



CS TRACK
Investigating Citizen Science

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Technical Specification of the Community Platform D5.1



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Executive summary	<p>This deliverable contains the specifications document that describes the technical requirements and the plan for implementation of the Community Platform based on the technical and user needs from the consortium partners. It details a) the requirements analysis process followed - which includes strategic and functional benchmarking with other Citizen Science platforms, a consultation process with consortium partners for the prioritization of targets and objectives, and an analysis of users, roles and pathways through the description of user stories-; b) a breakdown of functional requirements of our dashboard, e-Magazine and Newsletter as well as non-functional requirements which details the structural and technical characteristics to which they must submit the functional requirements; and c) the security and privacy policies following the standards and guidelines established in deliverable D8.2. POPD – Requirement No. 3.</p> <p>Some aspects of this deliverable will be fine-tuned with the first publication of the e-Magazine in December 2020. Besides, it relates to the needs of T6.4 Community support and contact in WP6 so is linked to the revisions that are made of the deliverable D6.1 Dissemination and Communication Strategy and Implementation Plan.</p> <p>This deliverable reflects the best of our understanding of the needs for and corresponding technical and functional affordances of the Community Platform as of this moment. As the project work advances in all WPs, our (WP5's) specific work in integrating and putting in operation the Dashboard and developing and publishing the e-Magazine and the Newsletter may need to adapt in directions that could only partially be foreseen in the present document, and the reader should take this possibility into account.</p> <p>This may result from needs and modalities of use that may be more user-type-dependent than expected, from the nature of the information we will have to deal with, whose wide diversity has only started to show, etc.</p>

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1. Introduction

Work Package 5 (WP5) of the CS Track project aims to create a Community Platform that facilitates useful information and offers a communication channel about the analysis of Citizen Science.

The Community Platform will be part of the CS Track website (www.cstrack.eu) that is the central space where users can access all public information about the project. The Community Platform will communicate and share the project's findings on issues such as participation patterns, incentives, disincentives, barriers enabler among others.

The main element of the Community Platform will be a dashboard providing graphic information synthetically on the results of the project that may be of interest to the CS community. Through the dashboard, users will be able to consult the information and the data obtained and analysed in WP2, WP3 and WP4. The project database will be connected to the Metabase tool¹ to create the dashboard's visualizations and graphics. The dashboard will be complemented by an e-Magazine in which articles will be published presenting the analytical results of the project that are of interest to the Citizen Science community. Users also can be subscribed to a newsletter to keep informed about updates on the project or news, events, reports and articles of citizen science in general.

Figure 1 shows the list of the different communication channels that are part of the Community Platform.

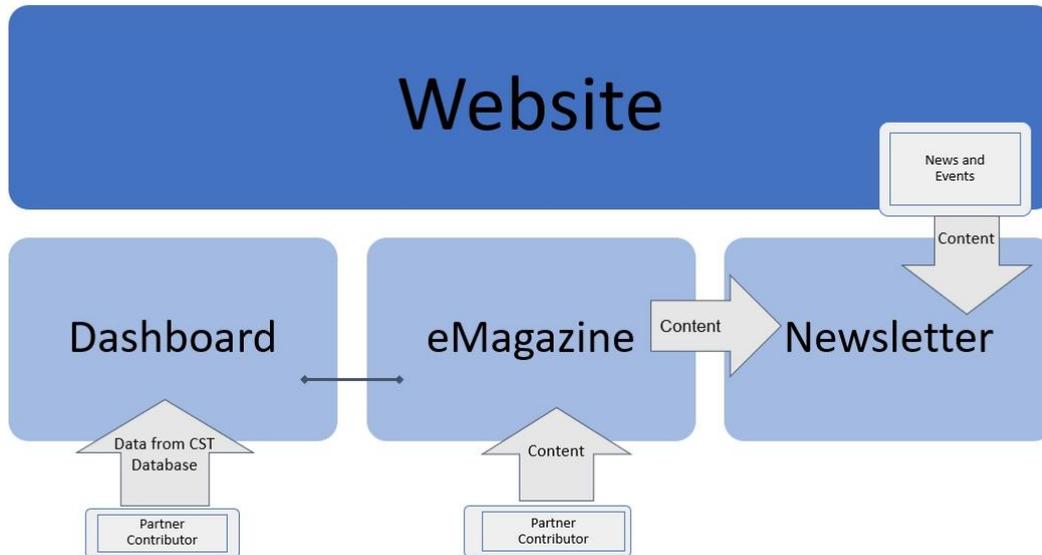


Figure 1. Communication channels of Community Platform

¹ Metabase is an open-source way to ask questions and learn from data. It allows exploring, summarize and visualize the data, and browse or search through the tables, and then visualize results. Available in <https://www.metabase.com>

2. Overview

2.1 Purpose

The main purpose of the Community Platform is offering relevant information about CS Track's analytics results and key outcomes, recommendations, reports, the value that CS can bring and how it can be supported.

The Community Platform will enable and promote a communication channel open to users interested in Citizen Science activities so that they can learn more about it. To this end, they will be able to interact with the dashboard, read analytical reports in the e-Magazine or subscribe to our Newsletter to keep up to date with the latest news.

2.2 Target groups

The Community Platform is aiming to engage the following stakeholders involved in the CS Track activities:

- (U1) Policymakers and policy influencers in the field of CS including the European Commission.
- (U2) Academics carrying out research into CS and related fields.
- (U3) Practitioners responsible for delivering and supporting CS activities.
- (U4) Heads of organizations supporting and funding research in innovative digital practices especially in the field of CS.
- (U5) Heads and technical managers of civil society organizations and NGO's providing and supporting CS initiatives including science centres and museums, CS clubs, etc.
- (U6) Heads and technical managers of industrial organizations including companies active in the scientific field and companies supplying resources and materials to CS activities.
- (U7) Heads, lecturers and technical managers of agencies responsible for teacher education training (pre-and in-service training) interested in CS and how it relates to formal education along with science teachers who are interested in the value and impact CS can have on formal learning in the classroom.

2.3 Objectives

The main objectives of the Community Platform are:

- (O1) Offering members of the community direct knowledge about the results of the project and responding to their demand for information.
- (O2) Offering relevant information about the project's analytics results and key outcomes, recommendations, reports, the value that CS can bring and how it can be supported.
- (O3) Stimulating awareness, exchange, and interaction between different CS initiatives.

- (O4) Stimulating synergies and the generation of new ideas for CS and the surrounding communities.
- (O5) Making stakeholders in public institutions and in companies aware of the potential of CS, focusing on aspects of innovation and employability and the general support of science in the community.
- (O6) Identifying novel ways of communicating and inter-relating science with everyday practice and societal needs, engaging more people in CS, and opportunities for curriculum revision.
- (O7) Increasing the understanding of the importance of science for civic interests in general

2.4 Milestones

According to the tasks and deliverables planned the following milestones have been defined and scheduled:

1. M5.1 Launch of Community Platform Site 1 [M9 - Expected in M10]
2. M5.2 Launch of Community Platform Site 2 with e-magazine and multiple languages [M12]
3. M5.3 Publication of the 1st e-magazine [M13]. After this month, the e-magazine will be published periodically.
4. M5.4 Legacy Site for after CS Track funding period [M36]

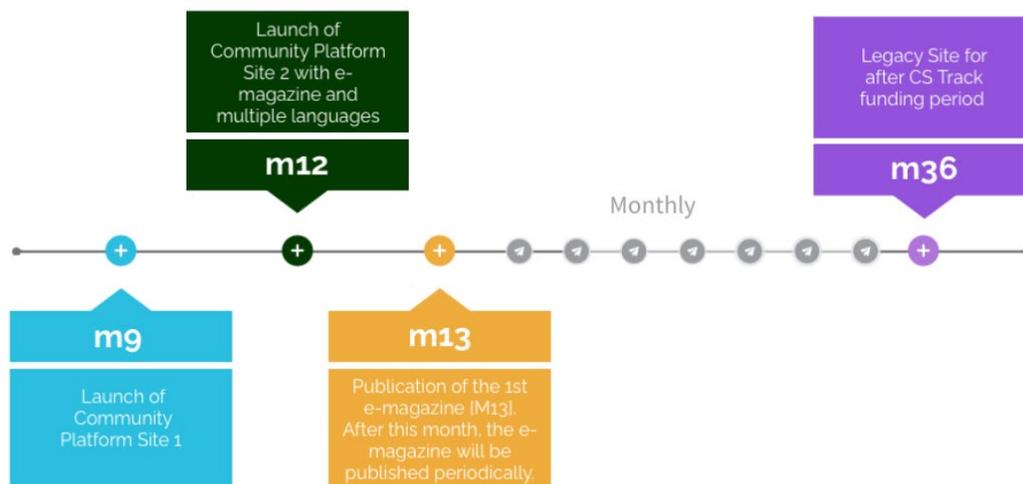


Figure 2. Milestones Community Platform

3. Requirements analysis

For the analysis of the requirements of the Community Platform multiple assessments have been carried out. These includes:

1. An internal assessment of functionality according to the users and objectives defined in the project to set Community Platform priorities.
2. A functional benchmarking analysis to know the opportunity and the gap that the CS Track Community Platform should cover.
3. An analysis of the type of users who will use the platform and an assessment of the required functionalities through the elaboration of User stories.

