Mapping of the citizen science projects at the UAB

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Resum– En la actualidad la demanda de nuevos proyectos de ciencia abierta esta subiendo, por eso en este trabajo hablaremos sobre una de las ramas de este tipo de ciencia, la ciencia ciudadana. Primero habría que dar una definición de esta forma de ciencia. Podríamos definirlo como una forma de ciencia participativa, es decir, que los ciudadanos o voluntarios, participan recolectando datos, que después serán procesados por científicos. Hoy en día hay más de 200 proyectos activos en el territorio español, de los cuales unos cuantos forman parte de la comunidad de la UAB, los cuales serán analizados en este documento, para entender y poder llevar a cabo observaciones sobre estos, lo que llevará a unos resultados sobre los que después escribiré una reflexión y diferentes soluciones a distintos problemas dentro de los proyectos. A su vez, la finalidad de este trabajo es conseguir un mapa de la UAB con todos los actores de la comunidad de la ciencia ciudadana.
Paraules clau– Ciencia ciudana, mapeo, proyectos, UAB, reuniones, iniciativa, datos, ciudadanos, plataformas, jornada.

Abstract– At present, the demand for new open science projects is increasing, so in this paper, we will talk about one of the branches of this type of science, citizen science. First of all, we need a definition of this form of science. We could define it as a form of participatory science, in which citizens or volunteers participate by collecting data and then will be later processed by scientists.Nowadays, there are more than 200 active projects in the Spanish territory. Many of these projects are part of the UAB community, which we will analyze in this paper to understand and make observations about these projects. It will lead to results in which I will write a reflection and different solutions to problems in these projects. In turn, the aim of this work is to achieve a map of the UAB with all the actors of the citizen science community.
Keywords– Citizen science, mapping, projects, UAB, meetings, initiative, data, citizens, platforms, workshop.

✦

1 INTRODUCTION

DURING my college degree, I enrolled some courses about open science that increased my interest in this topic, the citizen science. Citizen science was the topic that especially motivated me although there are more interesting branches, I want to focus in this specific one. Is not a new way of making science research, because one of the first projects of this kind of science was documented in the last decade of last century, but I feel, at present, social medias and communication medias do not give the enough visual support and that is the fact of why I am looking for a mapping and a research searching the reasons why here in Spain citizen science is not popular than in other countries like Austria. Lastly, the fact I was doing internship at Computer Vision Center (CVC) collaborating in a project called management of a cycle of a citizen science project, made me want to focus in research about this kind of make science who can encompasses a huge quantities of topics that impact on people behaviour.

The structure of this document is the following: In this chapter the motivation and in the chapter two the state of the art of this collage Thesis have been presented. Chapter 3 presents the goals to reach during this mapping. In the fourth chapter, describe the methodology about which tools I use for doing this research. Chapter 5, is the main chapter of this paper and provide the results obtained.To sum up, in chapter 6 there be a discussion of the results, in chapter 7 a conclusion of this paper and at the end in chapter 8 the acknowledgements.

After the bibliography, there are some annexes about the meetings and the workshop with people involved in the UAB citizen science community.

2 STATE OF THE ART

For having an idea about what citizen science is, firstly we need a definition about we understand about it. There are different definitions, but an all-encompassing definition could be "Citizen science is a partnership between members

of the general public and scientists within scientific research projects to address real-world problems "[1]. This work is focused on the behaviour from citizen science projects who receive institutional support or have relation with UAB.

Some of the projects which I aim in this paper are Planttes [2], Natusfera [3], and other projects like living labs.

2.1 Ten principles of Citizen Science

The Ten Principles provide a framework against which to assess new and existing citizen science initiatives with the aim of fostering excellence in all aspects of citizen science. We need to know this principles for knowing how to analyze the different types of projects, and know better what principles they must to follow.

1. Projects involve citizens in scientific endeavour that generate new knowledge.

2. Have a genuine science outcome, answering a research question or management decisions.

3. Both parts benefit from taking part, scientists and citizens.

4. Citizens may participate in multiple stages of the scientific process.

5. Citizens receive feedback from the project.

6. Is considered a research approach like any other.

7. Projects data and metadata are made public available and, results are published in an open access format.

8. Citizen scientists are acknowledge in project result and publications.

9. Programs are evaluated for their scientific output, data quality, participant experience and wider societal or policy impact.

10. The citizen science project leaders', take into consideration legal and ethical issues and the environmental impact of any activities [4].

2.2 ECSA's Characteristics of Citizen Science

These characteristics build on the 10 principles as a summary of best practice. Projects are expected to engage with them.

- **Core concepts** The term scientific research is used to refer to research in the science, the social science, the humanities and the arts. Citizen science can address a topic that is basic or applied, inductive or deductive, local or global. Depends on the context, it is appropriate to identify a subset of activities.

  Research in this kind of science, can take many forms, and the roles of the participants can include identifying a research question; collecting or analysing data; monitoring environmental or health conditions; and the creation of generic data within domain to support a wide range of research questions.

However, there are cases where the appropriate contribution is limited to data collection or providing resources.But, all the participants have to be aware that they are contributing to research.

Furthermore, the intentions and aims of citizen science projects should be communicated clearly and openly with participants and other stakeholders.

- **Disciplinary aspects** Citizen science is applicable across all scientific disciplines. It is well embedded within ecological, meteorological and astronomical research. Within these scientific and technological disciplines, there is a need to take into account methodological practices when designing citizen science activities.

  In the arts and humanities the research approach, problem formulation and methods of data gathering and interpretation can differ from natural science.

- **Leadership and participation** Basically, projects can be led by a community, researchers and scientists or can be carry out individually. Citizen science initiatives can be supported and run by differently types of organisations.

  If the main aim is have benefit to enterprises of an activity, and of results, it is generally not considered as citizen science. This also applies if motives for activities are to support a marketing or business strategy, rather than a research goal.

  Active engagement that requires citizens' cognitive attention during participation in the research process is favoured over limited interaction. It is also preferable to engage citizens in several phases of the research process.

  Citizen science projects can have educational outcomes for participants involved in various phases of the research process. Intended learning outcomes for participants are a favourable aspect in citizen science. However, for a project to be classified as citizen science, educational goals or science engagement/outreach should not be the only focus.

- **Financial aspects** Pure financial support to a project, such as crowdfunding, subscription fees and donations, is not considered citizen science. On the other hand, requesting financial contributions, can be consistent with citizen science. This may affect social inclusion and bias participation.

  Incentives are allowed to the citizen science projects, but it depends in the context and the form of relationship between the project leader and the participants. However, the type or amount of the incentive should be taken into account before considering its consistency with citizen science

- **Data and Knowledge** The knowledge produced in such projects should aspire to disciplinary standards, such as appropriate data quality and quality assurance. Citizen science is commonly perceived and placed within the open science domain, such as by complying with open data-sharing, open access publications and full transparency of data ownership.

However, there may be cases in which data use is limited, ans their participants should be made fully aware of why, when and how it is used by others. In the other hand, the data quality is important because it is a key aspect that warrants attention throughout the entire process of knowledge production. [5]

Now we know what rules people involved in citizen science have to follow, now we need an overview of the impact in the UAB, Catalonia, Spain and some examples in Europe.

2.3   UAB Background.

In the UAB there are some projects that initiate their path at this institution.

- **App Planttes**

  One of those projects we mentioned before, is the application planttes, it is a citizen science project to record the phenology, in particular, of eleven species of trees that cause allergies in Catalonia. The goal is to create a risk map where there are allergies from the trees registered in the application thanks to citizen participation [2].

- **Natusfera**

  Then we find "Natusfera", a project to collect observations of different species through photographs uploaded by groups of people to the web portal or the mobile application. It also allows you to design your follow-up projects or collaborate with some existing ones. The entities that lead the project are the Global Biodiversity Information Facility (GBIF) and the Center for Ecological Research and Forestry Applications (CREAF) [3].

- **Mosquito Alert**

  "Mosquito Alert" is a platform to control mosquitoes that transmit diseases. Through the mobile application, citizens can contribute with images of the findings of the tiger mosquito that is becoming more common in our community.

  This project is coordinated by the Center for Advanced Studies of Blanes (CEAB), the Higher Council for Scientific Research (CSIC), the Center for Ecological Research and Forestry Applications (CREAF), and finally, the Catalan Institution for Research and Advanced Studies (ICREA) [6].

- **Library living lab**

  Initiative Library living lab explore the connections between culture, technology and society. It focus in Vollpelleres, Sant Cugat. Project gathers a consortium coordinated for the Computing Vision Center, UAB and the town hall of Sant Cugat del Vallès. Other integers are the Neighbourhood Association of Volpelleres, la Diputació de Barcelona with it's Public library network, and it is open for participation of small and bigger companies [7].

- **MicroMón UAB**

  Is an international project from the Universitat Autonoma de Barcelona, that is linked with the MicroMundo network. It program aim to cheer students from secondary level(from 15 to 17 years) to develop their professional career in science and technology, addressing one of the most important challenge in the actuality for the human health of this century: microbial resistance to antibiotics worldwide health [8].

- **UAB Open Lab**

  Those spaces are ecosystems of open innovation, with a focus in the co-creation between the users, does not matter if they are researchers, enterprises, civil society or public administrators.

  They are open spaces for innovation where researchers and agents from the territory, from the public and private sectors, collaborate through the use of digital technologies to co-create knowledge and solutions that respond to social needs [9].

