.com/watch?v=adxmlHDim6c

USE IN CITIZEN SCIENCE

Suitable for transferring any data, including scientific.

FIREFOX SEND

ABOUT

Firefox Send is a file sharing service by Mozilla, maker of Firefox. You may add files with a total size of up to 1 Gigabyte as an unregistered user for sharing.

DESCRIPTION

The file size limit increases to 2.5 Gigabytes for registered users. Firefox account owners may sign in using the account, and anyone else may sign up for a Firefox Account to share up to 2.5 Gigabytes and may also manage uploaded files from other devices and change expiration limits. Creation of an account is free; there is no paid version.

- ✓ Web-based tool for data transfer
- ✓ Available languages: English
- ✓ Format of collected data: excel format, csv format, word format, pdf format, zip file, photos, videos, etc.
- ✓ Open source

INSTRUCTION

Click Select files to upload and select the files you want to send; Set an expiration and password (optional) for your files. By default, the link will expire after one download or one day; Click Upload; Copy the link and send to your recipient. For more instructions go to: https://youtu.be/eRHpEn2eHJA

USE IN CITIZEN SCIENCE

Suitable for transferring any data, including scientific.

SMASH

ABOUT

If you have particularly large files to send, Smash could be the file sharing service for you. Not only is Smash free, but there are no limits on the size of file that can be shared – you do not even need to register an account to use it.

DESCRIPTION

The files you share are made available for up to 14 days, after which time they are deleted (if you upgrade to a Premium account, this increases to a full year). As a security measure, you have the option of password-protecting shared files too.

- ✓ Web-based tool for data transfer
- ✓ Available languages: English
- ✓ Format of collected data: excel format, csv format, word format, pdf format, zip file, photos, videos, etc.
- ✓ Free to use

INSTRUCTION

The sharing process starts by dragging and dropping your files onto the Smash logo. Then you can supply the email addresses of those you wish to share with) before configuring share options. You can choose how long the files should be available for, whether they are password-protected or not, and change the look of the page recipients see when they access the files. For more instructions go to: https://en.fromsmash.com/why-smash

USE IN CITIZEN SCIENCE

Suitable for transferring any data, including scientific.

BRITEC

GOOGLE FORMS

ABOUT

To create your own form, you need to have a google account.

DESCRIPTION

Google Forms is a tool that allows collecting information from users via a personalized survey or quiz. The information is then collected and automatically connected to a spreadsheet. The spreadsheet is populated with the survey and quiz responses.
- ✓ Web-based tool for data transfer
- ✓ Available languages: Multilingual
- ✓ Format of collected data: Text, photo, various type of files can be uploaded.
- ✓ Free to use

INSTRUCTION

Step 1: Set up a new form or quiz a) Create a form from Google Drive, b)Create a form in Google Sheets
Step 2: Edit and format a form or quiz - You can add, edit, or format text, images, or
Step 3: Send your form for people to fill out - When you are ready, you can send your form to others and collect their responses. For more go to:
https://support.google.com/docs/answer/6281888?co=GENIE.Platform%3DDesktop&hl=en

USE IN CITIZEN SCIENCE

Suitable to transferring the data, measurements, photo-monitoring pictures.

SendSpace

ABOUT

Sendspace is a file transfer and exchange network, enabling millions of users around the world to distribute large files within their community. Free users can send files up to 300 MB.

DESCRIPTION

SendSpace is a file-hosting website that offers hosting to enable users to send, receive, track and share their files.
- ✓ Web-based tool for data transfer
- ✓ Available languages: English
- ✓ Format of collected data: Text, photo, various type of files can be uploaded.
- ✓ Free to use

INSTRUCTION

Go to **https://www.sendspace.com** , drag files into the insert box at the top of the page, or click browse to upload. If you want, you can add a description. Enter the recipient email address and yours. Click upload.

USE IN CITIZEN SCIENCE

Transferring data, photos, measurements.

NEXTCLOUD

ABOUT

Nextcloud is a suite of client-server software for creating and using file hosting services. It is free and open-source, which means that anyone is allowed to install and operate it on their own private server devices. Paid license available as well as mobile version.

DESCRIPTION

Nextcloud application functionally is similar to Dropbox, Office 365 or Google Drive, but can be used on home-local computers or for off-premises file storage hosting.

- ✓ Application for data transfer
- ✓ Available languages: English
- ✓ Format of collected data: Text, photos, zip files, etc.
- ✓ Open source

INSTRUCTION

You can share one or more files and folders on your computer, and synchronize them with your Nextcloud server. Place files in your local shared directories, and those files are immediately synchronized to the server and to other devices using the Nextcloud Desktop Sync Client, Android app, or iOS app. For more go to: https://docs.nextcloud.com/server/latest/user_manual/

USE IN CITIZEN SCIENCE

Sharing data, files, photos, measurements, data analysis.

BOX

ABOUT

With Box, you get a single place to manage, secure, share and govern all of the content for your internal and external collaboration and processes. Box Individual is free of charge, paid versions and apps for mobile phones are available as well.