3.1 Internal evaluation to prioritize of targets and objectives

Deliverable D.6.1 Dissemination and Communication Strategy and Implementation Plan established the main target groups and the different communication channels to be used (pp. 12-14).

Once the target groups had been defined, it was considered useful to consult the consortium partners in order to prioritize the specific objectives and target audiences for the Community Platform. This consultation aimed to ascertain the assessment of the partners to properly design the strategy for the development of the Community Platform.

The questionnaire was sent in April 2020 to all the consortium partners included in the CS mailing list (N=30) through an email with a link to complete the survey. The questionnaire, available in annex 1, contained two questions in which the participants were asked to rank, from most to least important, both the objectives and the target audiences. Eleven anonymous responses (36%) were received which provide the following results:

About the target audiences, the practitioners, policymakers, and policy influencers are established as priority groups and secondly the heads and technical managers and the academics (See figure3).

1. Target

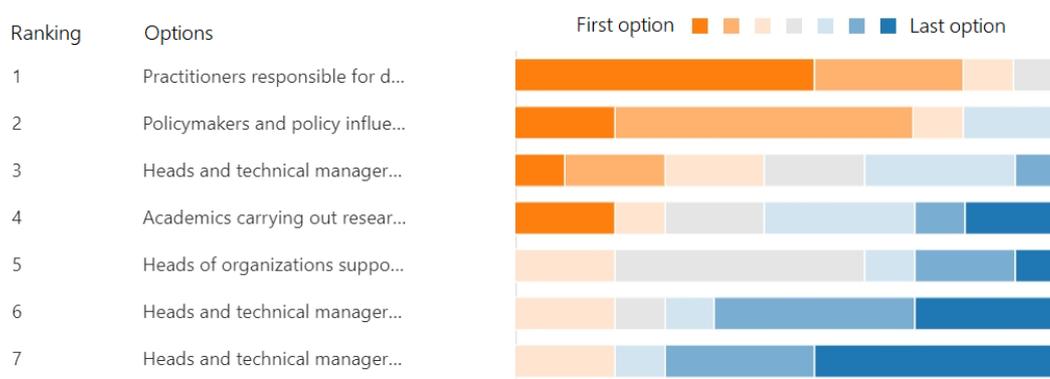


Figure 3. Results of the question on prioritizing the Target

Note: R3 = target (U5); R6 = target (U6); R7 = target (U7)

Regarding the goals, the following are priorities: Offering members of the community direct knowledge about the results of the project and respond to their demand for information, making stakeholders in public institutions and in companies aware of the potential of CS, and offering relevant information about the project's analytic results and key outcomes, recommendations, compendium, report, value that CS can bring and how it can be supported (See figure4).

2. Goals

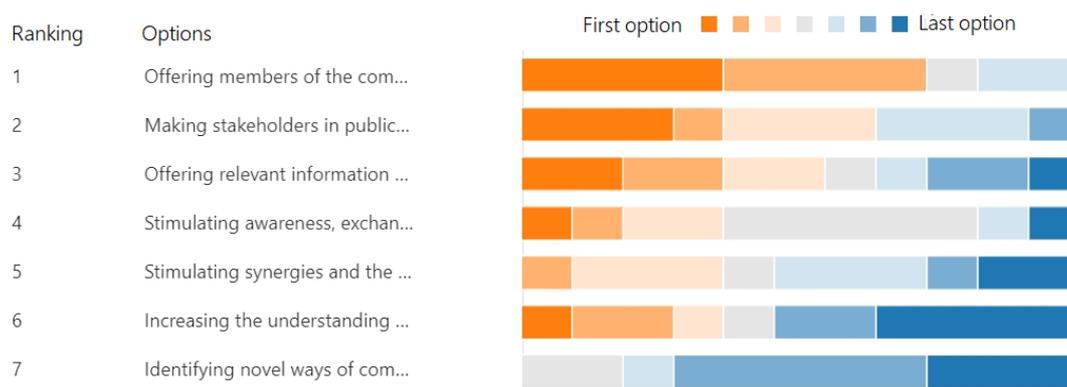


Figure 4. Results of the question on prioritizing objectives

The outcomes obtained in the survey resulted in the following prioritization of objectives and target audiences. Table 1 indicates which are the priority objectives for each target audience. Cells containing an X indicate that the target is a priority, while empty cells do not.

Table 1. Prioritization of objectives and targets

Targets	Objectives						
	O1	O2	O3	O4	O5	O6	O7
(U1) Policymakers and policy influencers in the field of CS including the European Commission.	X	X			X		X
(U2) Academics carrying out research into CS and related fields	X	X	X	X		X	X
(U3) Practitioners responsible for delivering and supporting CS activities	X	X	X	X		X	X
(U4) Heads of organizations supporting and funding research in innovative digital practices specially in the field of CS	X	X	X	X		X	X
(U5) Heads and technical managers of civil society organizations and NGO's providing and supporting CS initiatives including science centres and museum, CS clubs, etc.	X	X	X	X		X	X
(U6) Heads and technical managers of Industrial organizations including companies active in the scientific field and companies supplying resources and materials to CS activities.	X	X			X		X

(U7) Heads and technical managers of training (pre- and in-service) agencies responsible for teacher education interested in CS and how it relates to formal education along with science teachers who are interested in the value and impact CS can have on formal learning in the classroom.

X	X		X			X	X
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3.2 Functional benchmarking

A comparative analysis has been made to identify and compare other projects funded by the European Commission that already offer a Citizen Science Platform.

For the comparative analysis, we have taken as reference the projects listed by the EU-Citizen.Science website and are part of the Joint Newsletter that EU-Citizen.Science is editing (EU-CITIZEN.SCIENCE, 2020)

The purpose of this analysis is identifying potential overlap between other projects and the goals of our Community Platform detailed in the section 2.3 of this document. To ensure that the CS Track Community Platform provides information about CS information gap that does not exists elsewhere.

The analysis was conducted by gathering information about the platforms via the project descriptions published on CORDIS and investigating their functionalities by visiting them directly.

The following table displays a comparison between the objectives established in the CS Track Community Platform (columns) and the objectives of the analysed platforms. In each row, one of the projects is analysed, evaluating whether any of the objectives overlap with those of the Community Platform for CS Track. The meaning of the colour key (like a traffic light) is as follows:

- **Green colour:** No goal overlap.
- **Yellow colour:** Overlaps, but just a feature. In some cases, you can find an explanation about it.
- **Red colour:** There is an overlap.

In cases where there is an overlap, the text in the corresponding cell explains whether there is a thematic or scope overlap.

Table 2. Functional benchmarking

Platforms and projects		O1	O2	O3	O4	O5	O6	O7
International Association for CS	ECSA	Green	Green	Red	Red	Yellow	Red	Red
	ACSA	Green	Green	Red	Red	Yellow	Red	Red
	CSA	Green	Green	Red	Red	Yellow	Red	Red
General Citizen Science Platform	EU-Citizen. Science	Green	Green	Yellow	Red	Yellow	Green	Green
Thematic Citizen Science Platforms	ACTION²	Green	Yellow	Red	Yellow	Yellow	Green	Green
	CiteS-Health³	Yellow						
	CoAct⁴	Green						
	D-NOSES⁵	Green						
	Enviro Citizen⁶	Green					Yellow	Red
	MICS⁷	Green						
	Reinforce⁸	Green	Yellow		Green	Yellow		
	WeCount	Green	Green	Green	Green	Green	Green	Green

The results show a minimal overlap with most of the communities analysed. The analysis confirmed the opportunity for CS Track to address the existing gaps that the Community Platform of the project will cover.

3.3 User Analysis

To determine the type of users who will use the Community Platform we have evaluated the required functionalities through the elaboration of user stories. User stories are part of the agile approach for the development of different solutions of Community Platform (Lucassen, Van Der Werf, & Brinkkemper, 2015). A user story is "a general and informal explanation of a software function written from the perspective of the end user or customer" (Rehkopf, 2020).

Based on the objectives and the target audiences described, some typical users are declared with the main functionalities required to satisfy the needs that users will have in CS Track are defined (Gilson & Irwin, 2018). Also, the basic pathways –" how they might interact with our project– the pathway they to get involved and to sustain

² This project is aimed at boosting citizen science projects

³ This project has a thematic and local focus

⁴ This project has a thematic and local focus

⁵ This project has a thematic approach based on Governance

⁶ This project has a thematic focus on the environment

⁷ This project has a thematic focus on nature-based solutions

⁸ This project aims create a policy roadmap

involvement" (Marsh, 2020)- have been analysed to better understand how users will make use of the Community Platform.

This analysis subsequently provides the criteria for drawing up the requirements analysis.