- **BeWater**

  This project try to promote the climate change adaptation in the management of the Mediterranean waters through participate processes of co-creation with the objective of detect the problems and find joint solutions between scientific researchers and citizens [10].

- **GroundTruth 2.0**

  This project evaluate the effectiveness of six citizen observatories which study the environmental.One of this observatories is RitmeNatura, leaded by the CREAF-UAB [11].

- **AlertaForestal**

  It is a citizen science platform linked to other project called "Boscos Sans per a una Societat Saludable". AlertaForestal is a scientific,cooperative and nonprofit project that study the relation between forests health of Catalonia with people health [12].

2.4   Challenge-Based Learning

Challenge-Based Learning (CBL) is a learning methodology based on a real-life experience where participants are confronted with a territorial problem and explore solutions, formulating one, which is then implemented and evaluated. This methodology since some years is implementing in some areas at the university. Specifically there are some implementations at UAB [13].

2.4.1   Connections with institutes and territorial projects

Some examples of institutions that are connected with the UAB and CBL:

- **HUB 30:** The objective of this platform is give support to companies and institutions,to detect their challenges and offer them the best solution. HUB 30

has two activities: Innovation Brunch and Innovation Mornings. The first consist in meetings to share information of the most impact technology in business and social area. And the second one is about working social challenges with the Design Thinking methodology [13].

- **Parc de Recerca UAB:** Its mission is impulse and improve the tech and knowledge trading activities of their members and ease the interaction between the research, companies and the society [13].

- **INCENTIVE:** A project from the program SWAFS, that it objective is the implementation of citizen science Hubs in four European universities: UAB, Twente University, Aristotle University Thessaloniki, and in Vilnius Gediminas Technical University. A citizen science Hub is an area between science and society where citizens give feedback about research projects [13].

- **PECT(Projectes d'especialització i competitivitat territorial):** They are initiatives subsidised for the Catalonia's generality which impulse the territory agents and lead public entities to promote actions that contribute in the economic transformation of the territory [13].

2.4.2 Benefits

This methodology provide some benefits like the increase of the impact of the UAB to the civil society, connect the academic environment with the territory agents, setting up multi laterals relations, the implementation of a new innovative methodology, and positioning the UAB at the forefront of European universities [13].

2.5 Catalan background

At the local level, citizen science has received more and more popular, and more people and scientific groups are getting involve on these cooperative projects. It officially arrived in Catalonia in 2012. Barcelona City hall established the Office of Citizen Science, since the city has great scientific activity and great technological development, it is an ideal environment for the development of citizen science projects.

The Citizen Science Office is close to groups of people who want to start a citizen science project, they will give you advise when you have an idea for a project or when you want to start a new one, then they will help you by contributing with their project experience who have passed through the office. They can also help you reach new audiences and entities through science-driven exhibitions by the Office. Finally, if you need support with the dissemination, they will advertise you through the social networks of the Barcelona Citizen Science Office [14].

Here are some of the citizen science projects at the local level:

- **Ritmenatura** It is an initiative organized by different research institutes that collect phenological observations to help study the impact of the climatic change on the rythms of nature [15].

- **Beepath**

  It is a tool that allows you to study human mobility, registering it through an application for mobile devices. It is activated in specific contexts. It offers an automatic analysis of the type of mobility performed by the user and proposes mathematical models to explain the observed phenomena so that in the future it can predict mobility in certain contexts [16].

- **Bioblitz Barris**

  It aims to use the BioBlitz method, in which experts, citizens and citizens work side by side to identify the maximum number of species possible in a given area, to publicize and value the biodiversity of their neighborhood and provide tools to take the pulse of the health of your city.

  It have been done in Sarrià-Sant Gervasi, in the Turó del Putget Park and in the Turó de l'Oreneta Park [17].

2.6 Spanish Background

Citizen science about Spain has begun to evolve a lot in the last decade, very diverse initiatives have emerged in all areas of citizen science. This evolution is due in part to the Ibercivis Foundation together with the Spanish Science and Technology Foundation (FECYT). Between these two foundations, they carried out an agreement to promote citizen science throughout Spain.

The objectives of this agreement were:

- Encourage the development of the National Citizen Science Network that promotes the joint work of all those involved.

- Attract new groups and people to the Web, such as civil or social organizations and research centers.

- Organize a forum for debate and national and international findings on citizen science that takes place in the country and also in Europe.

- Improve knowledge of citizen science among scientific, environmental, and social associations, and directly involving users of social networks.

In 2016 during the growth of citizen science in Spain, there were 129 active projects, in the middle of 2021. This number has increased by 220 per cent, so we can say that in Spain, at this time, there are more than 287 citizen science projects active throughout Spain, although it does not explicitly imply that they must all be produced in Spain, for example, there is a Spanish project called "Desafio Bajo Zero" which works in Antarctica [18].

If you want to do a Citizen Science project in Spain,and you want to be in the citizen science map, your project can be referenced. You have to fill out a form where you are asked in which field your project is aimed at and which part of the country it would be directed [19].

2.6.1 Ibercivis

Is a non-profit private foundation that the main objective is conducting, promoting and visualising citizen science.

Their mission is promote research in different scientific knowledge areas at three levels; local, national and international. Also, they give tech support, dissemination and training to make all kind of people able to participate in every research [20].

In their website have information of citizen science projects that they did an ways to involves or know how to work in a project:

- **Education and Citizen science:**

  They develop projects of citizen science which involves students and teachers to make science at an inclusiveness and open way. This initiatives turn students in scientists to work with the tools that Ibercivis provides them and are involved in real research projects [21].

- **Didactic Guides:**

  They have some guides like the white paper on citizen science for Europe, or the green paper on citizen science.

  The first one "The White Paper on Citizen Science" is a strategic document that compiles and formulates the main policy recommendations of the international community to improve the involvement of society in science [22].

  And the second, "The Green Paper" aims to foster interaction between Citizen Science stakeholders and EU policy officials, reinforcing the culture of consultation and dialogue in the EU [23].

  Also, they provides more guides that they did in other projects from this foundation [24].

- **Publications:**

  Also, they provide information about projects carried out by Ibercivis and their conclusions generate scientific knowledge. They have a huge repository of projects that they were involved, and most of them have relation with some important EU organisms of citizen science [25].

2.6.2 Growth and consolidation of citizen science at the national level:

- The Spanish strategy of "Ciencia y Tecnologia" includes citizen science among its four basic principles to support national research and innovation.

- The call for FECYT grants corresponds to this edition of the Observatory added to citizen science among its lines of action.

- A large part of the myriad scientific impacts of citizen science is reflected in the growing number of publications in indexed journal event.

- Citizenship science projects in Spain, which are increasingly diverse in terms of topics, methodologies, scope and inclusiveness - generate important social, environmental, educational and political impacts.

2.6.3 Spanish Strategy 2021-2027 to be able to promote Citizen Science are:

- The coordination of RDI (Research Development Innovation) policies.

- The collaboration and agility of the administration.

- Gender perspective.

- The social and economic responsibility of RDI through the incorporation of citizen science and the application of co-creation and open access policies, as well as the alignment of R and D plus [26].

2.7   Tools, Crowd 4 SDG

The citizen science solution kit is a set of tolls for developing and running citizen science projects, maintained by the Crowd4SDG. Some of the partners are CSIC, Politecnico Milano, Université de Paris, Citizen science center Zurich, Université de Genève, etc. And this project has received funding from the European Union's Horizon 2020. [27]

2.7.1   Tools

Citizens Science Project Builder(CSPB):
It is a webs-based tool, inspired by the discontinued Crowdcrafting platform, that allow all kind of people to create and run a citizen science project. It supports projects where contributors can analyze or enrich existing data. Furthermore, it facilitates the implementation of Citizen science projects by providing an interface that requires limited technical knowledge and no coding skill [28].

VisualCit:
Its allows extraction of visual evidence about a situation from Twitter by searching for images posted and geolocating them. VisualCit using AI methods enables the user to search for posts with images. Also, it can associate locations to posts, even if tweets are not natively geolocated. It uses the same technology as CSPB [27].

Decidim4CS:
It is a digital platform for participatory citizen science and this platform aims to allow citizen scientists to propose ideas, comment and vote on them. It is based on decidim, a free open-source software originally created by the Barcelona City Hall as a participatory democracy platform for cities [29].

CS logger:
It is an open source data collection platform that makes programming and designing easy to build and configure customized mobile apps for their CS projects. CS Project Builder is a simple web interface which offers a menu of several ready-to-use components for the APP. The implementation is based on the integration of an existing open source solution, developed by the ChildMind Institute (Mind-Logger) [27].

Collaborative Sonar:
CoSo is a Smartphone application aimed at understanding how team interactions impact team performance and learning. CoSo allows to send surveys to collect answers about qualitative team features such as

diversity or organization. Developed in the context of the iGEM student comeptition, it is for any team study [27].

SDG in Progress:

This platform allows project developers to document ongoing projects, or to get inspired by other people's projects, re-use them or re-purpose them. Compared to other platforms, it provides a highly visual overview of how a project is conceived and iteratively improved. The main goal of SDG in progress is to provide an open repository that charts the step-by-step development of SDG projects. The idea is to document creativity, and support sustainable innovation [27].