DESCRIPTION

Box focuses on cloud content management and file sharing service for businesses. Official clients and apps are available for Windows, macOS, and several mobile platforms.

- ✓ Web-based tool for data transfer
- ✓ Available languages: English, French, German, Italian, Spanish.
- ✓ Format of collected data: Text, photos, zip files, etc.
- ✓ Open source

INSTRUCTION

To upload files go to https://www.box.com/home. Click the Upload button in the upper-right corner. Select Files or Folders, depending on what you'd like to upload. For more go to: https://community.box.com/t5/Get-Started-Guide-for-New-Users/tkb-p/GettingStartedToolkit

USE IN CITIZEN SCIENCE

Sharing data, files, photos, measurements, data analysis.

Step 4. DATA ANALYSIS

Erasmus+

BRITEC
BRINGING RESEARCH INTO THE CLASSROOM

SOFA STATISTICS

ABOUT

SOFA is a statistical analysis software, SOFA connects directly to different database engines, like MySQL, PostgreSQL, SQLite, MS Access, CUBRID and Microsoft SQL Server.

DESCRIPTION

SOFA supports multiple data file formats as tab-separated values (TSV), comma-separated values (CSV), Excel files, Open Office Calc and Gnumeric files, and reads the Google spreadsheets online files. SOFA supports many statistical operations, many chart and graph options, and advanced automated reporting.
- ✓ Application for data analysis
- ✓ Available languages: English
- ✓ Open source

INSTRUCTION

SOFA can be used to: make charts e.g. Pie Charts, produce attractive report tables on your data e.g. gender vs age, run basic statistical tests e.g. one-way ANOVAs and generally increase your understanding of your data.

SOFA is great for initial research and exploratory analysis – o "statistical/mathematical doodling". It doesn't have every statistical test you could possibly need, but for many purposes it has more than enough. And the plan is to gradually extend SOFA over time without compromising the emphasis on ease of use, beautiful output, and learn as you go.

USE IN CITIZEN SCIENCE

SOFA is a user-friendly tool aimed to individuals currently learning how to conduct statistical data analysis. The numerous data visualization possibilities will enable the learner to engage with the data and foster his/her understanding of the database so that valuable conclusions are derived.

GRETL

ABOUT

Gretl is a user-friendly statistical software for Windows, MacOSX, and Linux, originally developed for econometric analyses. Gretl has GNU R integration, Integrated powerful scripting language support (hansl), mixed time-series operations, parallel processing, and many econometric analysis operations.

DESCRIPTION

Gretl was written in C, which explains the speed, parallelization, easy seamless data exchange with GNU R, GNU Octave, Python, Ox, and Sata. Gretl supports many file formats, Excel files, tab-separated values (TSV), comma-separated values (CSV), Gnumeric and Open Document worksheets (OpenOffice/ LibreOffice files) and SPSS files.
- ✓ Computer program for data analysis
- ✓ Available languages: Multilingual
- ✓ Format of collected data:
- ✓ Open source & free use

INSTRUCTION

For instructions go to: http://gretl.sourceforge.net/index.html#man For generating data plots, Gretl calls on GNUplot 5.0 (http://gnuplot.sourceforge.net).

USE IN CITIZEN SCIENCE

This tool focuses on econometric analysis of data and can foster the understanding of users in mathematical fields such as Matrix Algebra. Moreover, using this tool, individuals can maximize their awareness of the socio-economic impact of various variables such as consumption, income, investment data, etc.

JASP

ABOUT

JASP is a free and open-source graphical program for statistical analysis. It is designed to be easy to use. It is available for computer with Windows, MacOSX, or Linux OS.

DESCRIPTION

JASP is an easy-to-use statistical analysis software, It is the perfect choice for beginners and students. JASP has installable packages for Windows, MacOSX, and Linux. It can run on the cloud as well using RollApp which is a platform for running the desktop application in the cloud. In addition to JASP format *.jasp, JASP reads multiple data file formats including .sav, .txt, .csv, and .ods.

- ✓ Application for data analysis
- ✓ Available languages: English, German
- ✓ Open source & free use

INSTRUCTION

For instructions go to: **https://jasp-stats.org/getting-started/**

USE IN CITIZEN SCIENCE

With JASP it is easy to pose questions, present interpretations, guide students through a chain of analyses, grade answers, and provide feedback. It is also ideal for introducing frequentist and Bayesian statistical analysis easily and intuitively. https://jasp-stats.org/jasp-workshop-materials/

OPENREFINE

ABOUT

OpenRefine is a standalone open source desktop application for data cleanup and transformation to other formats, the activity known as 'data wrangling'. It is similar to spreadsheet applications (and can work with spreadsheet file formats); however, it behaves more like a database. Available for PC with Windows/ Macos/Linux.

DESCRIPTION

OpenRefine (previously Google Refine) is a powerful tool for working with messy data: cleaning it; transforming it from one format into another; and extending it with web services and external data.