For each type of user - "persona" - analysed, the following scheme is followed:

- First, the user and his or her main motivation (e.g. information need) are described.
- Second, an epic tells what the user does to solve his or her need. An epic is a considerable amount of work that can be broken down into smaller tasks. The description of these smaller tasks is called user stories.
- Finally, the user stories are detailed. They describe the functional requirements to be met by the CS Track platform

The different user stories are described below:

Policymaker

Pedro is a 43-years old policymaker who works at FECyT (Spanish Foundation for Science and Technology). He lives in Spain. His daily work-life consists of developing Citizen Science strategies for Spain. He is interested in the elements that make the CS projects dynamic and contribute to their success.

Pedro's needs match with O2: Finding relevant information about CS Track's analytics results and key outcomes, recommendations, report, the value that CS can bring and how it can be supported.

Epic [E3]	As a member, I WANT to consult relevant information about CS Track's analytics results and key outcomes, recommendations, reports and other resources that illustrate the value CS can bring, SO THAT I could discover the indicators for success or possible insights for success of Citizen Science projects.		
User Stories			
As a/an	I want to...	So that I could...	Tasks
User	Consult the project experts on the published results	Identify the key elements that make Citizen Science activities successful	Contact the researchers of the CS Track project to make inquiries about the Citizen Science reports and analysis
User	Access the results and reports of the project	Improve the Citizen Science activities to be developed in the future	Interact with the project's database through a visual dashboard Access in-depth articles to find further information

Academic researcher

Sue is a 40-year-old researcher from Austria. She has a background in biology and her work focuses on biodiversity research at the Vienna University for Natural Resources and Life Sciences. She has been following the Citizen Science movement for years, although she has never organised a Citizen Science project herself so far. She is very

interested in Citizen Science projects and data that are generated in these projects as a potential source for her own research.

Sue's needs match with O1: Finding information about the project's analytics results and key outcomes, recommendations, report, value that CS can bring and how it can be supported.

Epic [E2]	AS a member, I WANT to consult relevant information about the project's analytics results and key outcomes, recommendations, reports and other resources that add value CS can bring in the biodiversity field, SO THAT can help me how it can be supported the CS activities.		
User Stories			
As a/an	I want to...	So that I could...	Tasks
User	Consult the project experts on the published results	Find information about biodiversity-related CS projects and their characteristics	Contact the researchers of the CS Track project to make inquiries about the Citizen Science reports and analysis
User	Access the results and reports of the project	Improve the Citizen Science activities to be developed in the future	Interact with the project's database through a visual dashboard Access in-depth articles to find further information Receive regularly updated information on Citizen Science projects on biodiversity

Practitioner

Martin is a 33-year-old engineer from Italy, who is an active member of an environmental NGO in his spare time. Where he lives, they recently opened a new industrial zone. Since this opening, citizens have the feeling that the air they breathe has become worse and worse. As local decision-makers seem not to worry about this problem and there are no air quality measurement stations in the area, Martin wants to initiate a citizen science-based air sensing project.

Martin's goal matches with O4: Generating new ideas for CS and the surrounding communities.

Epic [E2]	AS a member, I WANT to consult relevant information about CS Tracks' analytics results and key outcomes, recommendations, reports and other resources as well as that the added value CS can bring to the engineering sector, SO THAT I can gain more knowledge about CS activities and valuable insights for setting up my own CS project.		
User Stories			
As a/an	I want to...	So that I could...	Tasks
User	Consult the project experts on the published results to improve my knowledge about specific CS projects	Identify the key elements that make Citizen Science activities successful, access information about air sensing projects such as: if there are similar CS projects; their location (national or international); their types of collaboration, ...	Contact the researchers of the CS Track project to make inquiries about the Citizen Science reports and analysis
User	Access the results and reports of the project	Apply learnings from other Citizen Science activities in the development of my own CS project	Interact with the project's database through a visual dashboard Access in-depth articles to find further information Receive regularly updated information on Citizen Science projects

Heads of organizations in innovative digital practices in the field of CS

Michael is 55 years old. He lives in Berlin. He works as a social worker in the Human Resources' department in a company that promotes social inclusion. Also, he is a head of an organization supporting and funding research in innovative digital practices, especially in the field of CS. He wants to link his efforts to achieve digital and social innovation. Therefore, in cooperation with the European Social Fund, he is developing a program of activities and new ways of collaboration that uses technological resources in order to improve the social relations of people otherwise often excluded based on age, gender or ethnic origin. He is interested in finding the most frequently used technological resources and finding out if there is remuneration in CS projects to promote social inclusion.

Michael's needs match with O1: Offering members of the community direct knowledge about the results of the project and responding to their demand for information.

Epic [E4]	As a member, I WANT to consult relevant information about CS Track's analytic results and key outcomes, recommendations, reports and other resources as well as the added value CS can bring in the digital and social innovation field, SO THAT I can improve my knowledge about CS activities and learn how to make CS more inclusive.		
User Stories			
As a/an	I want to...	So that I could...	Tasks
User	Consult the project experts on the published results to improve my knowledge about social inclusion CS projects	Identify the key characteristics of Citizen Science activities such as: information about gender data, localization or types of collaboration in the CS project, ...	Contact the researchers of the CS Track project to make inquiries about the Citizen Science reports and analysis
User	Access the results and reports of the project	Improve the Citizen Science activities to identify novel ways of relating science and technology with everyday practice and societal needs	Interact with the project's database through a visual dashboard Access in-depth articles to find further information Receive regularly updated information on Citizen Science projects

Heads and technical managers of civil society organizations and NGO's

Ana is 38 years old. She is a marine biologist and lives in Barcelona. She investigates the quality control and pollution of marine waters. She works as a technical manager in an NGO for beach cleaning and she would like to develop an application that allows them to create a map of garbage islands and be able to collect the plastic waste to recycle it. In this manner, everybody (fishermen, divers, swimmers, ...) can collaborate using the app to mark the geolocation of plastic islands they discover.

Ana's goal matches with O2: Offering relevant information about CS Track's analytics results and key outcomes, recommendations, compendium, report, value that CS can bring and how it can be supported.

Epic [E5]	As a member, I WANT to consult relevant information about CS Track's project analytics results and key outcomes, recommendations, reports and other resources that add value CS can bring in biology and marine science field, SO THAT can help me to improve my knowledge about CS activities		
User Stories			
As a/an	ID	As a/an	ID
User	Consult the project experts on the published results to improve my knowledge about CS projects	Identify the key elements that make Citizen Science activities successful and to learn about digital resources used in CS projects	Contact the researchers of the CS Track project to make inquiries about the Citizen Science reports and analysis

User	Access the results and reports of the project	Improve the Citizen Science activities to generate new ideas that highlight the value of CS	Interact with the project's database through a visual dashboard Access in-depth articles to find further information Receive regularly updated information on Citizen Science projects
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Heads and technical managers of training (pre-and in-service) agencies responsible for teacher education

Nicholas lives in Athens. He is a 50-year-old teacher. He studied Biomedicine and he works as a Director at the Institute of Educational Technology in Athens. He is very worried about the Covid-19 pandemic and he wants the high school's students to participate in a CS project. For this reason, he is working to do a program with activities such as scientific workshops and training activities about CS in order to disseminate and raise awareness among students about this problem. He knows that if he uses gamification there will be more motivation between students. So, he wants to find a CS project about Covid-19 that uses video games to explain how to prevent infection and where the students can collaborate. In addition, the institute has several 3D printers and to involucrate young people it could be used for collaboration to create protective masks to prevent risk of transmitting the virus in hospitals. This way, the students develop digital competence, and everyone could work together as a team.

Nicholas's needs to match with O7: Increasing the understanding of the importance of science for civic interests in general

Epic [E7]	As a member, I WANT to consult relevant information about project's analytics results and key outcomes, recommendations, reports and other resources that add value CS can bring in Education field, SO THAT I can help to increase my students' understanding of the importance of science for civic interests		
User Stories			
As a/an	I want to...	So that I could...	Tasks
User	Consult the project experts on the published results to improve my knowledge about CS projects	Identify the key elements that make Citizen Science activities successful and to analyse resources used in the CS project or different ways to get involved with CS projects	Contact the researchers of the CS Track project to make inquiries about the Citizen Science reports and analysis
User	Access the results and reports of the project to carry out awareness program about CS	Generate an awareness program about CS that highlight its value	Interact with the project's database through a visual dashboard Access in-depth articles to find further information Receive regularly updated information on Citizen Science projects

4. Requirements

4.1 Functional requirements of the Dashboard

The user analysis carried out in section 3.3 of this deliverable has allowed identifying the need of users to interact with the project's database through a visual dashboard. The development of a dashboard will make it possible to meet this need.

Dashboard description

The main goal of the Dashboard is showing the data stored in the database of CS Track Project. This will provide graphic information synthetically that allow to the CS community to improve your knowledge about Citizen Science. The user can consult the information and the data obtained and analysed in WP2, WP3 and WP4. The project database will be connected to the Metabase tool to create the dashboard's visualizations and graphics.