2.8 ECIU university.

The UAB is one of the universities that conforms this project:

The European Consortium of Innovative Universities is a network of universities united by a common profile of shared belief. It was founded in 1997,and the name underlines the European dimension of a selected group of entrepreneurial universities.

The ECIU University will constitute be a real European college where learners, teachers and researchers cooperate with other agents to solve challenges of the real life in a unique and, flexible way. Furthermore, the challenges will aim on the UN Sustainable Development Goal 11: Sustainable communities and cities [30].

Their Vision: They believe in a European-wide ecosystem based upon open and inclusive collaboration connecting societal stakeholders, researchers and learners to provide European answers to future societal challenges. They create a playground for solving multi-disciplinary challenges in entrepreneurial, innovative ways and provide personalised learning and career opportunities for life at the European level [30].

Their mission: This university is an agile, open agora at the European level for solving multi-disciplinary societal challenges, doing research and learning for life. They create an invigorating model of a true European University for the benefit of European society [30].

Phases Towards ECIU university 2030.

In **2023** they want to be equipped to continue after the pilot phase. Learners in the ECIU member universities can freely choose all courses and micro modules from the member universities, and they will consolidate mechanisms for integrating multi-disciplinary challenge-based research, innovation and learning developed.

In **2024** wants to intensify the role of research. They want to finish the SMART-ER project and established as part of ECIU University, develop a plan to extent virtual ECIU institutes connected to relevant societal challenges.

In **2025** will set up the first version of ECIU university functional. As a single space of vast learning opportunities for life, developed and characterised by agile, personalised learning.

And in **2030** have the full version of ECIU university functional.ECIU University agora fully functioning based on demand and supply and all suitable parts of higher education of the ECIU member universities offered via the ECIU University platform [31].

3 GOALS

3.1 General

- To elaborate a mapping of citizen science projects in the UAB and know which people is working in the different projects involves at the campus.

- To analyze some of these projects and know deeply how they work and the difficulties they have to face.

3.2 Specific

- Perform a proper research of the different people involved in citizen science.

- Design a map of the UAB community at the area.

3.3 Academic

- Acquire knowledge of Citizen science in the university community.

- Learn more about the different facts that acts in a Citizen science project.

- Put in practice the knowledge acquired in the career.

4 METHODOLOGY

4.1 Survey

In a methodology section, I will explain how I collect the data of the different projects and how I will do to get information on these projects. In methods, I have a survey, which will help me to recollect information in meetings. I took the information of different documents about these projects, like websites, articles, or papers. The main questions are about knowing a complete description of the project, the platforms that they use and about data.

Besides these questions, in the original one there are more specific ones about technology, like questions about hosting, more questions about the recollection and clean of data, and also I ask for more information about the platforms that they use, their APP and websites. Furthermore, there are many more about polities and humanities, like with which regulations did you have problems when you start the project, Do you think your project is inclusiveness? etc. This survey was made consulting information of articles like, "The science in citizen science" [32], and documents form Ibercivis "Observatorio de la ciencia ciudadana" [26].

4.2 Research of information of citizen science projects

Queried the Google internet search engine, using keywords from respective indicators and combinations of ' "citizen science", to understand better the projects and their components.

4.3 Meetings

On the other hand, the methodology I followed for this paper, was organise meetings with people involved in Citizen science Community.

4.3.1 Informal meeting UAB citizen science community

The first meeting was with all people whom are or were related in a citizen science projects. The main goal of this meeting was make a little presentation of each of us, and explain two European initiatives, INCENTIVE and Smart-er.

4.3.2 Meeting with Dimosthenis Karatzas

The second one was with Dimosthenis Karatzas, and we talked about one project that he participated in 2012, Library Living Lab. He define me the project, the impacts and the problems related with the project.

4.3.3 Meeting with Begoña Miñarro

Other meeting I made was with Begoña Miñarro, who talked me about two projects that are institutional supported by the UAB, INCENTIVE and Smart-er. She gives me a description of both projects and the work packages of them.

4.4 Workshop June 22nd

The last meeting I made was the workshop22 where there were exposed points about the UAB citizen science community and the different projects that people involved with the university are currently working. Furthermore, also they debate about the points that the university could improve their support to the researchers.

4.5 Map citizen science UAB

I elaborate a dynamic map. This map is about the citizen science community, so, locate people and put the name of the researcher, his or her website, the project website and the logo of this project.

To build the map, I used leaflet, an open-source JavaScript library for mobile-friendly interactive maps [33].

5 RESULTS

5.1 First mapping

This first mapping is about the first meeting, where you can find the report of this, in the annex A.

5.1.1 Participants

People in the meeting made a presentation where they said what is their relation with citizen science. There were twenty participants including me. Most of the participants was from the Institute of Environmental Sciences and Technologies (ICTA), also there people of the Center for Ecological Research and Forestry Applications (CREAF) and form Computer Vision Center(CVC). The rest of the people were from faculties like engineering psychology, education, and the others are working in the rectorate.

At the end of the meeting there was a round of questions and answers, where they raised two important problems in citizen science community.

5.1.2 Meeting Questions and Answers

- **The hosting fees:**

  It could be a problem for people who are starting a new project. After research these fees, the price is 1.500 € per year to acquire your server, but this price is the default server. Table 1. So, I made a speculation of the near price of having a host and a server at UAB. First, I consult the information of a host website. we have two possibilities, choose Basic portal or Plus portal.

  I decided on the Plus portal because I found information about hosting which explain the main features you need to keep in mind at the time to rent a host, and there is a recommendation about websites that will use a combination of videos, files, and photos, and it says that these websites will need more than 4GB of storage so I discarded the basic option. Then, in the website of UAB hosting fees, there are options to make an approximated calculation of what would be the price of your hosting [34].Table 1.

  I have calculated the estimation of what will be the minimum to have a hostage website and a server, and the cost will be 2000€. So, for the new projects, it may mean a big problem to set up its website or all the databases.

TABLE 1: UAB HOSTING FEES.

Fees		
Virtual Server	Rent	1.500€/ year
Hosting a Server	Level 0	500€/year
	Level 1	1000€/year
	Level 2	3000€ /year
Hostage website	Plus Portal	385€/year
	Basic Portal	124€/year

- **There is not a metric measure of the impact of a citizen science project.**

  That means there is no way to see how this project is helping scientists' society or how this impacts people. That problem could carry to people involved in the projects to displeasure because there is no way to calculate the effort that they were doing for months or years.

Meeting Analysis:

In this meeting, I identify relevant actors. Xavier Ariño, who is the Gabinet's Rector, and supports the project INCENTIVE and explains it. Fernando Vilariño organized and was the mediator of this meeting. And Xavier Gabarrell talks about the SMART-ER project and necessities in the citizen science community.

Another thing that I identify that there are a huge variety of projects in this community, one focus on high schools

like Digna Couso and Catherina, and others focus on an indigenous area like Victoria Reyes.

5.2 Personal meetings analysis

These meetings were useful to understand the evolution and the consolidation of a citizen science project, and living labs.

5.2.1 Analysis library living lab

In this one, I learn what means to manage a living lab, the problems, and the impacts that can lead to trying to unify the Quadruple Helix to make them talk the same language when they talk different languages.

First of all, he explained to me the goal of this living lab and why they did it. The answer of Dimosthenis Karatzas was because researchers need to put into practice their research. Then he told me how they did it to carry on this idea and pass it from sketch to reality. Analyzing the situation, it happened around 2011 so, the idea of the living lab and open innovation were not the most popular topics. May it be a problem, but for politicians put a medal for democratizing science, it represents for they an easy one.

After he explains to me the two main problems they had at the consolidation of this living lab, the first one was the poor knowledge of open innovation per part of Barcelona's Council, and the second was to which it belonged at the politician level. These problems were produced for the lack of information in this time about Open innovation, it leads that a project retarded its start and use more staff ours than usually, it was to carry. In the section on impacts, the most significant was that its living lab leads to the creation of another in the "Sant Cugat Museum" which consists of the citizens have to scan the capitals with the technology proportioned by computer vision center (CVC).

It had an impact on media, but this project finally gets stuck because they did not find a way to manage the results of the capital scanned.

For know more about this meeting, read annex.B, where I report all the meeting and there are more information about the evolution, impacts and the problems during the consolidation.

5.2.2 Analysis INCENTIVE

INCENTIVE project is a institutional supported project from UAB, and in this meeting Begoña showed me the work packages, the participants, and what you need before propose a initiative to Europe institution who support citizen science "Horizon 2020".

INCENTIVE consist in create citizen science hubs in 4 universities, but to fulfill this object, they had these word packages explained in the start of this subsection. At the present UAB is making the third, which consist basically in setting up a citizen science hub. Apart of these work packages, they made a survey and are making reviews to people of different involved grades. This is to the co-creating process to find an inclusiveness in the creation of these hubs.

5.2.3 Analysis SAMRT-ER

In the same meeting we talked about SMART-ER because Begoña participate in it too. It is a different project because is at consortium level bigger than INCENTIVE, and this one want to create a virtual institute between universities which conform ECIU university.

It also, have workpackages but she only explained me three of them, and the third one are a summarize of the others which she does not explained me.

For know more about this meeting, read annex.C, where I report all the meeting and there you can find the workpackages of both projects.

5.3 Analysis workshop 22nd June

This workshop had an agenda, three parts of this, are important for the mapping, the first one was the second slot of this meeting, the short presentations of Citizen Science projects The other, was the last fourth point of this agenda, the infrastructures in the UAB to help citizen science projects and the last is the debate about what the university can do for improve this community and the projects.

