

Engaged Citizen Social Science or the public participation in social science research

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Abstract

Acknowledging the consolidation of citizen science, this paper aims to foster a collective debate on two visible gaps of the field. First, how to overcome the limited participation of social sciences and humanities in the broader field of citizen science, still dominated by natural sciences. Second, how to develop a citizen social science that allows for an active participation of citizens and for a critical engagement with contemporary societies. The authors coordinate a state-sponsored program of scientific dissemination within a Portuguese research institution and this paper intends to lay the groundwork for a future project of Citizen Social Science based on a new concept of “engaged citizen social science”.

Keywords

Citizen science; Public engagement with science and technology; Social inclusion

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Introduction

Social sciences and the humanities are underrepresented in debates and initiatives related to scientific culture or science practices [Delicado, 2004], including when exploring possible connections between science, citizens and society at large. In Portugal, until 1990 the social sciences (and the humanities) were absent from governmental initiatives aiming at promoting scientific culture; only since 2000 these scientific areas started being part of these actions [Delicado, 2004]. However there is still an overall lack of visibility of the work and contributions of the Social Sciences and the Humanities in the context of public engagement with science or of activities aiming at democratizing scientific knowledge. This can be seen, for example, on the website of the main Portuguese agency for the promotion of initiatives aiming at increasing public awareness of Science and Technology (<https://www.cienciaviva.pt/home/>) or documented in projects aiming at characterizing the public image of scientists [e.g. Finson, 2002; Suldovsky, Landrum and Stroud, 2019].

Despite this apparent invisibility of the Social Sciences and the Humanities, both scientific areas can offer invaluable insights on the fundamental challenges faced

by populations and societies today, from current patterns of production, consumption and development to their impacts on natural and social systems, and increase participation and inclusion of traditionally excluded publics in other modes of public engagement with science [e.g. Bonhoure et al., 2019; Lorenz, 2020]. Worldwide, research on the social sciences and humanities has a long-lasting tradition of working in close collaboration with citizens — research *in* and *with* the society — which is somehow contributing to the lack of visibility of those areas to the wider panorama of citizen science projects, as methods, methodologies and processes of a “regular” research area within the social sciences and humanities domains can make it harder to disentangle and classify the role of participant citizens [e.g. Heiss and Matthes, 2017; Bonhoure et al., 2019; Lorenz, 2020; Tauginienė et al., 2020]. CES — the Centre of Social Studies/University of Coimbra (Portugal) is no exception to this participatory and collaborative way of conducting research [e.g. Sousa Santos, 2002; Carvalho, 2018; Campos and Araújo, 2017]. In CES, specifically, research has a strong component of critical questioning and reflection through fruitful dialogues, both internally — via inter and transdisciplinary practices, — and externally, — promoting active links between science and society. As such, there is a need to move beyond more conventional activities, bridging the gap between science and society by developing projects that allow the consolidation of the social sciences and the humanities within the sphere of a citizen science program and fostering the widening and intensification of social and human sciences’ roles in the promotion of scientific culture.

Citizen science and the public engagement with science

Citizen science is a concept that can be translated into various forms of public participation in science, aiming to engage with the public in diverse stages of the scientific process, from the definition of working hypotheses/questions to the involvement in the analysis of results. It is a relatively new field of research and knowledge co-production, being recognized as a fundamental research tool for understanding processes and patterns operating at the micro (local) and macro (global) scales [Crain, Cooper and Dickinson, 2014; Kullenberg and Kasperowski, 2016]. Citizen science projects have been producing different forms of contributions to a vast array of areas and domains, such as species distribution [e.g. Theobald et al., 2015], traffic management [Gonzalez et al., 2011], sun activity monitoring [Barnard et al., 2014] or cancer activity detection in cells [Silva et al., 2016]. In this sense, it has the potential to generate data and produce knowledge within the scientific areas of projects, to contribute to data analysis and assessment of data quality, improve scientific literacy [Bonney et al., 2009] or to influence policy-making [Haklay, 2015].