- ✓ Application for data analysis
- ✓ Available languages: Multilingual
- ✓ Format of collected data:
- ✓ Open source

INSTRUCTION

It operates on rows of data which have cells under columns, which is very similar to relational database tables. An OpenRefine project consists of one table. The user can filter the rows to display using facets that define filtering criteria. For instructions go to: https://github.com/OpenRefine/OpenRefine/wiki

USE IN CITIZEN SCIENCE

This tool can help users in the process of data cleanup and data transformation. It is a process that can highlight the difference between a 'messy' database and a cleaner, more functional edition of the same database. The users will also understand the detail needed in the data collection and data storage processes so that the database is practical for future stages of the research.

PYBOSSA

ABOUT

PYBOSSA is a technology developed by Scifabric. It is used for the development of platforms and data collection within collaborative environments, analysis and data enrichment.

DESCRIPTION

PYBOSSA is an extremely flexible and versatile technology with a multitude of applications that adapt to each specific case facilitating many of the daily tasks that take place in research environments such as museums, art galleries, heritage institutions, libraries of any kind, market research companies, hospitals, universities and all those organizations that manage data or require information from their customers/users -such as airports, shopping malls, banks, hotel chains, etc.

- ✓ Web-based tool for data analysis
- ✓ Available languages: English
- ✓ Format of collected data: Many formats
- ✓ Open source

INSTRUCTION

For more go to: https://docs.pybossa.com/

USE IN CITIZEN SCIENCE

This technology has already been used in CS project as cellspotting (**https://github.com/Ibercivis/app-cellspotting**). Pybossa is a versatile statistical collection and analysis tool. It is adaptive to various data processing contexts, which makes it ideal for both, citizens and schools. Moreover, anyone can contribute to a Pybossa project since it is a collaborative platform that makes it unique for citizen-researcher collaboration. Therefore, it can be an asset to citizen science projects in general and even more specifically, in education citizen science projects.

R-STUDIO

ABOUT

RStudio offers free, open source products for R that meet the needs of most educators, staff and students. It also offer a free shinyapps.io account for up to 5 shiny applications and 25 active hours per month.

DESCRIPTION

In cases where qualified academic institutions prefer to install RStudio commercial products on their own servers, RStudio offers academic pricing. To qualify you must meet the Qualified Institution definition below and provide a school-issued email address during purchase. For teaching purposes, a syllabus must also be submitted.

- ✓ Application for data analysis
- ✓ Available languages: English
- ✓ Format of collected data: R-code
- ✓ Paid commercial use, but free for education

INSTRUCTION

For more go to: https://docs.rstudio.com/

USE IN CITIZEN SCIENCE

This tool is suitable for citizen science projects that engage participants in statistical analysis using R as a programming language. It is also ideal for introducing citizens to evidence-based decision making since this platform connects data scientists with decision-makers. The participants can see the interaction between the two parties firsthand.

ANACONDA

ABOUT

Anaconda Individual Edition is the world's most popular Python distribution platform with over 20 million users worldwide.

DESCRIPTION

Anaconda Individual Edition contains conda and Anaconda Navigator, as well as Python and hundreds of scientific packages. When you installed Anaconda, you installed all these too.

- ✓ Application for data analysis
- ✓ Available languages: English
- ✓ Format of collected data: Python code
- ✓ Paid commercial use, but free for education

INSTRUCTION

For instructions go to: https://docs.anaconda.com/anaconda/user-guide/getting-started/

USE IN CITIZEN SCIENCE

This tool is suitable for citizen science projects that use Python and R data. Both languages are used in data analysis in scientific applications, and therefore can be used in CS projects. It can also support machine learning algorithms for data analysis.

GNU PSPP

ABOUT

GNU is an operating system that is free software. The GNU operating system consists of GNU packages (programs specifically released by the GNU Project) as well as free software released by third parties. The development of GNU made it possible to use a computer without software that would trample your freedom.

DESCRIPTION

GNU PSPP is a program for statistical analysis of sampled data. It is a free as in freedom replacement for the proprietary program SPSS, and appears very similar to it with a few exceptions.

- ✓ Application for data analysis
- ✓ Available languages: English
- ✓ Format of collected data: several open formats
- ✓ Open source

INSTRUCTION

For instructions go to: https://www.gnu.org/software/pspp/manual/html_node/Concept-Index.html

USE IN CITIZEN SCIENCE

GNU PSPP is another open source statistical analysis software that can facilitate descriptive statistics, T-tests, anova, linear and logistic regression, measures of association, cluster analysis, reliability and factor analysis, non-parametric tests and more. Regarding the opportunities it provides in education citizen science, while learning statistics, students can engage in real science projects using this tool and understand in depth the statistical analysis models that are being taught.

Erasmus+

BRITEC

SPOTTERON

ABOUT

SPOTTERON is a fully customizable and affordable solution for your Citizen Science, environment protection and volunteer monitoring projects.