5.3.1 Projects presentations

As you can see in Annex D.2.2 of the workshop of June 22, there is a section of project presentations where the name of the researcher who will explain it plus the description of the project according to what he said in the presentation. In the final count of these contributions, 19 more contributions were made than I had from the first informal meeting we did in April, which has made my research on citizen science projects at the Autonomous University of Barcelona a total of 26 projects.

These can be seen at the bottom of the website of citizen science at the UAB [35].

5.3.2 UAB infrastructures

After the fourth slot talked about the infrastructures in the university to facilitate us the creation of open innovation projects. We can recognize three, COMTEC, Open labs distributed along the campus and the UAB like an infrastructure to make science. COMTEC is a physical space placed between the university archive and the communication library. This place commitment to fostering digital knowledge and talent in the field of communications. Furthermore, it has a wide range of tools of co-creation, that favors the creation of new projects such as Responsible Research and Innovation (RRI) projects.

The Open labs have a clear purpose, encourage the co-creation, and facilitate it giving tools like 3D printers or other design engines. In the campus there are two open labs; the Design lab in the engineering school and the digital lab in the humanities library.

And the last infrastructure is the campus itself. This is possible because the university consists of some 180 hectares, sixty percent of which are totally green spaces. In these spaces may arise needs such as analyzing the types of plants that exist or the organisms that live in these ecosystems. This is the origin of the idea of the campus as a citizen science infrastructure.

5.3.3   Workshop Debate.

Five important points can be highlighted in this debate.

1. Ensuring the continuity of citizen science projects over time.

2. UAB's involvement with citizen science.

3. The need for more training of different dimensions, not only in citizen science processes.

4. A model for the recognition of citizen science is needed.

5. Creation of an ethic committee.

These were the mains points in the debate and also solve this problems is what aims the last slot of the meeting, the what is next part.

To know more about these problems and what they refer to, the infrastructures at the campus and how was the workshop program, you can find this information in the annex D.

5.4   Final mapping UAB community

In this part of the paper, I have put the collection of all the projects and infrastructures, that have come out of the initial research, the informal meeting, and the workshop. Also the needs that I recollected in all questions and answers, and debates of these events.

5.4.1   UAB citizen science community map

The final map was developed with all the information researched from the meetings and the workshop. Then we can see that the last result looks like google maps whit points. Those points represent a researcher involved in citizen science projects. At each point, there is the name of the researcher and the project name with links to know more about both.

Fig. 1: Final map UAB community involved in citizen science.[35]

As we can see in the figure.1, this map is on beta testing because is so simple talking about style. I have to improve the style and some of the information, but this will be improved with the comments collected for the UAB citizen science responsible.

The map is a script that when executed generates a map within the HTML code. In this script, you have to define what kind of map you want, which I have chosen one of OpenStreetWeb, and the position of the points is generated from the latitude and longitude that you define in the add to map function. Then the popup is modified initializing the variable where you have saved the coordinates and putting inside this the text that you want to come out when clicking that location on the map.

5.4.2   Projects and researchers

Most of the projects in which UAB researchers participate are led by the Institute of Environmental Science and Technology.

ICTA researchers and projects :

- Susana Toboso; URBAG and The Water-Energy-Food Nexus. Implementation on rooftops.

- Petra Benyei; CONECT-e and OPEN-TEK.

- Jordina Belmonte; Planttes.

- Cristina Madrid; LIVEN, Sentinel, SEEDS, Sostenipra and URBAG.

- Victoria Reyes; CONECT-e.

- Isabelle Anguelovski; Dooling.

Then the second institute which lead projects of citizen science projects is the Center for Ecological Research and Forestry Applications.

CREAF reserchers and projects:

- Bernat Claramunt; iNaturalist, Earthwatch and Natusfera.

- Joan Pino; GroundTruth 2.0.

- Yolanda Melero; Observatori de papallones urbanes and Observatori metropolità de papallones (mBMS).

- Ester Prat; Ritme Natura.

- Anabel Sánchez; Mosquito Alert and Alerta Forestal.

And the last institute which their researchers are involved in citizen science is the Computer Vision Center.

CVC researchers and projects:

- Fernando Vilariño; 3D scanning of Sant Cugat capitals and Planttes.

- Dimosthenis Karatzas; Library living lab Sant Cugat.

- Alicia Fornés; XARXES and patient monitoring project.

And the rest are from faculties or part of the UAB rectorate.Table 2.

TABLE 2: Rest of the researchers; faculty and projects

Researcher	Faculty	Projects
Xavier Gabarrell	Engineering	SMART-ER.
Oskar Hernández	Communication	COMTEC.
Begoña Miñarro	Rectorate	SMART-ER.
Xavier Ariño	Rectorate	SMART-ER.
Caterina Solé	Education	ATENC!Ó.
Digna Couso	Education	ATENC!Ó.
Jordi Vallverdú	Philosophy	CSI-COP.
Elia Tena	Education	ATENC!Ó.
Bruna Álvarez	Anthropology	SexAFIN.
Chandra Kala Clemente Martínez	Anthropology	Journeys to the origins.

5.4.3 Needs and infrastructures

In the end, like any community, there are always things that can be improved or needs. In the case of the community of the Autonomous University of Barcelona, these are its needs:

- Ensuring the continuity of citizen science projects.

- More involvement from the UAB.

- Search for a metric measurementof the social impact.

- More training of different citizen science dimensions.

- Search for a model for the recognition of citizen science.

- Creation of a ethic committee.

The infrastructures that support the creation and development of citizen science projects are explained in the annex D.2.4.

6 Discussion

In this section I will write about what I interpreted of my results, discuss the limitations of my results and mention the value that this paper give it to me.

6.1 Projects interpretation

In this work, I have based my analysis on the analysis of 3 projects, two of which are in progress and one completed. Also, from a meeting and a workshop, where I was able to see the citizen science community of the UAB, or at least those who presented themselves, and the great variety that exists in it.

6.1.1 Informal Meeting interpretation

The results of these meetings have been that there is not yet a consolidated community at UAB. It was necessary to have presentations by each of the participants to get to know each other a little.

Among them, some people knew each other, but even so, I expected the meeting to be more focused on projects and not so much on academic presentations.

However, having these presentations served to prepare a report of what happened and who participated in the meeting. It also gave me the two issues that have been the focus of a whole page of this document, the questions, and answers.This section gave me the big problem of citizen science. There is still no way to measure the impact of citizen science metrically. And the second big problem for any start-up company or project, which is the fees.

6.1.2 Library living lab and INCENTIVE interpretation.

With the meetings, I saw what a project looks like and why researchers do it. Although it is only one case, we can generalize that researchers, apart from being in front of a computer or paper implementing theories, also like to translate these ideas into the real world. That is why the library living lab was born, the information that one of the participants of this project told me, was useful to know better citizen science projects and their issues. Two big problems are reduced to the fact that the administration did not have enough information to delegate instead of the department of culture, to the department of innovation.

Also, he talked me about the project to scan the capitals of Sant Cugat's cathedral. The project received great support at the beginning, but it got stuck at the time of valuing the product, which in this case were capitals.

This problem can also be caused by a lack of information at the moment of valuing the final product.

From the second meeting with Begoña. Something that differentiates INCENTIVE with Living Lab Volpalleres, is that it gives the feeling that it has had a greater preparation, because when I spoke with Dimosthenis, he said that Volpalleres was chosen on the fly, however when I asked Begoña the same question about why these four universities were chosen, she argued that they are universities that already have a great base on citizen science and those that do not have it, from the other universities that will pull them, they will be universities that also receive a great impact of citizen science in their communities.

Finally, in this meeting with Begoña I would have liked to talk more about the Smart-er project and to know more about different aspects, but as it is a project on a larger institutional scale, it would take much more time, and the meeting finalizes with a little a short explanation of the workpackage and what the SMART-ER project is all about.

6.1.3 Workshop interpretation.

The last interaction with this community was in the workshop. I collect the final information that I needed to develop the citizen science map at the UAB campus. This workshop starts with an introduction to the context of citizen science at the university. In this slot, one of the speakers talked about the union of the nodes. This means that people who before didn't know, now have a notion of who are the people working on the projects of the other faculties or centers. This fact helps to have a strong and united community. If this goal is achieved, the demands that exist nowadays in the university would have more strength analyzing them the university, since they would not be demands of a group of decentralized

people with different goals, but would be demands of a united community seeking the same target. In this case, the needs are; great support from the university in infrastructure issues of the projects, greater recognition for these projects, the creation of an ethics committee, and a department of citizen science.

About the needs, I think the most important it is to have a way to measure the impact of these projects because if there were a way to measure, it would solve the problem of recognition and the curricular value of these projects. It would be necessary to make society more aware of citizen science since it is not something that came out five years ago, but something that had existed for hundreds of years. But as it is a practice that involves citizens and a group of researchers, it is not given as much merit as a scientific project that only involves a group of researchers to find a solution.

At a local level, the most important need is the support of our universities. We have it in some ways, but we need to increase the tangible support like helping with the computer infrastructures, like hosting or data storage.

At present, the university has given this community some help organizing workshops and meetings, but it is not enough for what this community wants to become.