The displays to be shown on the dashboard will follow the features described in section 2.2.3 Visualizations of the deliverable D3.1 Specification of Web-based Analytics Methods and Tools: "the data are external, the source data are not an image itself, the graphics must be readable" (D3.1. Specification of Web-based Analytics Methods and Tools, p. 10)

The visualizations will allow the users to understand, in a simple and direct way, the main indicators obtained from the data available in the project database.

The dashboard will allow users to explore the information, categories and indicators that are currently being defined in several WPs. For example, in WP1, a categorization of citizen science projects is being established. In WP2, work continues structuring the project database that will be fed with the results also from WP3 and WP4 and evaluating the application of PPSR CORE Metadata standards (citizenscience.org, 2015). Besides, some descriptors that may be displayed as indicated in the Conclusions and Recommendations section of the D3.1 Specification of Web-based Analytics Methods and Tools prepared in WP3. For instance, basic information associated with CS projects such as type of actors, topics of interest, regional distribution, etc. obtained in WP2 will be included. This is the case also for the analytic work of WP3 that will gradually enrich the database with new descriptors like the relation of projects to different scientific disciplines or the outreach success as measured by their mentions in classical public media or micro-blogging channels (including Twitter).

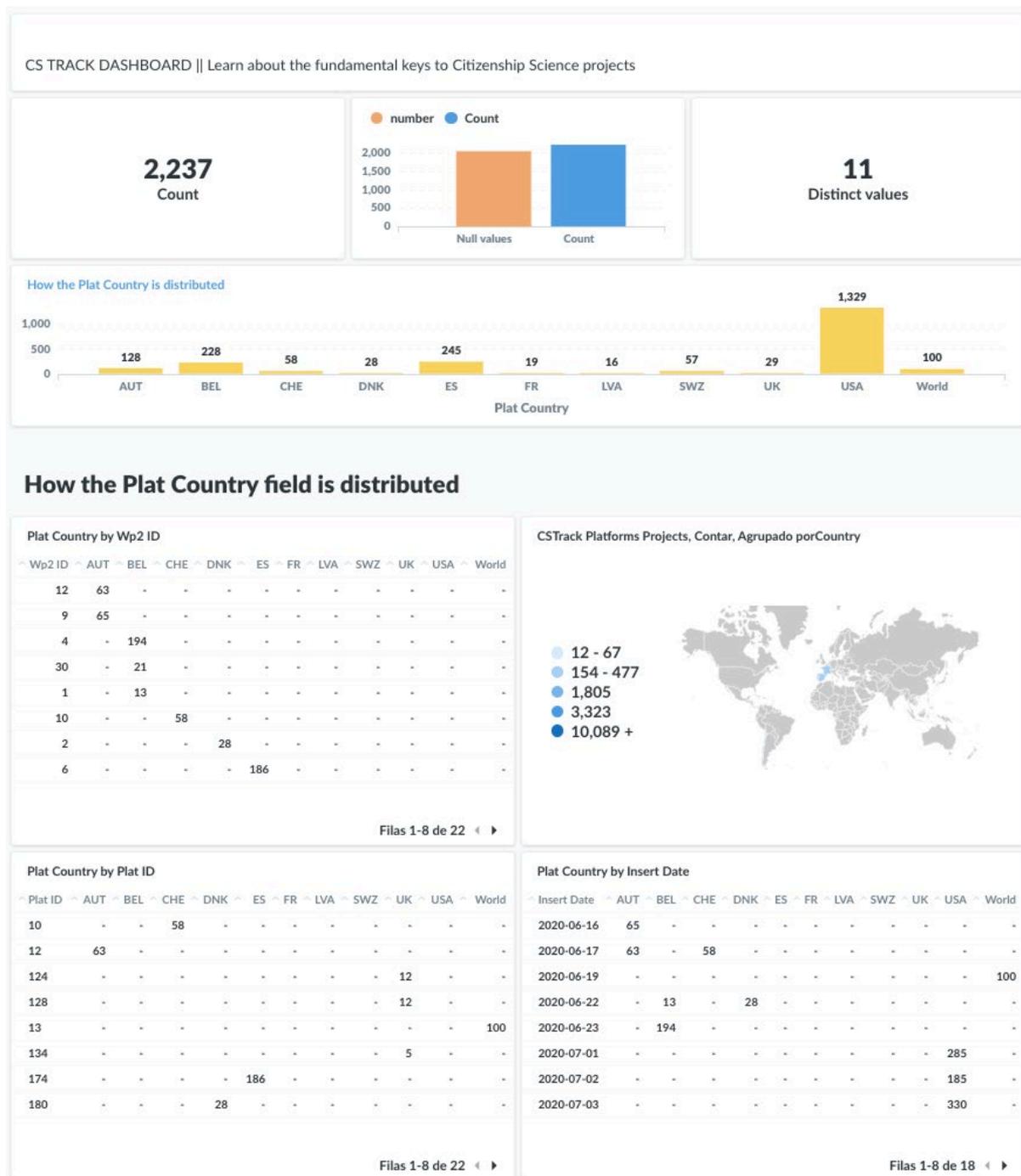


Figure 5. Sample dashboard screen

Just as an example, we expect (for the moment, tentatively) that users will be able to enquire about questions such as:

- Do the profiles of citizen engagement differ among countries?
- Do participation patterns depend on the scientific area or scope of the project?
- How have citizen science projects evolved over time?
- Are there activities that have specific characteristics? (i.e. filtering activities according to a set of pre-specified attributes)

The complete list of indicators as well as the type of display or specific displays made of each indicator or set of indicators will be adjusted to the data finally available in the database. The following table makes a first approximation as an example:

Table 3. Examples of indicators of Dashboard

Indicator	Question to answer
Number of Projects per country	Which countries have the largest number of projects? Are there differences by region?
Number of Projects per categories (typologies, academic fields...)	Are there differences in the types of projects by country? Are there differences by region?
Number of Projects per country and category or projects	Is there a relationship between the number of projects and the categories per country?
Requirements to participate in a project	Is necessary to have minimum requirement to be able to get involved in the projects? And what e.g. knowledge, tools, internet access, etc
Types of participation in a project	What type of participation is carried out in the projects? (Co-created, collaborative, contributory) (Shirk et al., 2012) (Bonney et al., 2009) How can volunteers contribute to the projects?
Issues related with gender	Are there gender-related differences in participation in Citizen Science in general, for different academic fields or types of projects, etc?
Scope and scale of the Projects	What is the geographical scope the projects? (European, national, regional, local)
Scientific field	Which areas of the projects?
Role of scientist and volunteers	How can the participation of scientists and volunteers in Citizenship Science projects be categorised?

Besides, the requirements' analysis has identified the need for users to be able to contact with the researchers of the CS Track project to make inquiries about the project data and visualizations. To meet this need, the dashboard will include a contact form to enable communication. Also, a guide with instructions on how to use the dashboard will be prepared and include instructions on how to contact the project experts.

Dashboard user roles

Based on the database that is being generated in WP2, an application based in the Metabase tool will be developed. This enables the users from various roles to run inquiries via the dashboard based on selected data from the WP2 that the Metabase has access to.

Table 4. User roles Dashboard

User	Description	User functions on the Dashboard
Administrator	URJC manages the platform content	Coordinates the information of dashboard
Subeditor	UPF	Handles the WP2 database as a base for the dashboard and the application used to visualise it the data (Metabase)
Contributor	Consortium partners responsible for: WP1, WP2, WP3, WP4, WP7.	Contributes with information and data within the dashboard Answers questions or comments
Public Reader	All target groups defined above (2.2) Any person who is interested in the CS Track Knowledge	Interacts with the data and the visualizations in the dashboard Asks questions or comments

Technical features

The technical development of the dashboard will comply with the following technical features:

- The viewer application will be dynamically connected to the database.
- If the number of queries required it, it will be possible to work with a caching mechanism. Weekly refreshing may be enough.
- The displays and graphics will be done in Metabase.
- The final design and visual theme of the dashboard can be done on project website to offer the best user experience. WordPress offers more flexibilities to manage the theme and create a specific layout. In this case, the visualizations will be integrated using iframes.
- Users will access the dashboard through a main menu tab of the project's website.

In conjunction with the work on the Deliverable 3.1. Specification of Web-based Analytics Methods and Tools, analysis and evaluation of the tools available for performing data visualizations and producing the dashboard has been carried out. Specifically, the possibilities of the Cognos Analytics, Power BI, MongoDB Atlas and Metabase tools to create interactive dashboards have been analysed (p. 10-12).

Finally, it was decided to use Metabase as a tool for creating the dashboard.

The graphics created in Metabase will be integrated through an iframe on the project website where the final layout of the Dashboard will be created, incorporating the explanatory and additional content that is necessary to improve its use.

4.2 Functional requirements of the e-Magazine

The user analysis carried out in section 3.3 of this deliverable has allowed identifying the need of users to access in-depth articles to find further information about Citizen Science. The publication of an e-Magazine will make it possible to meet this need.

e-Magazine description

The e-Magazine will have the format of an electronic magazine that will include articles prepared by the project's experts. It will take up and communicate interesting findings gathered through our analytics and empirical studies.