DESCRIPTION

It can be fully adapted to your project's needs and is constantly updated and maintained. All projects powered by SPOTTERON feature their own custom Smartphone Apps for iOS and Android and an interactive embeddable map application for your homepage.

- ✓ Mobile application for data analysis
- ✓ Available languages: English
- ✓ Format of collected data: many formats
- ✓ Paid license

SPOTTERON

INSTRUCTION

For instructions go to: https://www.spotteron.net/about/how-it-works

USE IN CITIZEN SCIENCE

The platform has been designed to handle CS projects and to facilitate the process during all the stages of the research. It includes various features such as interactive maps and a data management platform. It makes the communication between researcher and the citizens team easier and more effective. See **https://www.spotteron.net/**.

JUPYTER

ABOUT

The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. Uses include: data cleaning and transformation, numerical simulation, statistical modeling, data visualization, machine learning, and much more. An operative python environment is required.

DESCRIPTION

Jupyter provides a simple programming interface to create simple python applications.

- ✓ Web-based tool for data analysis
- ✓ Available languages: Multilingual
- ✓ Format of collected data: python source code
- ✓ Open source

jupyter

INSTRUCTION

For instructions go to: https://jupyter.org/documentation

USE IN CITIZEN SCIENCE

This web-based software provides a notebook designed for companies, classrooms and research labs. So it is easy for both teachers and researchers to integrate it in their workflow. It is ideal for data that need to be analyzed using Python and R. Both languages are used in data analysis in scientific applications, and therefore can be used in CS projects.

Institute of Geophysics Polish Academy of Sciences   UAM Universidad Autónoma de Madrid   GFOSS   ibercivis   European Schoolnet   KU LEUVEN

SPYDER

ABOUT

Spyder is a powerful scientific environment written in Python, for Python, and designed by and for scientists, engineers and data analysts.

DESCRIPTION

It features a unique combination of the advanced editing, analysis, debugging, and profiling functionality of a comprehensive development tool with the data exploration, interactive execution, deep inspection, and beautiful visualization capabilities of a scientific package. Furthermore, Spyder offers built-in integration with many popular scientific packages, including NumPy, SciPy, Pandas, IPython, QtConsole, Matplotlib, SymPy, and more.

- ✓ Application for data analysis
- ✓ Available languages: English
- ✓ Format of collected data: Python code
- ✓ Open source

INSTRUCTION

For instructions go to: https://docs.spyder-ide.org/

USE IN CITIZEN SCIENCE

Programming environment for Python and R programs. Both languages are used in data analysis in scientific applications, and therefore can be used in CS projects. SPYDER editing, analysis and debugging of data with Python. It can be utilized by citizens that have participated in relevant projects and have already acquired some coding skills with Python.

PANDAS

ABOUT

It is a fast, powerful, flexible and easy to use open source data analysis and manipulation tool, built on top of the Python programming language.

DESCRIPTION

Pandas is a fast, powerful, flexible and easy to use open source data analysis and manipulation tool, built on top of the Python programming language.

- ✓ Tool for data analysis
- ✓ Available languages: Multilingual
- ✓ Format of collected data: Python code, databases
- ✓ Open source

INSTRUCTION

For instructions go to: https://pandas.pydata.org/docs/

USE IN CITIZEN SCIENCE

Pandas is also a Python library designed for data management. It can be used in data analysis in scientific applications, and therefore can be used in Citizen Science projects. When using it as your designated analysis software the coordinators of the project should make sure that the participants have the appropriate background knowledge and experience to use a Python based statistical analysis tool.

SPSS MODELLER

ABOUT

SPSS® Modeler is a functionally complete version of the product that you install and run on your personal computer. You can run SPSS Modeler in local mode as a standalone product, or use it in distributed mode along with IBM® SPSS Modeler Server for improved performance on large data sets.

DESCRIPTION

SPSS Modeler is a leading visual data science and machine-learning solution. It helps enterprises accelerate time to value and achieve desired outcomes by speeding up operational tasks for data scientists.

- ✓ Application for data analysis
- ✓ Available languages: Multilingual
- ✓ Format of collected data: Proprietary format
- ✓ Paid license

IBM SPSS Modeler

INSTRUCTION

For instructions go to: https://www.ibm.com/support/knowledgecenter/search/SPSS%20Modeler

USE IN CITIZEN SCIENCE

This data analysis tool can be used by users of all levels. It provides possibilities with machine learning algorithms and integration with big data for researchers while it can also be used by beginners in data analysis process. Therefore, this tool can be the meeting point between citizens and researchers in a CS project.

Step 5. PRESENTATION OF RESULTS

DATAWRAPPER

ABOUT

Datawrapper was created by journalism organizations from Europe, designed to make data visualization easy for news institutes.

DESCRIPTION

Based on a web based GUI (graphics user interface), it promises to let you create a graph in just four steps.