6.2 Limitations in the research

One of the limitations in this work is the specific information in the projects, for example, the work package of the incentive project I got from the meeting, that is to say, that searching in google or other documents I didn't find that information in months. It could also be said that in other projects, I would have liked to gather more information of that caliber.

Another limitation was the poor geoinformation that some researchers give to me because, in the elaboration of the map, there were moments where I had to find the correct place where they are situated on the campus.

6.3 Value of this paper

In this paper, there are two unique things. The first is the annex which belongs to this report I had to make about a meeting that took place about a month ago, the second one is the mapping. It has been created by me and it is oriented on the people involved in citizen science at UAB.

7 CONCLUSION

In the last section I will restate my results, explain the overall significance of my study, and if I reach my goals explained in the third point of this paper.

7.1 Restate of the results

To conclude the paper, I will restate the results obtained from it. The first results were from the bibliographic study, which consisted of the information you could find on the web of any citizen science project. From there I got information that helped me in the creation of the survey. The next ones were the ones I collected from the first citizen science community meeting, which were information from different people and information about INCENTIVE, SMART-ER, and the upcoming events at UAB about citizen science. Other results were about the interviews I had with Dimosthenis and Begoña, and workshop 22, and the contributions that people made in this meeting. And to sum up, the last that I have received was about the workshop, which helps me to consolidate the first map of citizen science at UAB and know the needs of this community.

7.2 General goals

- The first goal has a connection with the main goal of this paper, make a correct mapping of the CS community, and truly, now I know better all the projects involved which have a researcher of the UAB or are from one of the institutes of the area. I have also, recognized which are the infrastructures that exist in the university. These help the creation and development of the projects, as well as the needs or problems that this community has right now.

- I achieved the second goal because I made some meetings to know better projects like INCENTIVE, and also I made a visit to the Computer Vision Center, and also I see some more projects like XARXES, and they explained to us how they work.

7.3 Specific goals

- In this goal, I feel like I achieved it. Some of the people which participate in one of those projects do not have open information, so I do not have information about what projects they led or participated in. But with the rest of the people involved in CS, I have a good description of them. If in the future I have to put on the map a little deeper description, like studies or projects, I would do it.

- The last goal of this section was to elaborate a map, but it is not complete yet. I want to improve the style and make it more interactive like put buttons instead of having to click on the link. Also in terms of information, I have to change it with the observations delivered to me for the people working in citizen science.

7.4 Academic goals

- The first goal I have achieved is because from the previous research to elaborate the state of the art plus the informal meeting and the workshop I have been able to find all the information of the different projects that exist in the university.

- In the second, I learned the different facts of a CS project. I achieved it with the personals meetings and state-of-the-art research.

- And last but not least, I put in practice some of the knowledge learned during the degree, like programming in the elaboration of the map, communication systems when I had to use ssh to upload the map in the CVC server, and some of

geoinformation, using software called instamaps which help me to put the points in the final map.

7.5 What is next

The task of mapping never ends as new projects appear, or projects that already existed end up finishing, and knowing the reason for this is the task of mapping on that project. That is why the next steps I want to follow is to be able to give a solution to some of the problems that have appeared in this mapping, such as the academic and curricular recognition of citizen science projects. Another task that remains to be improved is the final map, which we must continue to work with both in quality and style.

7.6 Expectations and opinion

To conclude the work, I would like to give my opinion on it. I think that the expectations I set for myself in this work have been fulfilled, as I have mapped the great majority of community projects. In this paper, I have missed something that has been the interaction in these projects, is because of the current context in which we live, there have been some projects that have had to stop their activities, and something I would have liked to add to this document is some face-to-face activity on a citizen science project because theoretically, you can only know what others give you to understand, but you can also draw your conclusions from the projects. At the same time, the beginning of the elaboration of this document was tedious, but when I started with the more practical part like the elaboration of the map, the interviews, and the activities that require interaction with the other agents I found it fun to elaborate this mapping. But I think it is understood that the meaning of my study. It was analyzed and mapping the projects and needs at the UAB.

8 ACKNOWLEDGMENTS

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First, I would like to thank the two people with whom I organized meetings to learn more about CS projects. These individuals were; Dimosthenis Karatzas, a researcher at the CVC and participant in the Library Living lab project, and Begoña Miñarro, who works on the INCENTIVE project and SMART-ER, within the framework of the ECIU university.

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A   INFORMAL MEETING UAB CITIZEN SCIENCE

This meeting was realized on Monday 26th of April at 16:30 p.m., and it was by video conference; the platform that we used was Microsoft Teams. It was the first meeting and it start with a turn of presentations and it developed with the explanation of two projects, Incentive and Smart-er, and some points of views from both. The meeting finished whit a turn of questions and answers. The object of this first meeting was identify the people who are involved in the area of citizen science and citizen engagement.

People involved in UAB Citizen science

- **Fernando Vilariño:** He is Associate Director of the Computer Vision Centre and Associate Professor of the Univ. Autònoma de Barcelona in the Computer Science Dep. He is linked with the development of living labs in public libraries, and he helped with the development of the project Planttes.

- **Bernat Claramunt:** CREAF investigator, he is working in different Citizen Science projects since 2014-2015. He is the principal investigator in a project financed by an American ONG. He participated in the development of iNaturalist. Also, he gives support to people which is starting with their projects of Citizen Science. At present he is developing an encrypted application in war zones.

- **Xavier Ariño:** Head of the rector's cabinet, biologist, participant in some projects that were linked with lichens in Barcelona. And he is trying to organize the part of interaction of science and society, citizen participation and RRI.

- **Victoria Reyes:** She is a researcher ICREA in the Science and Environmental Technology Institute. She participated in a citizen social science project, CONECT-e, that recollects information of traditional plants and animals using network platforms, and at the present she is working in another project with the objective of knowing the impacts of climate change effects and how people perceive these impacts.

- **Begoña Miñarro:** She is in linked the ECIU university program, and she is working in two specific projects, INCENTIVE and SMART-ER. INCENTIVE

has the objective of developing Citizen Science Hubs and SMART-ER will create a number of pilots.

- **Caterina Solé:** Ph.D. student and she is working with Digna Couso, they have projects around the didactic of science. She is participating in a project in Miss Global about the relation between the environmental contamination and the attention, investigating how to approach Citizen Science to high schools and for it have a meaning for the students.

- **Digna Couso:** She is in the education faculty, and she is interested in RRI, she is more involved in projects related with high schools, for instance the study of pollution and contamination. By the way, she is starting a European project called, Multiplayer that is linked with the same topic, the contamination and Citizen Science.

- **Sofia Mojica:** She is working with Begoña Viñarro and Xavier Ariño in INCENTIVE and SMART-ER.

- **Jordina Belmonte:** She is a botanic biology, UAB professor, and she is working in the research of respiratory allergies. She proposed with her partner create the Planttes application, aiming at recollecting information about the plants that they proposed, and with this information they can draw a safe path for allergic people.

- **Xavier Gabarrell:** He participates in SMART-ER project. At institutional level, UAB leads some helping projects, but we need to carry out more researcher groups. And for this we need a mapping clearly showing, what we have, what are we doing, what can we do in the future, what we want to do and the potential collaborations that we can engage at international level.

- **Joan Pino:** CREAF director, he is implicated in a number Citizen Science projects. He has carried out, among others, a project that consist in the creation of Citizen Science observatories (GroundTruth).

- **Fausto Salazar:** Student of Smart Cities, he is developing his Final Year Project with an analysis of Citizen Science at UAB level.

- **Petra Benyei:** She is working with Victoria Reyes. Among other things, she wrote a paper about Citizen Science studies, the study of the citizen science like a tool. She is a member of ECSA.

- **Dulce Tienda:** SShe has experience in preparation of Citizen Science proposal for the UE. Specifically, she is giving support when projects are in proposal stage.

- **Oskar Hernández:** He is working as a manager of the Hemeroteca at UAB, and he is researching in open spaces, investigation, and co-creation in library scopes, he is a participant in Comtec, a project who try to reformulate the concept of a library, it is a commitment to foster digital knowledge and talent in the field of communication.

- **Miquel Domènech:** Science and technology researcher, and he is interested in citizen science like a methodology and like a movement who try to democratize scientific research processes.

- **Dimosthenis Karatzas:** He starts with the citizen innovation, he made with Fernando Vilariño a living lab in the Sant Cugat's library.

- **Mireia Galí:** She is ECIU local Ambassor. And they are developing the citizen science branch in the projects SMART-ER and INCENTIVE. Also, she is coordinating the implementation of the European University ECIU University at UAB.

- **Susana Toboso:** UAB environmentalist, she is part of the group of Xavier Gabarrell. She worked in a study around the management of energy, water, and other resources, designing future scenarios, etc… with the support of citizens. In this way, it is possible to include a social opinion and support to the environmental development projects.

- **Cristina Madrid:** She is participating in two projects, that will create two living labs. They try to go further than only participation; they try to make a co-design project. In the first project, they co-design an environmental analyse module, which works like an energetic system complementary. On the other hand, in the other project, CHIST-era, they design a tool for a time real decision about the use of the energy.

EU Projects, Institutional support UAB:

INCENTIVE: Aims to developing a citizen science HUB to support UAB researchers' necessities. Also intensify the participation in the citizen science, with different types of support, legal level, coaching, training for the people and groups. Furthermore, whit technological support with open repositories, information and help with the IP (intellectual property), data protection. That's why they are working with different public organisms creating new laboratories in town halls (Mollet HUB) [36] , and they are trying to create a new HUB in Cerdanyola, which will have a relation with public policies and citizen participation. Research is changing and we must change it, and with these initiatives they are trying to change it.