At its early years citizen science was mainly focused on helping with the processing of massive databases, particularly the collection and analysis of such data [e.g. Krasny and Bonney, 2005]. Nowadays, it is widely acknowledged as a decisive way of bringing closer society and scientific research, even though definitions of what is citizen science and what words should be used in different contexts of citizen science projects may vary according to regions, countries, scientific fields or type of engagement [Trumbull et al., 2000; Eitzel et al., 2017]. Citizen science is a relatively new but expanding field that is mostly recognized as an approach that brings together scientists and non-specialists citizens in research projects [Irwin, 1995]. Ideally, such projects may be started or promoted by any member of these academic and social communities, which can also share

responsibilities in its design, implementation, data collection and analysis, interpretation of the results and which and how project outputs will be used [Bonney et al., 2009; Shirk et al., 2012; Edwards et al., 2018; Pettibone, Vohland and Ziegler, 2017]. The collaborative nature of these projects can thus have important impacts on both the scientific and the social communities, contributing to alternative models of knowledge production, promoting dialogues among the different members of both communities and, in many cases, fostering a commitment to respond to or address socio-scientific questions [Trench, 2008; Bonney et al., 2009; Kullenberg and Kasperowski, 2016; Bonhoure et al., 2019]. Hence, engagement between scientists and non-scientists citizens is a form to conduct socially inclusive science, with and for members of the social community, and to share practices and experiences. Scientists can benefit from the help of citizens and/or their knowledge of a given subject or context while the members of the non-academic society have the opportunity to participate and “learn from the inside” in the process of scientific-knowledge production, widening the debates about science and the societal implications of scientific knowledge and products and strengthening the opportunities for public participation in science-based decisions and policy development.

The underrepresentation of social sciences and the humanities in the universe of citizen science projects

As in other forms of public engagement with science or public recognition of science, the social sciences and the humanities are also underrepresented in the universe of citizen science projects, being the natural sciences the most represented scientific field in the landscape of citizen science projects [Hecker, Garbe and Bonn, 2018; Griffin Burns and Harasimowicz, 2012; Crain, Cooper and Dickinson, 2014; Kullenberg and Kasperowski, 2016]. The thorough scientometric meta-analysis conducted by Kullenberg and Kasperowski [Kullenberg and Kasperowski, 2016], scrutinizing the Web of Science website, showed that in the scientific literature citizen science was mostly absent until the XXI century. It was only from 2010 onwards that this approach to research projects started to increase its presence in the literature, but with the predominance of citizen science projects related to the fields of the natural sciences. Even though the social sciences and the humanities may be “hidden” in natural sciences and biomedical projects [Tauginienė et al., 2020], citizen science projects in the fields of social sciences and the humanities are reduced and appear to be more associated to public participation and/or public engagement, focusing more on the dynamics of the participation/engagement of the public and less on citizen science understood as a research or data collection method [Kullenberg and Kasperowski, 2016]. Furthermore, citizen science projects in both scientific fields also have a very low number of scientific outputs if compared to the number of projects, which can be related to the nature of socially engaged science that characterizes particularly research conducted in the social sciences, where non-scientific outputs are as relevant as scientific ones [Kullenberg and Kasperowski, 2016; Tauginienė et al., 2020].

This quasi invisibility of both scientific areas has consequences, namely on the way people form opinions about science, and the scientific knowledge construction process, and especially about the contributions of social sciences and humanities research to our understanding and representation of the world. Enhancing learning through engaged and inter and transdisciplinary knowledge co-construction, including not only non-scientific knowledge but also the diversity of modes of scientific knowledge production, is an important factor to deepen our perception of

local and global realities [Haraway, 1988]. Because citizen science is, in its essence, about widening the process of scientific knowledge construction, and blurring the frontiers between scientific and social communities, increasing the representation of social sciences and humanities research in the landscape of citizen science projects is a fundamental step to expand the public perception of science [Sarukkai, 2012; Erickson, 2016; Lorenz, 2020]. It entails the potential to question the dominant visions of a neutral and single science, and scientific knowledge, largely situated in a Global North Western geographic authority while reducing or even eliminating other approaches, knowledges and practices [Santos, 2009; Medina, 2013; Sarukkai, 2012]. Such “epistemicide” may lead to arbitrarily distinguishing between “cultural” and “scientific” knowledge according to its geography instead of situating it in culturally defined lines and narratives [Haraway, 1988; Haraway, 1991; Medina, 2013]. As with other forms of public engagement with science, citizen science requires the recognition of science as knowledge and processes within a given context where it is produced and received, subjected to the influence of individual beliefs [Haraway, 1988; Haraway, 1991] and of the public as an heterogeneous element, made of groups with different values, ways of looking at the world and of constructing knowledge from what they observe, and that may have different perceptions of science and of the impacts of scientific knowledge on society [Erickson, 2016]. Science is an ubiquitous part of most human societies and, as a complex human construction, science should also be a democratic construction encompassing diverse knowledges, bringing together different publics and their knowledges and expertise, and allowing the multiplicity of histories about (social, cultural, natural) realities [Haraway, 1991; Santos, 2009; Sarukkai, 2012; Medina, 2013]. Moreover, the growth of citizen science projects on social sciences and humanities scientific fields and their characteristics participatory and collective methods, methodologies and practices may also improve the active role of citizens [Irwin, 1995; Lorenz, 2020; Tauginienė et al., 2020], in accordance to the best practices in citizen science, as endorsed by, for example, the European “Green Paper on Citizen Science” [Societize Consortium, 2013] and by the “Ten Principles of Citizen Science” of the European Citizen Science Association [Robinson et al., 2018].