- ✓ Web-based tool for presentation of results
- ✓ Available languages: English
- ✓ Format of collected data: XLS/CSV; google spreadsheet
- ✓ Paid commercial use, but free for education

INSTRUCTION

To create a graph, click on the "New Chart" link on the top menu bar. You can then paste your data in the text area; then, the tool analyzes it and shows you the preview. If everything is fine, you can publish it. Datawrapper is fully open source, and you can download it from their GitHub page and host it yourself. It is also available as a cloud hosted, paid service on their website. For more go to:
https://academy.datawrapper.de/

USE IN CITIZEN SCIENCE

In a CS context it is very important to show interactive visualizations; with datawrapper you can create charts, maps, tables to include in stories.

ADDITIONAL INFORMATION

The free versions allows to have a platform powerful, secure and flexible end-to-end as the professional versions and you can securely consume your data via browser, desktop, mobile or embedded into any application.

RAW GRAPHS

ABOUT

Raw is a web-based tool that allows you to simply paste your data and create graphs in few simple steps.

DESCRIPTION

Built on the D3.js library, it is extremely easy to use and packs all the goodness of D3 into a format that is ready to be used by non-programmers.

- ✓ Web-based tool for presentation of results
- ✓ Available languages: English
- ✓ Format of collected data:
- ✓ Open source

INSTRUCTION

RAWGraphs allows users to easily and quickly create data visualizations that can be exported and edited in a vector graphics software (such as Adobe Illustrator and Sketch). For more go to:
https://rawgraphs.io/learning

USE IN CITIZEN SCIENCE

RAW Graphs can be used to create data visualizationsfrom spreadsheet applications (e.g. Libreoffice. Microsoft Excel, Apple Numbers, OpenRefine) than can be exported to various formats.

TIMELINE

ABOUT

TimelineJS is an open-source tool that enables anyone to build visually rich, interactive timelines.

DESCRIPTION

Timeline is a tool that can display events as sequential timelines.
- ✓ Web-based tool for presentation of results
- ✓ Available languages: English
- ✓ Format of collected data:
- ✓ Paid commercial use, but free for education

INSTRUCTION

To create timelines, all you need to do is format your data in a Google spreadsheet, use Timeline's generator to publish it. For more go to: http://timeline.knightlab.com/#faq

USE IN CITIZEN SCIENCE

Citizens can use Timeline to present the data that they have stored in a Google spreadsheet. Experts can use their JSON skills to create custom installations, and more complex visualizations.

DATAMATIC

ABOUT

Datamatic.io is a visualization generator based on the amazing D3.js library.

DESCRIPTION

Datamatic.io a new type of editor built on top of the amazing data visualization library d3.js. Anyone can create complex, interactive and beautiful data-driven documents as easily as if they were using an Excel file with a dash of Power Point.
- ✓ Web-based tool for presentation of results
- ✓ Available languages: English
- ✓ Format of collected data:
- ✓ Paid commercial use, but free for education

INSTRUCTION

Go to datamatic.io and sign in using your Google account. You can experiment without signing in but you won't get editing history or exporting options as datamatic.io uses Google real-time API which requires users to be signed in. For more go to: https://medium.com/@DatamaticIO/how-to-make-an-interactive-d3-js-visualization-using-datamatic-io-3c0663040eff

USE IN CITIZEN SCIENCE

Damatic can be used for the creation of complex, interactive and beautiful data-driven documents easily. It is like using an Excel file with a dash of Power Point.

GOOGLE CHARTS

ABOUT

Google Charts is an interactive Web service that creates graphical charts from user-supplied information.

DESCRIPTION

The user supplies data and a formatting specification expressed in JavaScript embedded in a Web page; in response the service sends an image of the chart.
- ✓ Web-based tool for presentation of results
- ✓ Available languages: Multilingual
- ✓ Format of collected data:
- ✓ Paid commercial use, but free for education

INSTRUCTION

Google Charts is a pure JavaScript based charting library meant to enhance web applications by adding interactive charting capability. Google Charts provides wide variety of charts. For example, line charts, spline charts, area charts, bar charts, pie charts and so on. For more go to:

https://developers.google.com/chart/interactive/docs/quick_start

USE IN CITIZEN SCIENCE

Google Charts can easily generate charts that can be embedded in any citizen science web page.

ChartBlocks

ABOUT

ChartBlocks is a simple online chart building tool, and its data import wizard can lead you step-by-step to show you how to import data and design charts.

DESCRIPTION

You can easily share your charts on social media. You can also export charts as editable vector graphics or embed charts into websites with a free personal account.
- ✓ Web-based tool for presentation of results
- ✓ Available languages: English
- ✓ Format of collected data:
- ✓ Paid commercial use, but free for education

INSTRUCTION

ChartBlocks lets you quickly & easily build charts. Import data, design a chart and then share it online or download it as an image. For more go to: https://www.chartblocks.com/en/support

USE IN CITIZEN SCIENCE

A chart building and publishing tool that can be used for building charts from data by importing the data from spreadsheets.

HIGHCHARTS

ABOUT

Highcharts is a modern SVG-based, multi-platform charting library. It makes it easy to add interactive charts to web and mobile projects.