SMART-ER: Virtual institute for sustainable development research. Also, it is in the ECIU university structure, and it focus on the sustainable development topic 11, sustainable city and it has a work package in the citizen science. One of the next objectives is the identification of the necessities of the researcher's groups to promote courses, cycles or support groups in citizen science.

To end this meeting, Xavier Gabarell talks about the project that he is involve and what he thinks, so he said that at institutional level, UAB leads some helps projects, but we need to carry out more researchers' groups. And for this we need a mapping which say, what we have, what are we doing, what can we do in the future, what we want to do, in who we are interested and in what we are interested.

Next steps:

June 2021: It is proposed to organise an open wokshop in an online conference style, about Citizen Science in UAB

Community. The objective is to share the different projects, experiences and grasp a better picture of our critical mass.

September 2021 on: It is suggested to start implementing "A Pint of Citizen Science"-like regular events, so that the Citizen Scientists at UAB can meet together and share projects and experiences…   in an informal meeting with the citizens.

Questions and answers

There were two main questions in this meeting:

1. **How UAB can help citizen science researchers? For instance, hosting fees, legal issues, the storage of data, and the data format.**   Its problem has two possible points of view one is the data format unacknowledged that people have when they do their recollection of data results, but on the other hand, the problem maybe provides from the inflexibility of the data storage platforms.

2. **There is not a way to give a metric measurement of the social impact of the projects.**   Also, the acknowledgement and rewarding framework associated to the career of researcher in the context of Citizen Science.

B   MEETING LIBRARY LIVING LAB VOLPALLERES

The meeting happened on Thursday 20, May of 2021, at 15:40 until 16:10. It was via online meeting, and we used the platform Microsoft Teams, and the topic was the project library living lab, definition, problems and impacts.

Definition and creation of library living lab

The meaning of living lab. It is a tool that connects the fourth helix and allows detection and defines innovation opportunities because it forces four parties that speak a different language to speak the same. Its idea was born to form the necessity of public agencies to have a clear mechanism for produce an impact in the public sector. For the project of Volpalleres library living lab, there was not a previous study, they didn't go out looking, but if you have your antennae up, information will come back to you. They watched an opportunity in this neighborhood because they see the different aspirations that the neighbor association from there had. They wanted to be an innovative neighborhood. The computer vision center (CVC) put on the table different ideas of living labs projects, but neighbors chose a library. Then they print a 3D model of the library and marked an area of 100 m² with innovative technology inside. When they presented the project to the politicians, they were astonished because politics are not accustomed to coming up with ready-made initiatives. When they watched what CVC researchers want to make do not disturb people and is a library, they accept to make it. Also, it represents put a medal for democratizing innovation

Problems during the consolidation of the project

The main two problems they had were:

1. The first one was Barcelona's council because, in 2010, they were not conscious of open innovation. Convince them was hard, but in the end, they did

it with facts nor words. Convince them had a big repercussion because it helps to create Bibliolab, that it is a project about open innovation in the council.

2. The second was to which it belonged at the political level. It harmed the project in many ways because the libraries are related to the culture department, and not with the innovation department. The project has been delegated to the programmers of the culture department, who do not understand the innovation area. They do not want to innovate, want to plan; they do not want an open schedule, want a closed one. So, they saw it as an obligation that they do not want to do and not like an opportunity to innovate.

Another problem was the political institutions still not having a mechanism to manage and incorporate innovation results. Companies have it because they know how to commercialize it, but the city council has their procedures, and generally, they do not want to get out of these, and even though you give them innovation results, they do not know how to exploit them. So, they are not prepared to receive innovative incomes. The problem resides in the mentality of the institutions.

Impacts

A result of this impact was that after one year and a half, the Sant Cugat museum director was interested in the project of the library living lab, and he wants to innovate in the museum, and he did not know how to do it. This process would be based on the fact that, through citizen participation, capitals would be scanned, and new ideas would emerge. But this project got stuck when reached the moment of managing the resulting product.

Evolution of the project living library lab

In the beginning, the project had a good start, the results of the first year were great, but the next two or three years, this gets stuck because the town hall was studying how to integrate and never had a conclusion. That is the reason why the project dies because 5 years went by without signing the agreement with the city council when the council was paying the city council to hire a person for the project.

C   BEGOÑA MIÑARRO MEETING

This meeting was realized on Wednesday 26 from May at 12:00 a.m till 12.30, and it was by video conference. The platform that we used was Microsoft Teams. This meeting was to know more about two UAB citizen science projects; INCENTIVE and SMART-ER. The participants were Begoña Miñarro and Fausto Salazar.

INCENTIVE description

Is a project from the SWAF and their objective is create citizen science Hubs in 4 different universities and they will be designed to detect the different necessities.

INCENTIVE Participants

In this project there are 9 participants where seven of them are universities and the rest are citizen science institutions or companies. Participants are:

1. Universiteit Twente

2. Universidad Autonoma de Barcelona

3. Aristotelio Panepitismo Thessalonikis

4. Vilniaus Gedimio Technikos universitetas

5. Competence Center - Citizen science

6. Universita Commerciale Luigi Bocconi

7. Q-Plan International Advisors PC

8. White Research SPRL

9. Verfin der Europafischen Burgerwissenchaften

INCENTIVE Work packages

These work packages aim to cover all aspects of the consolidation of this project, like the creation of the Hubs and operating them.

- **Workpackage 1**

  The first is lead by Aristotelio Panepitismo Thessalonikis and the objectives of this one are explore in-depth the current the landscape across the globe and study good practices among them, understand the existing institutional structure, and analyze the requirements and motivations of the quadruple helix to participate in citizen science projects.

- **Workpackage 2**

  The second is lead by the Universiteit Twente and the objectives are a co-creating citizen science Hubs with key stakeholders,define the governance structure and operating model, and a Manual tool for incentivizing and engaging quadruple

- **Workpackage 3**

  The third "setting up and operating the Citizen science Hubs" is lead by UAB and the objectives are a detained plan to guide partners,organize, training, and mutual learning workshops, and set-up and operate the citizen science Hubs to stimulate institutional changes helix stakeholders.

- **Workpackage 4** The fourth is lead by Q-Plan International Advisors PC,and the objectives are design a methodology and framework to measure the progress, outcome and impacts, monitor the performance of the citizen science Hubs, and evaluate the activities designed and implemented.

- **Workpackage 5** The fifth is lead by Universita Commerciale Luigi Bocconi and the objects are safeguard the sustainability of the institutional changes,and define the innovation and IPR Managment Startegy.

- **Workpackage 6** The last one is lead by White Research SPRL that the objectives are the dissemination; plan, organize, run, monitoring and fine-tune INCENTIVE.

Furthermore, INCENTIVE made a survey, and it is orientated to all citizens with or any knowledge of citizen science, so is for all kind of people. With this survey, they want to have an idea of the perceptions, opinions, and facts which make people participate in the Citizen Science Hubs.

INCENTIVE survey 2021

The survey starts with questions about how much you know about citizen science and your experience with this topic. Then follows with questions about our perceptions in citizen science projects. It asks about what we think about participation, the Hubs, what we think, and our opinion. The next page focuses on the boundaries we made when we want to participate in one of these projects, like the preoccupation of the project with a low ratio of participation, lack of knowledge of the topic, etc. The next series of questions focus on why we participate in a project and the importance for us in participating in one of these. This is reflected with questions like if I did it to know new people or acquire new knowledge. And on the other side, it is reflected with the facts like receive acknowledgment of my contribution or the coordinate team inspire me. The penultimate page of the survey is about our inspiration to participate in a project. And there ask you about if you want to participate in a project and if you will encourage your friends to participate too. Furthermore, it asks you about what type of project and process you are interested in. And the last one is about your information: gender, age, country, education level, employment status, and net incomes.[37]

SMART-ER description

Smart-er arises of an Erasmus + project. It makes more focus in education area than in research area. Also, is a bigger project, talking about, consortium than INCENTIVE. SMART-ER was created to support the research area of ECIU and create a virtual research institute between these 12 institutions that conform to ECIU university. This project has an important citizen science component because work package 5 leads Fernando Vilariño and this is the implementation of two international citizen science pilots between these 12 universities.

Smart-er Work packages In the project SMART-ER they also had different workpackages, but with a little relation with the INCENTIVE because the firsts are to setting up the pillars of work and the others are to consolidate them. Table3

TABLE 3: SMART-ER WORKPACKAGES

Workpackages	Description
Workpackage 1	The first point is to create a research agenda and common innovation between the consortia to create this virtual institute.
Workpackage 2	Create all the foundation of the project and governance tiers in the institution.
Workpackage 3 and the others	The lasts work packages are oriented to riding the project of virtual institute.

D CITIZEN SCIENCE WORKSHOP JUNE 22ND OF 2021.

Context:

The meeting was on Tuesday, June 22nd, 2021, from 11:00 until 14:30, and it was via Microsoft Office Teams. This workshop was organized by UAB to strengthen the citizen science community at UAB. To participate in this meeting, people needed to register before June 21st at 11:00 p.m., and it was open to the entire UAB university community.