Citizen science at a social science research centre

The Centre for Social Studies (CES) of the University of Coimbra is a Portuguese Associate Laboratory from the national scientific system. It develops research and advanced training within the social sciences, the humanities and the arts, “conducting research with and for an inclusive, innovative and reflexive society by promoting creative critical approaches in the face of some of the most urging challenges of contemporary societies” (<https://www.ces.uc.pt/en>). CES’ research have a strong component of critical questioning and reflection through fruitful dialogues, both internally, via inter and transdisciplinary practices, and externally, by promoting active links between science and society. These approaches subsidize its mission: to democratize knowledge, revitalize human rights and contribute to foster the concept of science as a public commodity.

CES has a long-standing tradition of engaging with different social communities, in the scope of a research, advance training and outreach triad methodology. As associate of Ciência Viva, the Portuguese Agency for the Scientific and Technologic Culture, CES has also been collaborating in the organization of national projects and activities targeting non-specialist publics, especially high school students. This collaboration is formalized by the program “Ciência Viva at CES”

(<https://www.ces.uc.pt/en/formacao-extensao/ciencia-viva>, currently coordinated by the authors). The mission of Ciência Viva Agency is “to promote generalized access to scientific culture as means to the full exercise of citizenship” (<https://www.cienciaviva.pt>). One of the Ciência Viva most emblematic initiatives is the Summer Internships for Young People in Laboratories, running since 1997. This program is organized in collaboration with research centres and companies with R&D, and aims at integrating high-school students in research projects, in professional scientific and technological contexts, so that they can have first-hand contact with science. Since 2006 the program “Ciência Viva at CES” has been committed to organize science communication and dissemination and participatory citizen science activities [e.g. Campos, 2019]: the Summer Internships and the Science in Loco, a more recent initiative that invites students to visits CES’ installations, allowing for a dialogue with researchers regarding their daily routines and activities. It has also been responsible for the participation of CES in nation-wide scientific outreach activities, such as the Science and Technology Week. Other initiatives aiming at deepen the public engagement in and for science, expanding the target public to include teachers and elementary school students, were already planned but had to be postponed due to the current COVID-19 pandemic.

The “Ciência Viva at CES” Summer Internships offer a unique opportunity to implement citizen science principles of participatory and collaborative research. In these internships students are invited to develop their own research, as equal parts of the research team. After an initial presentation of the general theme of the internships, students enrol in the wide range of research tasks daily conducted in a scientific institution and take an active role in the development of a small research project, from choosing the specific theme, the methods and methodologies to be used, data collection and analysis to discussing results and communicating main findings. For the past 15 years, internships have been addressing themes as diverse as science in the parliament, diversity and discrimination in the University, the functioning of the Portuguese judicial system, the use of image in the Social Sciences, the digital differential, weapons and violence, cities and civic participation, the crisis and the debt of families, sexuality and inequality, mental illness, art and science, the new forms of protest and the relation with cultural heritage, the refugees drama, creative tourism, urban green spaces or the financialization of housing. Throughout the years, this activity has been able to bring together a large number of researchers from CES, in different stages of their careers, and from very diverse scientific backgrounds, as well as external institutions and organizations, thus offering a good insight of interdisciplinary and socially engaged research. Furthermore, it has been positively contributing to the promotion of scientific culture among young audiences, attracting an increasing number of high school students and mobilizing CES’ scientific community, as well as the school community and their families around these themes. Informal questioning of the participants about their perception of the work during the internships confirms this positive reception of the experience:

“(...) one of the best activities I’ve ever experienced. Not only because it enriches us and gives us a deeper insight, but also because, from my point of view, it combines two essential aspects: entertainment and the opportunity to get to know (...). “Ciência Viva” internship not only displays information, but rather stimulates us to think for ourselves and to build a critical sense about the surrounding world. (...). The second

very positive aspect is that it gives us the opportunity to meet new people from our age range, creating mutual-help ties and the ability to work in teams.” (A.F.)

“My participation (...) was very enriching. I learned a lot, met a lot of people, new places, themes and different lifestyle contexts from those I knew. It certainly was an excellent learning experience and I recommend young people to attend these internships during summer, if they want to enjoy some fun, enriching and very “scientific” vacations.” (D.)