DESCRIPTION

You can obtain a non-commercial license for free version. All charting libraries work with any back-end database or server stack. Data can be given in any form, including CSV, JSON or loaded and updated live. Wrappers for most popular languages, such as .Net, PHP, Python, R, and Java, as well as iOS, and Android, and frameworks like Angular, Vue and React, are available.

- ✓ Application for presentation of results
- ✓ Available languages: English
- ✓ Format of collected data: various formats
- ✓ Paid commercial use, but free for education

INSTRUCTION

For instructions go to: https://www.highcharts.com/docs/index

USE IN CITIZEN SCIENCE

In a CS context it is very important to show interactive visualizations; Highcharts is a very powerful tool with a lot of possibilities in showing data, illustrate trend o anomalies, which are effective in show the results of big data, typical in CS projects.

GOOGLE DATA STUDIO

ABOUT

Data Studio is a free tool that turns your data into informative, easy to read, easy to share, and fully customizable dashboards and reports.

DESCRIPTION

Google Data Studio compare, filter, organize and show the data from spreadsheets, Analytics, Google Ads, Google BigQuery and more in one report.

- ✓ Web-based tool for presentation of results
- ✓ Available languages: Multilingual
- ✓ Format of collected data: the same as Google
- ✓ Paid commercial use, but free for education

INSTRUCTION

For instructions go to: https://support.google.com/datastudio/answer/6283323?hl=en

USE IN CITIZEN SCIENCE

In a CS context it is very important to show interactive visualizations; GDS has the advantage to be a tool easily to use because usually people are familiar with Google tools.

TABLEAU PUBLIC

ABOUT

The free versions allows to have a platform powerful, secure and flexible end-to-end as the professional versions and you can securely consume your data via browser, desktop, mobile or embedded into any application.

DESCRIPTION

Tableau Public is the free version of Tableau and allows to easily create interactive visualizations without coding, to embed your visualizations on a personal website, blog, or social media, to explore and interact with the most extensive library of data visualizations in the world.

- ✓ Application for presentation of results
- ✓ Available languages: English; Deutsch; French; Italian; Mandarin, Japanese, Korean, Spanish; Portuguese
- ✓ Format of collected data: Text; spatial file; statistic file; excel; database; Google sheets; web data
- ✓ Paid commercial use, but free for education

INSTRUCTION

For instructions go to: https://help.tableau.com/v2020.1/public/desktop/en-gb/default.htm

USE IN CITIZEN SCIENCE

In a CS context it is very important to show interactive visualizations; with tableau you can create a story. That is a sequence of visualizations that work together to convey information. You can create stories to tell a data narrative, provide context, demonstrate how decisions relate to outcomes. For instance, you can use a chronology to illustrate a trend; or shows anomalies or where things are exceptionally different; or explains a subject by dividing it into types or categories.

Step 6. SHARING INFORMATION

Erasmus+

BRITEC

NUCLINO

ABOUT

Nuclino is an easy way to collaborate and share knowledge in teams: team's knowledge will always be in one place, easily accessible, organized, and up-to-date.

DESCRIPTION

Nuclino allows to collaborate in real-time: every item/change/information (text, images, videos, files, tasks, embeds, code blocks), is instantly shared in the team. Anything can be found fast, typing into the search bar and switch between search results without losing context. Nuclino allows to work visually information in boards and graphs. Nuclino can be integrated and extended with the a

- ✓ Application for sharing information
- ✓ Available languages: English
- ✓ Paid commercial use, but free for education

INSTRUCTION

Nuclino can be used in your browser or download the desktop and mobile apps for all major platforms. Create an account, set up the workspace (or open it), customize the workspace according the unique needs of different teams. Onboard team, assigning appropriate roles and permissions is one of the key tasks of the team manage. For more go to: https://help.nuclino.com/d81c3c05-getting-started

USE IN CITIZEN SCIENCE

Sharing information in very important in Citizen Science activities. Using Nuclino you can easly keep all project documentation in one place, you can capture and collaborate on all relevant project knowledge, and your whole team can contribute from day one.

SLACK

ABOUT

The free version gives access to Slack's basic features: 10k searchable messages, 10 apps and integrations, 1-to-1 video calls, and two-factor authentication. Slack helps people work together and collaborate easily and efficiently online.

DESCRIPTION

A workspace can be created for all people involved in the CS activities but it is possible to organize the workspace in different channels so teams working on different tasks can collaborate independently. Teamwork happens in channels, where the right people are included, relevant information in one place, and new team members are able to get up to speed easily, have conversation, share ideas, make decisions, and move work forward. Teams can: share files and documents; find everything in the archive; talk it out face-to-face; connect Slack with other services, like Google Drive, Office, etc.