D.1   Description of the workshop

The schedule includes presentations of institutional context and instruments to support the development of citizen science at the UAB, a short presentation about citizen science projects managed for UAB teams.

A speech of the citizen science impact in the territory with quadruple helix agents and a discussion about which actions of support, infrastructure, and recognition could use the UAB to promote Citizen Science.

The schedule:

From 11:00 to 11:15: Welcome and institutional presentation. Citizen science context at UAB. In this part of the workshop took action three participants: Marius Martinez Muñoz, the international relationships vice rector, Rosa María Sebastián Pérez, vice rector of innovation and strategic projects, and Xavier Ariño Vila, Rector cabinet header.

From 11:15 to 12:15: Short presentations of UAB citizen science projects. Participants explained their contributions in 3 minutes speeches.

12:15 to 13:00: Citizen science like an impact device and positive transformation in the area. In this journey will participate Maite Pelacho. She explained the Ibercivis foundation and the citizen science observatory in Spain.

Tatiana Fernández, area of economic promotion from the "Generalitat de Catalunya". Diana Escobar made an emphasis on the citizen science office in Barcelona town hall. And Ester Omella, who talked about the Barcelona Provincial Council network of libraries.

13:00 to 13:30: UAB facilities to make citizen science. Here intervened Konstantino Kourkoutas talking about physic facilities in UAB, Open labs. The TBC mentioned the knowledge co-creation and the digital content: Hemeroteca's Lab. And Ana Florensa with the topic, The UAB Campus as a research infrastructure.

13:30 to 14:20: The debate. How can the university contribute to consolidating a stronger community of citizen science? In this stage, all attendees debated which kind of support should have the UAB, like Modalities of recognition of citizen science projects, access to software infrastructures and data management, legal and technical support in the development of project proposals, or others.

14:20 to 14:30: Next steps and closing. The meeting concluded, and they said which will be the next steps for the citizen science community at UAB.

D.2   Report of the meeting

The workshop starts with the intervention of Fernando Vilariño, who was in charge of introducing the different stages of it.

First, he explains the different points of the programs and introduces a map about people involved in citizen science in the UAB. Before the first stage of the workshop starts, he voices his gratitude to the contributions and the people registered in this citizen science workshop.

D.2.1   Welcome and institutional presentation:

Afterward, he gave the floor to Xavier Ariño, Marius Martínez Muñoz, and Rosa María Sebastíab Pérez to welcome the participants and give an introduction of the citizen science context at the UAB.

Xavier Ariño expressed his thanks for the fact that the Vice-Rector for Personal Relations and the Vice-Rector for Strategic Projects were able to attend this meeting. He also talked about the journey it has taken to get to this workshop, with the whole citizen science community together.

Marius Martínez spoke about the opportunities that our university gives us to be able to bring projects like these and connect the previously independent nodes into a community with an institutional framework. Furthermore, he talked about the ECIU university and how the SMART-ER initiative can help to give more impulse to challenge-based learning from the undergraduate level.

Rosa María Sebastían Pérez gave the vision that citizen science has a different scope. She talked about how they influence research projects and how the government team is already involved in propagating this idea by informing citizens about citizen science. To conclude his speech, she gave the idea that citizen science is here to stay and that this workshop should serve as an inspiration for other people to create new projects.

D.2.2 Short presentations of UAB citizen science projects.

CONECT-e and OPEN TEK

Petra Benyei was the person who presents these two projects.

CONECT-e means sharing traditional natural knowledge, which is a system of knowledge, practices, and beliefs that comes from the exchange between humans and nature. This project is carried out at ICTA by the LASEG group (laboratory for the analysis of socio-ecosystems). Researchers from IECTB and the Seed Network also collaborated on this project. The citizen science strategy in this project is that citizens are trained in how to interview so that they interview their older relatives to gather information on traditional natural knowledge.

OPEN TEK is relyed on the LICCI project: Local indicator of climate change impact, and it focuses on the idea of training people to collect climate data. OPEN TEK is a web app that the citizen science factor is that any citizen in places where there is no meteorological data collection, can collect the data themselves and in turn can access the data from the LICCI database. In this project, the ICTA is also involved.

From the urban greening orthodoxy to green justice.

Isabell Anguelovski presents this project. Is an ICTA project in the urban environmental justice lab, and it is based on planning an agenda concerned with public green spaces that lead to the exclusion of the economically vulnerable population while promoting environmental ethics. In this project are two initiatives. The first one is a map that projects the different urban fights about environmental injustices in Barcelona. And the second initiative is the green divide, an interactive web documentary, where we will see some green inequalities across six cities in Europe, the United States, and Canada. The citizen science strategy in this project is the participation of the citizens, reporting these inequalities to the map developers, that they will put it on the map.

Planttes.

This presentation was presented by Jordina Belmonte. It is a project that was developed over many years with his partner Concepcion de Linares. Planttes was born because they were contacted by the design school of Barcelona to give them ideas to develop an application. The group that Jordina coordinates generates data on pollen in the air. So when they were proposed to create an application, they thought of creating one that from a drop-down with images of plants that secrete pollen, people can photograph those that are in it, and then the researchers are responsible for verifying the information and put it on the map, so that people who suffer from allergies can avoid passing through there.

It is a free and open data application.

Nest boxes on campus and Monitoring of diurnal butterflies on campus.

Anna Florensa talked about two projects, nest boxes on campus and the monitoring of diurnal butterflies on campus.

Nest boxes on campus were started in 2013 and are coordinated by the Autonomous Solidarity Foundation and the university's environmental office, and volunteers from the solidarity foundation group are working on the project.

The project is based on the identification and geolocation of the different nests that can be found on the campus and made a follow-up. Their strategy is training their volunteers in the creation of nest boxes, and observation and then to start monitoring the nests.

Monitoring of diurnal butterflies on campus has been working on the observation of these kinds of butterflies, and this led to a transect on the campus since 2005.

SCI-COP:citizen science investigating cookies and APP GDPR complice.

Jordi Vallverdú talks about privacy and cookies, and this project tries to raise awareness to the people who surf in the network. To reach this goal, people have to be trained, and then they will have to share information about the different cookies they found while are surfing the internet.

Butterfly urban monitoring.

Jolanda Melero explained to us where they are monitoring butterflies. Some of the places are; Madrid, Barcelona, Sabadell, and the metropolitan area of Barcelona, and this is coordinated by LED, an open lab created in the UAB. They include participants in these projects because they want to raise awareness that in our cities we also have butterflies, and make them participate in the improvement of the green places.

Wildlife in the changing Andorran Pyrenees, Natusfera and European Bioblitz: invasive alien species.

In this presentation, Bernat Claramunt explains three of the projects that he is participating in or developed.

Wildlife in the Changing Andorran Pyrenees' main goal is to understand how climate change affects our natural communities in the mountain regions. Is an on-site project, the participants are with the scientists or researchers observing these mountain regions. The citizen science component is the citizens help them with the first choice of samples, sometimes even collaborating in deeply tasks.

Natusfera is a node of the iNaturalist network, and this aims to support people who want to start natural research. In this project participate ISGLOBAL and the CREAF.

Bioblitz Europe invasive alien species aims to organize an annual Bioblitz to detect invasive alien species in Europe. It is coordinated by the CREAF, and the first edition will be in 2022. In this project, the citizen science component is the different platforms that people will use for the collection and storage of information.

Atenc!o.

This project was explained by Digna Couso and is about the co-creation of a research survey with secondary school students. The main goal is to identify if the environmental and personal facts affect the student's attention, in this case, the third ESO student.

RitmeNatura.

Ester Prat explained the citizen science observatory, RitmeNatura. It was created to report the climate change impact on our natural ecosystem. This observatory is based on phenology. It studies the vital cycle phases of living beings and how the variations in the climate affect them.

RitmeNatura is coordinated by the CREAF and the meteorological service of Catalonia. Citizens send to the observatory phenological remarks that they did with help of a survey created by the CREAF.

Mosquito Alert and Alerta Forestal.

Anabel Sánchez talked Mosquito Alert and Alerta Forestal, a CREAF projects.

Mosquito Alert consists of the citizen participation to analyze the different kinds of mosquitoes in your area. Also, it makes the function of a monitor and fights the spread of invasive mosquitoes capable of transmitting global diseases such as dengue, Zika, or chikungunya.

In Alerta Forestal, the main goal is the collection of information about the forest health status, and know which of those have the worst health status. To reach this goal, it is necessary lots of information about those ecosystems. The citizen's participation here is collecting information about these forests and then uploading it to the platform.

XARXES and patient monitoring project.

A CVC project, lead by Alicia Fornés, about making a social network with old standards. People are involved in this project by the fact of help the machine to understand all kinds of manuscripts. This support will lead to a computer understand all kinds of written words, and then, in the registers analysis phases, it will be easier for the machine to understand and distribute.

At the end of the presentation, she introduces another project, which is developing in the center of computer vision, about patient monitoring. Whit the help of healthy people, the machine will learn what is good and will apply a parameter for healthy or sick. This project is developed for stroke patients, but they are working to adapt it to multiple sclerosis patients.

SexAFIN.

Bruna Alvarez exposes a project about sexual and reproductive education at primary school. The citizen science component comes from the whole educational community where children, families, and teachers are asked about sexuality. After this, their answers are analyzed, and scientists implement a solution for a possible problem in the sexuality area.

Journeys to the origin.