When accessing the e-Magazine, the reader will find specific information based on data taken from the dashboard. For instance, this could be a narrative text supported by a static chart about a finding of the CS Track project.

The content developed for the e-Magazine will be reused in WP6 for dissemination actions, using, for example, computer graphics, images and other similar resources developed. This content will also allow adding value to the dashboard because interrogating the data permits a deeper observation of details or findings.

The requirements' analysis has identified the need for users to be able to contact with the researchers of the CS Track project to make inquiries about the Citizen Science reports and analysis. To meet this need, the e-Magazine will include a system to collect comments and enable bidirectional communication that allows responding to the inquiries for further information about e-Magazine articles. This "comment system" will enable all users to engage in providing feedback, reflecting or other forms of engagement with the posted content.

e-Magazine publications timeline

The e-magazine will be published monthly and consist of two new articles. By the end of the project, a total of 48 articles will have been published.

The first edition will be published in the first week of M13 (December 2020) with the publication cycle shown in the table below:

Table 5. Publication schedule in the e-Magazine

Edition 1	Month	M13	M14	M15	M16	M17	M18
	Articles	2	2	2	2	2	2
Edition 2	Month	M19	M20	M21	M22	M23	M24
	Articles	2	2	2	2	2	2
Edition 3	Month	M25	M26	M27	M28	M29	M30
	Articles	2	2	2	2	2	2
Edition 4	Month	M31	M32	M233	M34	M35	M36
	Articles	2	2	2	2	2	2

Articles types

The following figures show the types of articles that will be featured in the e-Magazine.

Article Type A

Article Type A will be composed of:

- Text between 400-500 words

- A still image [public domain photo]
- (Optional) One iframe interactive graphic (provided by workgroups)

eMagazine rocks: article with data slideshow

MAY 26, 2020

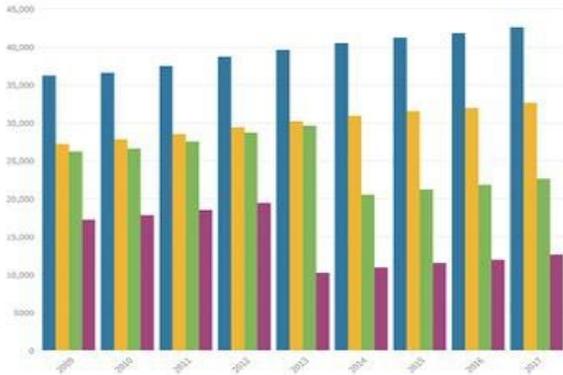


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• A Flourish data visualization

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Figure 6. Visual Example of Article Type A

Article Type B

Article Type B includes the same as Article type A plus a Static infographic like this one.

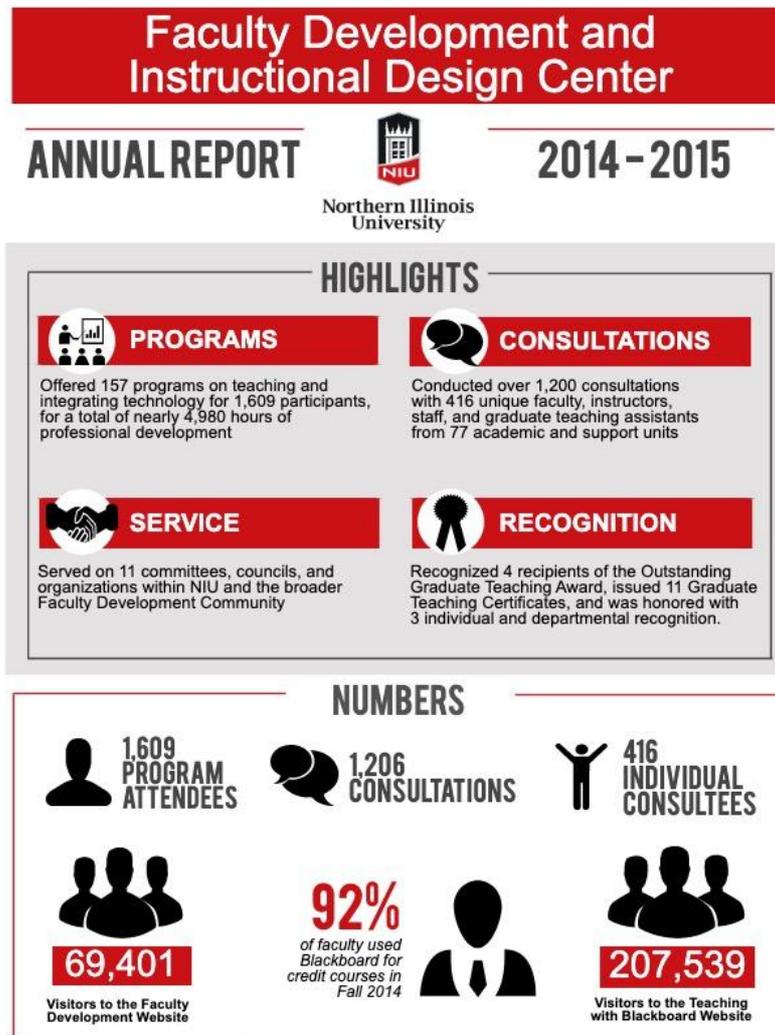


Figure 7. Visual Example of infographic included in Article Type B (From Website: niu.edu/facdev)

e-Magazine user roles

We have identified the following user roles for the e-Magazine within the platform and will assign access rights aligned with those roles and their needs:

Table 6. User roles e-Magazine

User	Description	Functions
Administrator	URJC manages the platform content	Coordinating all the information within the platform
Multimedia Editor	URJC manages the multimedia content	Managing all the publication of e-Magazine articles and elaboration of multimedia content
Contributor	Consortium partners responsible for: WP1, WP2, WP3, WP4, WP7, WP8	Contributing information and data within the platform Edit information via WordPress application Answer questions or comments
Public Reader	All target groups defined above (2.2) Any person who is interested in the CS Track Knowledge	Reading and participating in the community including feedback and reactions on the posts asking questions

e-Magazine workflow

The basic flow of collaboration and publication of the e-Magazine will be as follows:

1. The text of the article will be created by one or more of the project members (contributor) depending on the WP whose results are to be reported.
2. The contributor will give the content to URJC to follow the Work Card template (template in annex 2).
3. URJC will edit and layout the provided content in order to publish it in the e-Magazine.

Figure 8 graphically details the steps in this process.

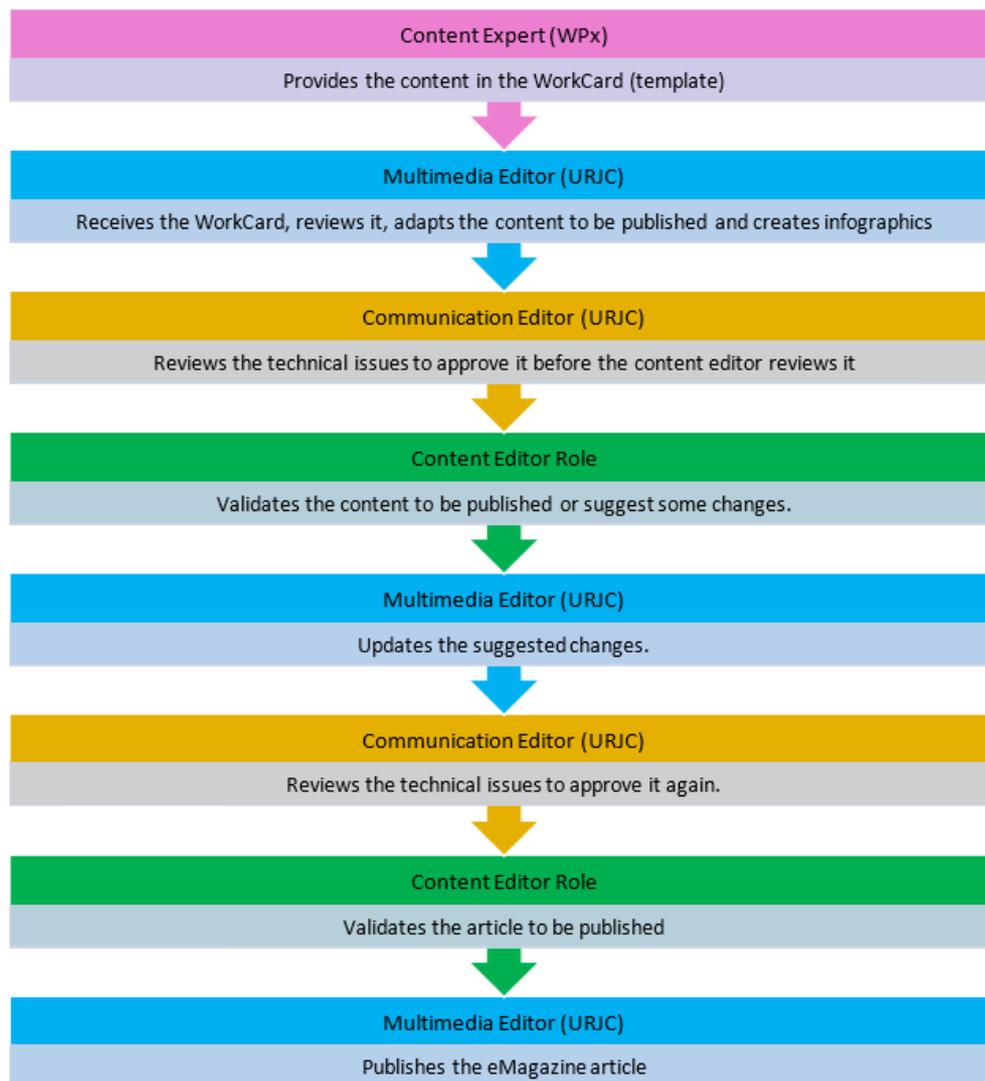


Figure 8. The workflow of publication of the e-Magazine

4.3 Functional requirements of the Newsletter

The user analysis carried out in section 3.3 of this deliverable has allowed identifying the need of users to receive regularly updated information on Citizen Science projects on biodiversity. The publication of a Newsletter will make it possible to meet this need.