“This experience ended up helping me take one of the most important decisions of my life. Currently, I’m studying Psychology because the internship week has helped me understand that this was what I really wanted, putting an end to all my doubts.” (C.)

“(...) the experience was spectacular! It was a great way to get away from the summer vacations routine. (...) I must say that the Centre for Social Studies always provides internships covering very interesting subjects that are not usually approached in school. (...). CES gives you the opportunity to go on free field trips to places to which you will probably never go again, and it mainly gives you the opportunity to speak up and voice your opinion, as we all are important and our opinion always matters.” (R.)

“With this internship, particularly, with the short research that I have conducted for the final presentation, I understood the importance of assuming a critical sense, seeking to enquire about how did things happen, how people are living, involved parties or not, and what do they think about the issue.” (R.)

“Being at CES was an amazing experience which I will always remember. (...) Great professionals taught us to self-reflect, to look for the origin of issues, whether territorial, religious or merely bureaucratic. But the week did not only make us more responsible, but also more tolerant and receptive towards other cultures, and dealing with stereotypes was the best way to overcome them.” (C.)

Together, the activities organized by the program “Ciência Viva at CES” helped to highlight the contributions of a deep interconnection between science and society, and of the importance of academic outreach activities embedded in research projects enabling a direct interaction between researchers and citizens, to social transformation and inclusion, sustainable development and democratic practices. By valuing the educational and communicative aspects of these initiatives and increasingly developing a democratic, pluralistic and participatory approach to knowledge producing within the social sciences and the humanities, the program seeks to achieve what has been referred to as Citizen Science, thereby actively involving citizens in scientific activities, asserting themselves, in this context, as co-producers of knowledge and, therefore, as agents in the transformation of social reality.

Objective

We wish to bring to the discussion some of the initiatives that CES has been promoting throughout the years, integrated in a participatory and collaborative research, embedded in a citizen science perspective. The end goal is to foster a collective debate based on three major questioning:

1. How to overcome the limited participation of the social sciences and the humanities in the broader field of citizen science, still dominated by the natural sciences?
2. How to develop a citizen social science that allows for an active participation of citizens in research programs and projects and for a critical engagement by social scientists with contemporary societies?

3. How to devise distinct, and adequate, formats for citizen science participation; and chose appropriate assessment strategies?

Framing the work around two main concepts: ecology of knowledges and citizen social science

As discussed above, the almost absence of the social sciences and the humanities in the citizen science landscape may also unbalance the representation of other modes of producing and valuing knowledge. In an attempt to reflect of these inclusion and exclusion processes, Santos developed on the concept of ecology of knowledge [Santos, 2007]. This metaphor is associated to the notion that social justice depends on cognitive justice, and that cognitive justice can only be achieved by recognizing the epistemological pluralism of the world, which is built in different ways of living and social practices. It further defends the inseparability of the scientific and the social and the need to “rescue” the diversity of knowledges and experiences and of the social richness of the world [Sousa Santos, 2002; Santos, 2007]. By acknowledging the plurality and heterogeneity of ways of knowledge, the concept also acknowledges the diversity of ways of intervention in the real world. And by favouring context-dependent hierarchies of knowledges, it gives preference to knowledge that warrants participation, in any given situation [Santos, 2007]. In this way, the concept rejects the idea of “alternative knowledge”, wherein non-scientific knowledge is hierarchically inferior to scientific-knowledge and thus systematically invisible, and argues that it is important to identify the contexts and practices in which each operates and how each conceives the problem or reality under study [Sousa Santos, 2002]. For each specific case, hierarchies of knowledges will be constructed according to the solution or expected outcome they present [Santos, 2007]. Applied to a citizen science framework, the ecology of knowledges concepts allows for an effective integration of citizens and their multitude of forms of knowledge via recognition of the multitude of social practices and experiences that generate and sustain them and the creation of opportunities to a fruitful and mutually enriching dialogue between different knowledges. It will, however, require that researchers, and stakeholders, are willing to give up their position of power to allow these “other” knowledges to be used and influence policy-making.