Chandra Kala Clemente explained a project called Journeys to the origin, one that comes from bigger ones. This project focused on third-party reproduction and access to biogenetic information. This is an AFIN-UAB project. Also in this project participates in adoptive associations, ARTS clinics, and people that were born after ARTs or were adopted.

The citizen science component is the questions asked to citizens which were adopted. They have been asked about the barriers and challenges they have experienced throughout their lives. Another component would be data collection, data analysis, and implementation.

Open environmental assessment for energy modelling.

Cristina Madrid participates in projects that consisting of energy modeling and environmental analysis.

The first project is LIVEN, this living lab is led by her, and it consists of put together different actors involved in energetic planning to make an improvement in the environmental analysis in different energetic scenarios.

The next project is Sentinel, it is a living lab too where they put together energetic modelers to know their necessities, and how to add the environmental analysis. To reach, this goal Sentinel has developed a python module called ENBIOS.

The last project is SEEDS, that they develop a mobile phone application to generate sustainable energetic transition scenarios taking into account the preferences of the general public.

D.2.3   Citizen science like an impact deviceand positive transformation in the area.

Maite Pelocho.   Ibercivis and Citizen science Observatory.

The outline of his presentation is based on first talking about citizen science, then Ibercivis and the observatories and, finally, the impacts on the territory.

In the first point he omitted to give a definition of what citizen science is, but he mentioned the book science in citizen science. Then he gave a structure of how a citizen science project is developed, it begins first with the detection of the problem and the formulation of research questions, followed by the collection of data, conducting experiments, interpretation of data and results, and ends with the development of technologies or applications and publications at different levels.

She then gave an introduction to the Ibercivis foundation. This foundation promotes research and provides technical support, dissemination and training so that anyone can participate in any project.

Ibercivis started with a nuclear fusion project in 2007 and has 8 laboratories open to the public.

He showed some Ibercivis European projects of European scope, but only emphasized one, the eu-citizen.science platform, which is the one that should interest any European citizen who likes citizen science.

Finally, I present the impacts divided into categories. The first one was the scientific impact, which I showed a graph where we could see that there has been a growth in the impact journals, thanks to the data shared by the projects. In the case of environmental, economic, social, educational and political impacts, they do not differ much, so environmental and political impacts go hand in hand. The conclusions of this presentation were that there is an infinity of practices within citizen science, there is support at both local and European levels, there is a poly centrism, as well as social capital, and mutual recognition between academics and non-academics that translates into cooperation.

Tatiana Fernández. Head of economic promotion.

His presentation began with the question of why citizens should participate in science. There were two answers, one from the point of view of productivity, which is based on the fact that it is beneficial for researchers; and the second answer is from the perspective of democratization, which is more about the benefits for citizens.

To change the territory towards the objectives of sustainable development is not easy, that is why it is necessary to make a radical transformation to our society. It is complex to know how to get from the current situation to the desired one.

Since transitions are not linear, citizen science can contribute to the evolution by surfacing the problems caused by unsustainable practices, or by generating evidence on how to implement sustainable practices. That is, citizen science on the one hand can help to contribute to the

detection of problems and configure new research agendas, with the mobilization of research and facilitating a socio-technical co-evolution.

To conclude, he gave a small reflection on what they are looking for with projects like Transform, the first thing they are looking for is how citizen science can provide new evidence and perspectives, and the second would be how it can contribute to articulate new forms of collaboration between academia, public administrations, business and society.

Diana Escobar. Citizen Science Office of the Barcelona City Council.

Basically, what the citizen science office of Barcelona tries to do is to contribute to the development of citizen science projects in the territory. This is achieved through programs and weaving a network through collaborations, and that these are agents that make sense within the world of citizen science. To this end, they have two programs, one is citizen science in schools and the other is citizen science in the neighborhoods that work with cultural facilities and citizenship for young people and adults.

One of the difficulties of citizen science projects is the long term, i.e. projects that have to last over time are expensive to maintain and costly to develop. And the other problem is the scalability and maintenance of the projects over time.

Ester Omella. Network of libraries of the Diputació de Barcelona.

He made a small reference about the Bibliolab program. He gave a description about when the idea arose, in 2016, why it was born, with the idea of improving the public libraries of the Barcelona library network.

He presented some Bibliolab projects: the first is the Bibliolab project of social innovation driven by the UAB to measure air quality where research groups formed by citizens of the libraries of Barbera del Valles, Cerdanyola and Volpalleres have been formed.

The second is the healthy city science project on urban health, promoted by ISGLOBAL, and the intercultural community intervention program of the La Caixa Foundation and six libraries in six municipalities in the region. This project aims to measure air pollution in certain detected areas of the communities and the data obtained is carried out through co-creation.

The third is citizen science and action, which was developed with the University of Barcelona and three libraries, which is at two levels. The first level of citizen science experimentation where the participants chose the topic, which was the improvement of access to housing. And the second level is a laboratory where thirty libraries participated and the objective is to implement citizen science projects that had been previously identified.

And the fourth project is the Gema al riu; it was presented this month and reflects the interest in promoting a citizen science project in the environment of the Riu Llobregat and its tributaries. It seeks to complement the Riu Net project by promoting spaces for social innovation created in libraries through communities of users working on the same social challenge.

D.2.4 UAB facilities to make citizen science.

In this section of the journey, the platform COMTEC was presented by Carmina Crusafón, the Open labs by Konstantino Kourkoutas and The UAB Campus as a research infrastructure by Ana Florensa.

COMTEC:

One of these infrastructures is the COMTEC, situated between the communication library and the UAB archive. It is part of a general strategy that the faculty of communication has called Techcomm. It is a project that covers teaching, digital talent, R and D, institutional agreements and technological agreements.

What is the COMTEC center? It is a space that corresponds to the evolution of libraries.

The area is divided into three axes, one for experimenting, one for thinking and, finally, one for creating. One thing that stands out about this space is that everything is movable. At the same time it is a space that responds to the needs of the university itself, where there is debate and reflection, where there is co-creation and a space for experimentation and research.

This space can be used for teaching, research and transfer, but it can also be used as a library or as a space for events. One of the novelties of COMTEC is to have a working methodology that combines the library with the Faculty.

Open labs:

As infrastructures for design and physical creation. Born from a strategic project in the field of research and transfer that wanted to create an innovative and entrepreneurial ecosystem at the UAB in order to increase the impact of research and transfer activities of the university. The open labs are funded by a project of the ERDF operational key therefore the objective was to incorporate citizens in innovation processes. They seek to unite research, creation and citizen participation to address social challenges and jointly address solutions and validate their impact. The Design Lab is a space in the faculty of engineering where you can make ideas tangible and take them to a physical version. And within the humanities library they created the Digital lab. This was promoted from the idea of incorporating co-creation and research spaces in the libraries.

The campus as research infrastructure:

Our campus consists of about 260 hectares therefore there are areas where it is urbanized, but the remaining 60 per cent are agricultural and forestry areas where it can accommodate citizen science projects on observation as either the case of observations of butterflies or other organisms that can be developed within the campus. In addition, the campus also consists of different organizations that manage the forestry areas, livestock and science and health faculty to coordinate infrastructural issues of the university and in the future collaborate with citizen science projects to be carried out.

Being such a large ecosystem, a small change in management can lead to the emergence of citizen science projects such as, for example; in 2019 the blue route left areas in which it did not mow areas of the green zones. This led to the appearance of more butterflies, which in turn could lead to a citizen science project on the different

butterflies that are in our area. And the same thing happened in 2010 when they allowed green areas to grow and this led to the appearance of new types of plants on campus.

D.2.5 The debate. How can the university contribute to consolidating a stronger community of citizen science?

In this meeting there were some topics of debate but the most important were:

1. Ensuring the continuity of citizen science projects over time.

2. UAB's involvement with citizen science.

3. The need for more training of different dimensions, not only in citizen science processes.

4. A model for the recognition of citizen science is needed.

5. Creation of an ethic committee.

The first makes reference to projects that have a great impact, but with time end up in oblivion. Some solutions are the creation of an institutional entity to manage all campus citizen science projects.

The second is about the UAB's support for citizen science projects because if the UAB is committed to this kind of project, it should support it with more tangible things, not only by organizing workshops or meetings.

On the training point, he refers to the fact that citizen science projects are not just about collecting information and analyzing it, it is more than that since you involve citizens in doing research tasks. That is why at the time of the training of both the scientists and the participants, you have to include more factors than those involved in the project itself.

The next topic also has appeared in the first meeting, the recognition of citizen science. The problem here resides in there is an insignificant curriculum recognition for the people who worked in a citizen science project.

And the last point in this debate was introduced for Maite Pelacho. She said that an ethics committee helps the projects to have a greater initial impulse, but if we do not have one, the initial impulse will be delegated to another committee that will probably give a lower boost.

D.2.6 Next Steps:

- At the community level, it would be the implementation of webinars in CS and make a pint of Citizen Science approaching to the neighborhoods of our cities.

- Make a specific workshops for European projects.

- Develop specific supports for technological infrastructures, such as including TFGs of Citizen Science using the technology of the engineering school.

- Training in data management (GDPR).

- Advance within the vision and policy of Open Science and Open innovation at UAB level.

- Make specific actions such as "Researcher's night".

- Develop recognition and awards within the curriculum vitae of our researchers.

- Provide support on the issue of ethics, one option could be with the creation of committees.