Newsletter description

The newsletter will be an informative digital publication distributed via email on a monthly basis.

Any interested person can subscribe to the Newsletter through the project's website to receive information about results and actions carried out by CS Track and additional curated content.

Newsletter content

The newsletter will offer valuable information in the form of:

- A compilation of curated information on the website about interesting events and news from the project.
- A selection of reports, technical notes and featured articles published on the website and/or from e-Magazine.
- A summary of the communication actions of the project.

The content to be included it will be taken from the following sources:

Table 7. Sources of content to Newsletter

Content	Where to find specific information?	Who prepares specific information?
Reports, technical notes and articles (CS Track specific)	Reports, technical notes (abstract of the project's analytics results) and articles from e-Magazine tab (on the website)	URJC select the relevant information published on the project's website and Community Platform
Citizen science news	On the web, into the tab "News & Events" https://cstrack.eu/news-events	ATit selects curated information from the section of the website "News & Events" and send it to URJC for editing
Overview (paragraph) about communication actions from CS Track	CS Track project	ATit and URJC select relevant CS Track communication action for including in the newsletter

Newsletter user roles

We have identified the following user roles for the Newsletter:

Table 8. User roles Newsletter

Newsletter	Description	Functions
Administrator	URJC manages the newsletter system	Coordinating the information for the newsletter Including information from: e-Magazine News and Events Paragraph about communication actions (CS Track)
Contributor	Consortium partners through feeding news & events of website	Contributing with relevant information about CS Track communication actions (a paragraph that describe it) and an interesting selection of news and events
Subscriber	All target groups defined above (2.2) Any person who is interested in the CS Track Knowledge	Signing up in order to receive the newsletter

Technical features

To enable the newsletter subscription a banner will be included on the project website. To subscribe, users must complete a form providing the following information (first name, surname, email address), accept the privacy policy, grant communication permissions (email, direct mail) and select their preferred format (HTML, Text) to receive the newsletter.

Each edition of the newsletter will have a selection of information with around 200 words and structured into the three sections explained in Table 8.

Procedures will be enabled for re-dissemination of the newsletter to extend its reach. For example, it will relate to other general newsletters on Citizen Science such as EU-Citizen-Science newsletter.

4.4 Non-functional requirements

Some of the decisions on the general architecture, platform and technology have been previously defined in WP6 as the project website and Community Platform share supporting technology.

Table 9. Non-functional requirements

Category	Solution	Comments
Architecture type	Web	Hosting: <ul style="list-style-type: none"> • Web Server: Apache or Nginx • Database: MySQL version 5.0.15 or greater • PHP: Version 7.3 or greater • Wildcard SSL Certificate • Malware and site scan protection enabled
CMS	Wordpress	To guarantee the integrity with the web, and the optimization of the update and maintenance processes, the web CMS developed for WP6 is shared
Visual Page Builder	Divi	The selection of the page builder responds to the need for some of the following features: <ul style="list-style-type: none"> • Layout Library • Inline editing • Advanced customization of visual parameters • Wireframe view • Split Testing Using • Customizable Builder Settings • History States • Lead Generation • Social Media Integration
Business Intelligence Server	Metabase	Solution installed on the UPF server, and made available through WP2, available at https://database.cstrack.upf.edu
Accessibility		The website incorporates a specific plugin (UserWay) to improve accessibility by allowing keyboard navigation, page reading, adapting the contrast, enhancing links, increasing text size or expanding text space, among other aids. The Community Platform will conform to the W3C Accessibility Standards. To this end, evaluations and tests will be carried out with WAVE (Web Accessibility Evaluation Tool) to verify compliance with WAI standards.

5. Security and Privacy Policy

5.1 Privacy Policy and Security procedures

The privacy policy and the security procedures will be in accordance with the deliverable D8.2. POPD – Requirement No. 3 elaborated in WP 8 and already delivered on 15.3.20

This deliverable detail the Personal Data Protection procedures, specifically regarding the data collection, storage, analysis or other handling for any purpose associated with the research carried out in the CS Track project. In addition, this deliverable includes The POPD strategy/mechanism being implemented in the project detailing: a) the Data Protection Regulation on the treatment of data, b) the Prerequisites for approval by the DPO (Data Protection Officer) for the treatment of personal data in the frame of a research project; c) the personal data protection regulations governing photos and videos; and d) the Plan of action in case of a Digital Privacy Violation.

As far as security procedures are concerned, it states that " All data collected on portable devices will be encrypted and transferred to secure storage facilities at the earliest opportunity. Data will be stored on secure servers with regular back-up." (p. 7)

The dashboard viewer (Metabase) will access the CS Track database via a secure VPN (Virtual Private Network) connection to ensure connection privacy. Tunnelling the connection and encrypting the data will ensure the security of the connection.

Both the dashboard and the e-Magazine will show only interpretations based on aggregated data sets that are no longer associated with individuals.

Access to the data will comply with the data security and ethical aspects described in sections 4 and 5 of the deliverable D7.1 Data Management Plan.

5.2 Cookies policy

The privacy and cookie policy will be established according to Privacy Policy and Security procedures explained above. For the preparation of the cookie policy, the following have been used: a) the European recommendations on the use of cookies published by GDPR.eu (2020), b) the template of the Spanish Data Protection Agency (AEPD, 2020) based on these European recommendations.

The full text of the Cookies policy to be included in the platform is available in Annex 4 and 5.

6. References

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7. Annexes

7.1 Annex 1. Internal survey to prioritize targets and objectives

URL: <https://bit.ly/form01-cs-track-platform>

Requirements for the Technical Specification of Community Platform

Dear CS-Track partner: As you know, the WP5 aims to create a "community of practice" that facilitates a bidirectional channel to allow community members to share their questions about the issues that are of most interest around Citizen Science. Two fundamental aspects for the analysis of the requirements that the platform must fulfil, and that we are working on in the document of Technical Specification of Community Platform are: (a) To prioritize the target group (b) To prioritize the objectives initially set Within the requirements gathering process, please, order the following statements regarding the target and goals of CS-track project according to your personal opinion.

1.Target

Policymakers and policy influencers in the field of CS including the European Commission

Academics carrying out research into CS and related fields

Practitioners responsible for delivering and supporting CS activities

Heads of organizations supporting and funding research in innovative digital practices especially in the field of CS

Heads and technical managers of civil society organizations and NGO's providing and supporting CS initiatives including science centers and museum, CS clubs, etc.

Heads and technical managers of Industrial organizations including companies active in the scientific field and companies supplying resources and materials to CS activities.

Heads and technical managers of training (pre-and in-service) agencies responsible for teacher education interested in CS and how it relates to formal education along with science teachers who are interested in the value and impact CS can have on formal learning in the classroom.

2. Objectives

Offering members of the community direct knowledge about the results of the project and respond to their demand for information.

Offering relevant information about project's analytics results and key outcomes, recommendations, compendium, report, value that CS can bring and how it can be supported.

Stimulating awareness, exchange and interaction between different CS-Track initiatives.

Stimulating synergies and the generation of new ideas for CS and the surrounding communities.

Making stakeholders in public institutions and in companies aware to the potential of CS, focusing on aspects of innovation and employability and the general support of science in the community.

Identifying novel ways of communicating and inter-relating science with everyday practice and societal needs, engaging more people in CS, and opportunities for curriculum revision.

Increasing the understanding of the importance of science for civic interests in general

7.2 Annex 2: Work Card e-Magazine

To facilitate the work between contributors and editors, a template (Work Card) will be used to develop the content.