- ✓ Application for sharing information
- ✓ Available languages: English
- ✓ Paid commercial use, but free for education

INSTRUCTION

For instructions go to: https://slack.com/intl/en-it/resources/using-slack/app-launch

USE IN CITIZEN SCIENCE

In a CS context it is very important to share information, so using Slacks is very effective
- Instead of a single overstuffed inbox, conversations in Slack happen in dedicated spaces called channels;
- Slack makes it simple to follow conversations or find important information in an easily searchable archive;
- Unlike email, Slack lets you choose which conversations are most important — and which can wait.

MURAL

ABOUT

MURAL is an online collaboration and data sharing tool, that uses a visual whiteboard interface. It is great for brainstorm sessions, and contains a lot of templates for different team exercises, but it also has the capacity to store documents, hyperlinks, images, comments and voting opportunities.

DESCRIPTION

Mural allows to visually collaborate in real-time: every item/change/information (text, images, videos, files), is instantly shared in the team, and can be consulted and worked on by team members at different times as well. The content of a Mural can be exported in different formats.

- ✓ Web-based application for sharing information and collaborating
- ✓ Available languages: English
- ✓ Paid commercial use, but free for education

INSTRUCTION

Mural only requires users to create an (free) account. Any new account receives a standard 'workspace' in which different 'rooms' can be created, each containing as many Muralboards as the user wishes. He/she can invite other users as permanent members of his/her own Workspace, and hence collaborate. The newly created workspace usually expires after a trial period of 30 days, but teachers/educators can apply for a free account and workspace to use in the education field.

USE IN CITIZEN SCIENCE

The project BRITEC (Bringing Research into the Classroom) has used Mural during a focus group meeting with c. 20 teachers, in order to visually guide the group through a group discussion that was built around some key questions about their expectations and views on citizen science. The tool can be used to create interactive lessons with students, or interactive workshops between researchers and teachers or students. The amount of members is limited, but Mural has an option to invite external people as temporary (and anonymous) guests to the Mural.

Erasmus+

BRITEC

BRINGING RESEARCH
INTO THE CLASSROOM

ELIUM

ABOUT

Elium is a paying online knowledge database system, in which organizations can save, structure and easily trace back documents, websites, pdfs, spreadsheets, etc. – by designing a unique tagging structure and applying it to the documents.

DESCRIPTION

With Elium, organizations can share, structure and easily find back information they store internally. The big advantage of this online platform is the possibility to tag files according to their content or functionality, with a large amount of tags and tagging types. The tagging system is completely customizable.

- ✓ Web-based application for sharing information & collaboration
- ✓ Available languages: French, English
- ✓ Paid commercial use,

elium

INSTRUCTION

For an introduction to the platform, check **https://www.youtube.com/watch?v=FnZhYn4kOQI**

USE IN CITIZEN SCIENCE

Elium can be used as a platform for users, such as teachers, to quickly find and share information with each other and with researchers. Because the information stored in the system can be tagged in multiple ways, teachers can for example tag one single file according to its content (e.g. the solar system), its associated citizen science project (e.g. Radio Meteor Zoo), the level of the public for whom the item is built (e.g. 12 year olds), the type of information (e.g. video, or classroom experiment), the author (e.g. name of the teacher, or an organisation like NASA), etc. – this allows all collaborators on a project to very quickly find their way in a sometimes complex structure of folders and subfolders as we are used to.

Institute of Geophysics Polish Academy of Sciences   UAM Universidad Autónoma de Madrid   GFOSS   ibercivis   European Schoolnet   KU LEUVEN

Step 7. COMMUNICATION TOOLS

Erasmus+

BRITEC

BRINGING RESEARCH
INTO THE CLASSROOM

BASECAMP PROFESSIONAL

ABOUT

Basecamp is more than just a project management tool — it's a better way to work. Teams that switch to Basecamp are more productive and better organized. They communicate better and require fewer meetings.

DESCRIPTION

Basecamp provides a platform for collaboration and project management. Basecamp Personal offers up to 1GB free storage space, up to 20 users working on up to 3 projects.

- ✓ Web-based tool for communication
- ✓ Available languages: English
- ✓ Format of collected data: Text format, photos; various files can be uploaded and stored
- ✓ Free to use

INSTRUCTION

Sign up for Basecamp Personal here: https://3.basecamp.com/signup/account/new?plan=free_v2 and follow the instructions, which you can find here:
https://3.basecamp-help.com/collection/1-the-manual.

USE IN CITIZEN SCIENCE

A suitable communication platform for small teams (teachers-researchers).

GOOGLE HANGOUTS

ABOUT

Google Hangouts is a cross-platform messaging app developed by Google. Hangouts allows conversations between two or more users. The service can be accessed online through the Gmail or Google+ websites, or through mobile apps available for Android and iOS

DESCRIPTION

Google Hangouts is a communication software product developed by Google. It brings conversations to life with photos, emoji, and even group video calls for free. It's essentially a useful and cost-effective collaboration platform for the average person as well as enterprise customers.