Citizen Social Science was a term first used to characterize the merging of social sciences methods and practices in the field of citizen science [Purdam, 2014]. However, the author ascribed a more passive role of citizens regarding the concept, each one responsible to collect big data but not really actively engaged with the science-policy process. An expansion of the concept was proposed recently [Kythreotis et al., 2019] whereby citizens assume a co-leading role along the phases of a citizen science project development based on their values, experiences and knowledges. As such, citizen social science brings an innovative methodological and theoretical framework, integrating the rich and heterogeneous points of view, values, experiences, practices, cultures and knowledges of the social community into the scientific community. Scientists and citizens become co-producers and co-learners, and work alongside to widen the understanding about a problem or question, look for possible solutions or ways to overcome it and participate in the policy-making process [Kythreotis et al., 2019]. It is not just about public engagement, but mostly about allowing citizens to act as catalysts and drivers of policy transformation [Kythreotis et al., 2019]. The inclusion of citizens in decision-making, moving from a traditional top-down to a bottom-up approach, requires considering simultaneous and with equal weight scientific evidence and public opinion and values to make informed and context-dependent decisions.

Citizen social science also allows addressing the lack of sociocultural diversity in other science communication approaches [Lorenz, 2020] while empowering citizens to effectively participate in political and civic life [Bonhoure et al., 2019].

Engaged citizen social science

The scientific literature has already reflected on the need to expand the concept of citizen science to incorporate a more active participation of citizens [e.g. Crain, Cooper and Dickinson, 2014; Thornhill et al., 2016]. The concept of citizen social science, in particular, has been used to define the inclusion of citizens in policymaking, moving from a traditional top-down to a bottom-up approach [Kythreotis et al., 2019]. Based on the nature of the work done in CES, reflected both on the research and on the citizen science initiatives, such as those organized under the *Ciência Viva* at CES program, and on the two concepts identified above, we propose a new concept in order to include participatory and collaborative research on and with society, imbedded in the concept of the ecology of knowledge [Santos, 2007]: engaged citizen social science. This new concept allows expanding the concept of citizen social science to include participatory and collaborative research imbedded in the “ecology of knowledge” [Santos, 2007]. This mode of research, conducted on and with society, implies the integration of non-scientific knowledge and other types of community-based knowledge within the scope of research projects, given equal opportunities to all type of interplaying knowledge to be acknowledged and used according to the contexts. It further implies the co-design of research projects and considers the engagement to be bidirectional: citizen engagement with science and scientists’ engagement with society. Finally, it includes the social reception of scientific knowledge and its translation into the designing of programs and policies and the enhancement of community projects and debates on public and private memories and histories closely linked to current social issues (such as, for example, race and gender inequalities).

Developing a new approach: putting forward a (engaged) citizen social science project

As the next step, we are working to put forward a research/dissemination project designed under a citizen — participatory — science framework to enhance and widen the contributions of social sciences and humanities research activities concerning citizen science, and especially its dialogue with the surrounding social milieu. At an initial stage, this engaged citizen social science approach comprises an internal institutional debate at CES and an expansion to include other academic institutions and outreach agencies. Ultimately, the project would lead to the consolidation of the network of public and private schools already involved with CES initiatives, and the amplification of this network to the entire school communities, considered as a broader body of interrelations (between, e.g., scientists, students, teachers, families, neighbours or museum staff). The baseline for this project is the reflections on the relative absence of the social sciences from the citizen science universe of projects and public discourses discussed in the previous sections and some goals that need to be considered. These goals would be 1) how to operationalize a citizen science project with the objectives and mission of a research centre like CES, its critical nature, the need for social sciences and the questioning of the “usefulness” of the scientific research; 2) which regional, socio and cultural groups should be included, namely in the context of “regional development” strategies, programs and associated axes; 3) what kind of tools can be contemplated and what concept of extension should be adopted. With this in mind, this project should be able to 1) articulate the participatory and collaborative strategies adopted so far at CES with a novel

perspective of co-construction of knowledge; 2) raise public awareness about the vital contributions of the social sciences and humanities to the overall structure of the scientific culture and system; 3) be translated into social and environmental benefits; 4) foster an active participation of the public, in particular of school students, in the research process; and to 5) enhance social engagement by local actors and institutions in public debates related to the social sciences domain and, in particular, those with direct, localized impact. This process is currently in an early stage, inviting contributions from a wider community in its designing and implementation.

Different citizen science projects face common challenges, such as citizens' motivation for (sustained) participation and communication among all participants [e.g. Lorenz, 2020]. Allowing citizens to take the lead regarding the project, combining scientific objectives with social concerns, working in close proximity with the large school community, respecting their situated knowledge and embodied experience, and taking advantage of CES large experience in attracting students and teachers might help to overcome both "barriers". If succeed, the project will help establish a framework for better integrate the social sciences and the humanities in citizen science projects, advance our understanding of socially relevant issues at different geographic scales and provide an open data set of main questions, theoretical backgrounds, methodological procedures and scientific results and social outcomes.

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