The template will contain, at least, the following elements and recommendations:

Table 9. Contents of Work Card

Title	<ul style="list-style-type: none"> • The title must be attractive and attract interest. • It must contain between 40 and 70 characters (10/20 words) • It is very important that the keyword or concept that is developed about the communication appears in the title.
Subtitle	<ul style="list-style-type: none"> • It must contain between 60 and 100 characters (15/40 words) • It is recommended that the subtitle encompass one or two questions, which are answered in the body of the text.
Lead	<ul style="list-style-type: none"> • Brief paragraph, between 60 and 70 words, that summarizes the most relevant of the content • It will include the key concepts of the relationship of the analysed resource with communication for projects, results, research actions
Text body	<ul style="list-style-type: none"> • It contains the details of the subject, organized as far as possible following an inductive logic (from the particular to the general). It can be done as storytelling, starting from a specific case. • As a guide, it will have between 1000 and 1300 words. • It will be written in several short paragraphs. • An idea or concept will be covered per paragraph to facilitate reading.

Examples	<ul style="list-style-type: none"> • The most relevant, prominent or shocking information will be dosed to keep the interest of the user until the end. • At least a couple of subtitles will be included to divide the text. • Links will be included in the text to other news and information from the blog itself, but also to sources that refer to or external, verified information that serves to complete the content of the post. • The information will be complemented with some multimedia content: an image, an infographic, a video, a table, etc.
Final	<ul style="list-style-type: none"> • It is the last paragraph of the post, so it closes the content. • It must be forceful and include some data or final question that serves as a conclusion and responds to what was raised or expressed in the first paragraphs of the article. • Include methodology when appropriate.
References	<ul style="list-style-type: none"> • When references are used in the text, a list of them will be included following the APA 7th edition model. Whenever possible, the link to the DOI (without references that have it) or to the URL where it is available will be included.

7.3 Annex 3: Design and structure

The design of the website in which the Community Platform is integrated is based on the web style guide elaborated with the deliverable D6.1 Dissemination and Communication Strategy and Implementation Plan and specifically in the Project Brand.

WP5 will create communication channels using the data and information analysed by WP1, WP2, WP3 and WP4.

Website

It is the general site where information about the CS Track Project is gathered.

The structure of the website is simple and horizontal in order to get the most out of all the content produced. The information is catalogued sequentially, and the content is ordered chronologically by date, that is, at the beginning the current information and at the end the oldest.

The navigation bar is always visible and changes its colour according to the background colour web page when the user scrolls. Both the header and the footer are constant on each page during navigation.

The design of the web page is intuitive and adaptable to the different device. The major elements of the web page are:

1. In the upper part is the header and its contents:
 - CS Track logo
 - Navigation menu/bar of the web page. It includes links to the each of the core sections of the website (Home, about, news & events, e-Magazine, community platform and contact).
 - Accessibility menu. It can be hidden
 - Search box
 - The opening paragraph with a brief outline of the web page



Figure 9. Design of website

2. In the central part of the website is the *body* which includes the most relevant content of the website. The contents vary depending on each section. You can see some examples:

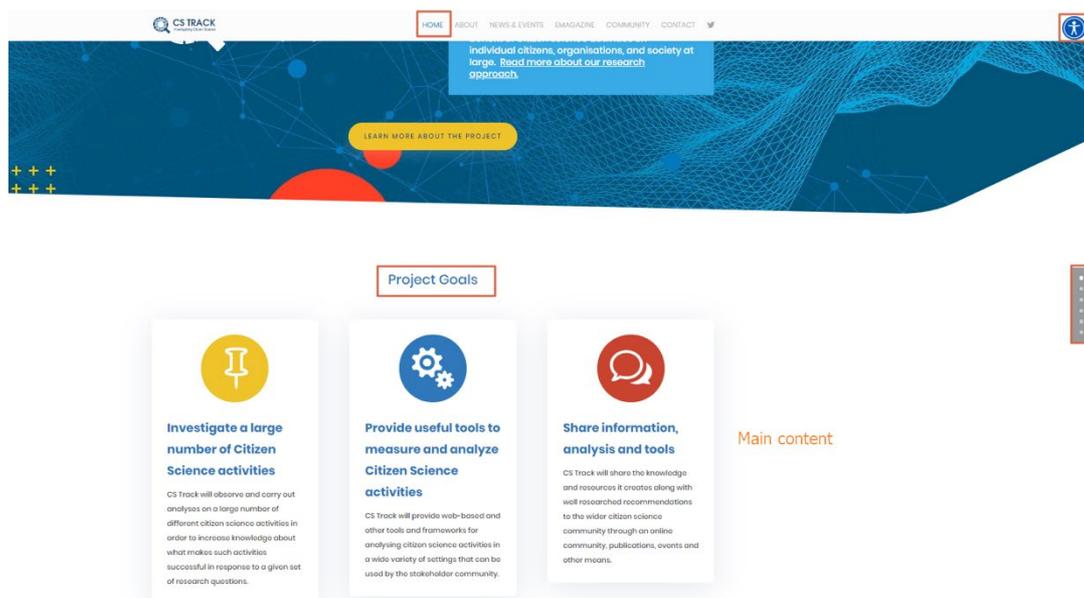


Figure 10. Home page

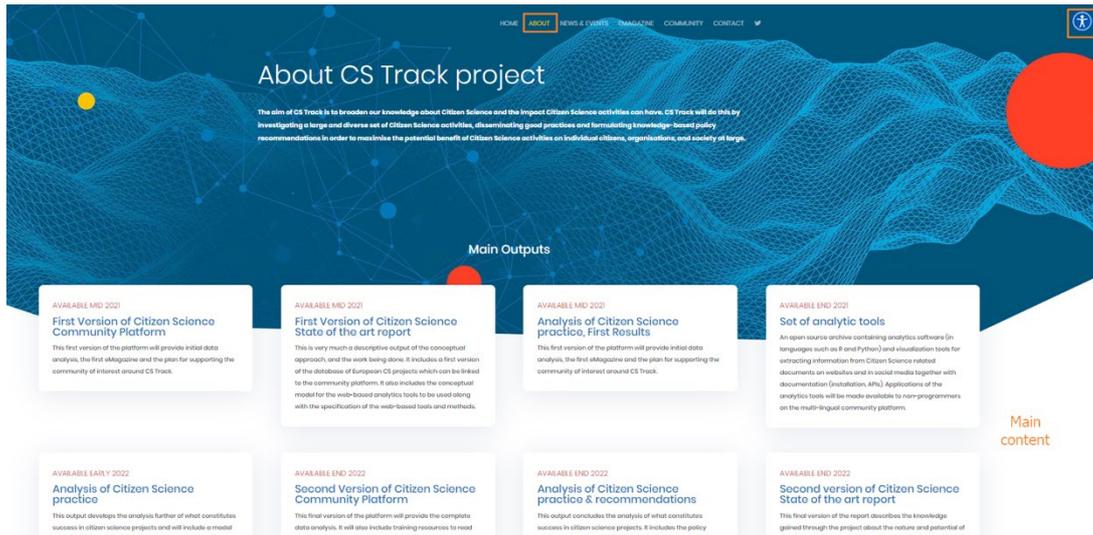


Figure 11. About page

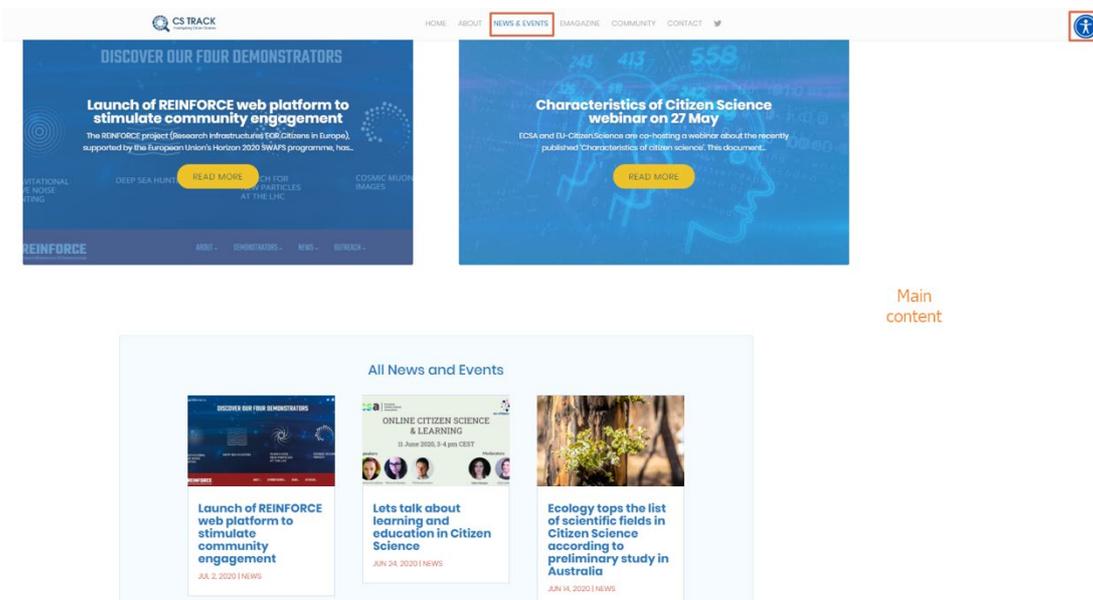
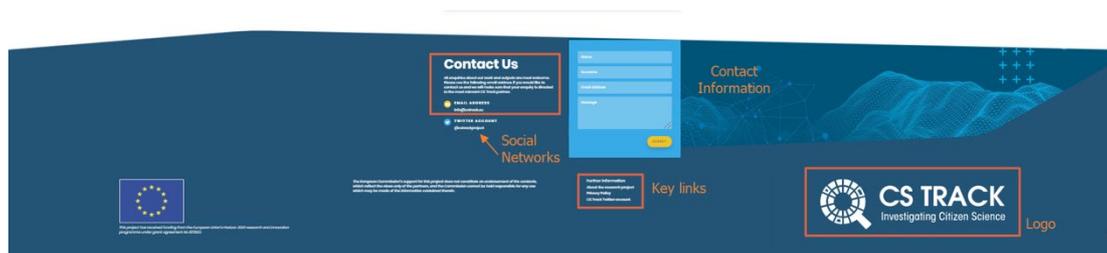