- ✓ Web-based tool for communication
- ✓ Available languages: English
- ✓ Format of collected data: Text, audio, photos, video, etc.
- ✓ Free to use

INSTRUCTION

On your computer, go to hangouts.google.com or open Hangouts in Gmail. If you have the Hangouts Chrome extension, Hangouts will open in a new window. For more information go to:
https://support.google.com/hangouts/answer/3110347?co=GENIE.Platform%3DDesktop&hl=en

USE IN CITIZEN SCIENCE

A suitable communication platform for small teams (teachers-researchers).

CHANTY

ABOUT

Chanty helps small teams become more productive with clean interface and seamless user experience.

DESCRIPTION

Unlimited message history, task management, file sharing and powerful notifications organize and save your day. Free plan is for teams with up to 10 members.

- ✓ Web-based tool for communication
- ✓ Available languages: English
- ✓ Format of collected data: Text, audio, photos, video, etc.
- ✓ Free to use

INSTRUCTION

Download Chanty here: https://www.chanty.com/downloads.html and follow the instructions.

USE IN CITIZEN SCIENCE

A suitable communication platform for small teams (teachers-researchers).

ROCKET CHAT

ABOUT

Communicate and collaborate using team chat and switch to video or audio calls with screen sharing for more efficient teamwork.

DESCRIPTION

Improve productivity by discussing and sharing ideas, projects and files with real-time or asynchronous team chat.

- ✓ Web-based tool for communication
- ✓ Available languages: Multilingual
- ✓ Format of collected data: Text, photos, video, etc.
- ✓ Open source

INSTRUCTION

Download desktop app here: https://rocket.chat/install

For instructions go to: https://rocket.chat/docs/user-guides/connecting-to-a-server/

USE IN CITIZEN SCIENCE

A suitable communication platform for small teams (teachers-researchers).

ZOTERO

ABOUT

Zotero is a free collaboration platform with "groups" feature that allows you to collaborate remotely with project members, set up web-based bibliographies for classes you teach, share your own work or sources you have discovered with others who are working in related areas.

DESCRIPTION

It is software to manage bibliographic data and related research materials. Notable features include web browser integration, online syncing, generation of in-text citations, footnotes, and bibliographies, as well as integration with the word processors Microsoft Word, LibreOffice Writer, and Google Docs.

- ✓ Web-based tool for communication
- ✓ Available languages: English
- ✓ Format of collected data: Word format, pdf format, etc.
- ✓ Open source

INSTRUCTION

Download Zotero 5.0 for Windows and follow the instructions, go to:
https://www.zotero.org/support/installation

USE IN CITIZEN SCIENCE
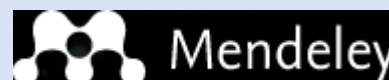
Research collaboration platform.

MENDELEY

ABOUT

Mendeley is a free reference manager and academic social network that can help you organize your research, collaborate with others online, and discover the latest research.

DESCRIPTION

Generate bibliographies, collaborate easily with other researchers online, easily import papers from other research software, find relevant papers based on what you're reading, access your papers from anywhere online, read papers on the go, with iOS and Android apps.

- ✓ Web-based tool for communication
- ✓ Available languages: English
- ✓ Format of collected data: Word format, pdf format, etc.
- ✓ Free to use

INSTRUCTION

Create a free account here and follow the instructions. For guide go to:
https://www.mendeley.com/guides

USE IN CITIZEN SCIENCE

Research collaboration platform.

SLACK

ABOUT

Slack is a channel-based messaging platform. With Slack, people can work together more effectively, connect all their software tools and services, and find the information they need to do their best work — all within a secure, enterprise-grade environment.

DESCRIPTION

Slack is a collaboration hub that can replace email to help you and your team work together seamlessly. It's designed to support the way people naturally work together, so you can collaborate with people online as efficiently as you do face-to-face. Slack is free for small teams trying it out for an unlimited period of time.

- ✓ Web-based tool for communication
- ✓ Available languages: English, French, German, Japanese, Portuguese, Spanish
- ✓ Format of collected data: Text, photos, video, etc.
- ✓ Free to use

INSTRUCTION

Go to slack.com/downloads to download Slack's desktop and mobile apps and Set up your profile. In Slack, work happens in channels, find and join relevant channels in your workspace to make sure you're getting all the info you need. For more, go to: https://slack.com/intl/en-be/help/articles/218080037-Getting-started-for-new-members

USE IN CITIZEN SCIENCE

A suitable communication platform for small teams (teachers-researchers).

MICROSOFT TEAMS

ABOUT

Microsoft Teams is a communication and collaboration platform that combines workplace chat, video meetings, file storage, and application integration.

DESCRIPTION

Microsoft Teams is a hub for teamwork in Office 365. Free plan is for teams with up to 10 members.

- ✓ Web-based tool for communication
- ✓ Available languages: Multilingual
- ✓ Format of collected data: Text, photos, video, etc.
- ✓ Free to use

INSTRUCTION

Download Microsoft Teas here: https://teams.microsoft.com/downloads and follow the instructions

USE IN CITIZEN SCIENCE

A suitable communication platform for small teams (teachers-researchers).