Figure 12. News & Event page

- At the end of the website is the footer. It includes contact information, links to CS Track social media accounts, links to key documents as such the privacy policy and additional information about the project



The type of the website is a dynamic page. Every web page presents different information about the project in a visual manner. The home page includes the project goals, information about the consortium partners and an overview about the latest news and events. About page contains the main resources and describe the progress of the project. It will provide gathered information about Citizen Science activities, good practices and policy recommendations in order to maximize the potential benefit of Citizen Science activities on individual citizens, organizations, and society at large. Additionally, information on the consortium partners are available and their location is displayed on an interactive map. News & Events page incorporates information on news and events about Citizen Science in chronological order. e-Magazine (In progress) will offer relevant information about the project results and key outcomes as well as recommendations, reports and other resources that highlight the value that Citizen Science. Dashboard page (In progress) It will be designed to show an overview of the data from the CS activities database (WP2). It will provide a panel to interact with the data. Finally, Contact page includes the different methods to contact the members of the consortium. Members can be contacted either by filling out a form or by writing to a generic mail account.

7.4 Annex 4. Full text of the Cookies Policy

Identification data

The data collected from registered and non-registered users of the CS TRACK project fall within the scope of the standard operation of research projects funded under H2020.

The research team uses this information to guide its work in communicating and creating a community of interest in Citizen Science. The authors of the entries and information published both on the website and on the Community Platform are responsible for the data on individuals that may contain or appear in their communications.

The researchers of the CS TRACK project comply with industry standards of data privacy, specifically the provision of the European Union's General Data Protection Regulation (GDPR) for "data subject rights" which include (a) notice of breach; (b) right of access; (c) right to be forgotten; (d) data portability; and (e) privacy by design. The GDPR also allows for the recognition of the "public interest in the availability of the data", which is of relevance to those involved in maintaining, with the greatest possible integrity, the public record of scholarly publications.

Who is responsible for the data?

- The person responsible for the processing is the IP of the Ciberimaginario Research Group of the Rey Juan Carlos University.
- Contact: info@ciberimaginario.es

What information do we collect and for what purpose do we process your data?

- Send communications about the results of the project and the activity of the community.
- Guide users on models of community participation.

- Improve the retrieval of information and content of interest by users through the collection of aggregated data on their behaviour on Community Platform.
- Manage the correspondence with the users of the community of interest.
- Send information and informative communications related to the scientific research, the areas of interest and focus of the project through various means, including the project newsletter, managed by means of the external application Mailchimp.
- To carry out statistical studies related to the areas of interest and the focus of the project.

How long do we keep your data?

The personal data provided will be deleted at the end of the project and the deletion is made in accordance with the provisions of Regulation EU 2016/679 of the European Parliament and of the Council of 27 April 2016, (Art 17, 1a)

What is the legitimacy for the processing of your data?

The legal basis for the processing of your data is the provision of information service on the Community Platform and/or consent of the person concerned

In order to send you newsletters via the e-mail address you provide in order to contact you personally or to recognise you on your next visit, we rely on your informed consent.

The treatment of the information that our cookies collect is based on the informed consent that you give us, in accordance with current legislation.

To which recipients will your data be communicated?

Data may be shared with CS Track project partners on an anonymous, aggregated basis, with appropriate exceptions, such as community publication metrics.

Personal metadata linked to the publication of an article (authors' names, professional affiliation, country) are deposited and distributed, associated with those of the public content of the publication.

The data will not be transferred or sold, nor will they be used for purposes other than those established here.

Is there an obligation to provide data or any consequences if not doing so?

Failure to provide the data explicitly requested will prevent registration and participation on the community platform, sending messages and exploring the results of the project.

How do we protect your data?

The CS Track project's website and community platform use information security techniques generally accepted in the industry, such as firewalls, access control procedures and cryptographic mechanisms, all with the aim of preventing unauthorized access to data. To achieve these purposes, the user accepts that the provider obtains data for the purposes of the corresponding authentication of access controls. All information is always transmitted via secure communication protocol (https, SSL), so that no third party has access to the information transmitted electronically.

All personal data is stored securely in accordance with the general EU data protection regulation (Regulation (EU) 2016/679) (GDPR).

What are your rights when you provide us with your data?

Data subjects have the right to access their personal data, as well as the right to request that inaccurate data be corrected or, where appropriate, that it be deleted. The deletion of the minimum data required to be registered on the platform (username, first name and surname, and e-mail) will result in the effective removal of the user profile from the platform.

You have the right to file a complaint with the Control Authority - Spanish Data Protection Agency.

How to exercise your rights?

You can exercise these rights by using the contact form on the website <https://www.cstrack.com> or by sending a request or message to the address info@cstrack.com

Right to withdraw consent: You have the right to withdraw your consent sending a request or message to the address info@ciberimaginario.es

Right to complain to the Control Authority: Spanish Data Protection Agency (AEPD), www.agpd.es

Cookie Policy

The CS Track project website uses cookies to manage user sessions, which are necessary if you are a member of the community platform. Cookies are not used if you only access the community platform or the website as a reader, without registration. On some pages we use cookies to remember issues such as: a) your presentation preferences; b) the processing status of your activity on the platform; c) the reading of notifications related to communications with other users or information alerts on the community platform; d) whether or not you have given your consent for us to use cookies on our website; or e) the reading access made previously. In addition, some multimedia resources, such as the videos embedded in our pages, use cookies to produce anonymous statistics on how you have reached them and which videos you have viewed. Although cookies are not essential for the website to function, enabling them will provide you with a better browsing experience. You can delete or block cookies, but if you do so, some of the features of this website may not work properly. These cookies are essential for access to certain platform functions, so if they are not enabled you will not be able to use this system. In addition, we keep the data on your web browsing patterns fully under our control. These cookies are used exclusively for the purposes indicated here.

7.5 Annex 5. List of cookies

Cookies required

Cookies will only store the information necessary to make the platform usable by activating basic functions such as page navigation and access to secure areas of the site. The platform could not function properly without these cookies. Some of these will be:

- Request Verification Token. It will help prevent cross-site request forgery (CSRF) attacks. Session expiration, type http.

- Session Id: Keeps user statuses on all page requests. Session expiration, type http.
- Auth. Identifies the user and allows authentication with the server. Session expiration, type http.
- Consent. Stores the user's cookie consent status for the website and platform domain. 1-year shelf life, http type.
- Identification. Identifies the user's session. Persistent expiration, html type.
- Funt. It serves to calculate load balancing, web content delivery and DNS server connection for web operators. Session expiration, type http.
- Session. Keeps user statuses on all page requests. Session expiration, type http.
- loggedin. Records whether a user is online, making it inaccessible some parts of the platform, based on the user's connection status. 1-year shelf life, http type.

The following will be used for preference setting:

- Userlang. Remembers the language selected by a user to display a web page. Expiration of 1 year, type http.

The following ones will be used for the analysis of the statistics:

- _ga [x4]. Records a unique ID that is used to generate data
- statistics about how the visitor uses the website. Expiration of 2 years,
- type http.
- gid [x4]. Records a unique identification that is used to generate data
- statistics about how the visitor uses the website. Expiration of 1 year,
- type http.
- _sid. Unique ID identifies the user on recurring visits. Persistent, type html.
- _currentTime [x2] Records the date and time of the user's last visit to the
- website. Session expiration, html type.
- _sid. Unique ID identifies the user on recurring visits.

Web metrics analysis

The website's servers will automatically detect the IP address and domain name used by the user. An IP address is a number that is automatically assigned to a computer when it connects to the Internet. All this information is recorded in a server activity file that allows subsequent processing of the data in order to obtain only statistical measurements that allow us to know the number of page impressions, the number of visits made to the web services, the order of visits, the point of access, etc.

For this purpose, both internal Wordpress analytical systems and the external service of Google Analytics are used.

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