

Meaningful public engagement in the context of open science: reflections from early and mid-career academics

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Abstract

How is public engagement perceived to contribute to open science? This commentary highlights common reflections on this question from interviews with 12 public engagement fellows in Utrecht University's Open Science Programme in the Netherlands. We identify four reasons why public engagement is an essential enabler of open science: Interaction between academics and society can 1) better align science with the needs of society; 2) secure a relationship of trust between science and society; 3) increase the quality and impact of science; and 4) support the impact of open access and FAIR data practices. For such public engagement to be successful and sustainable requires support in skills training and a form of institutionalisation in a university-wide system; but most of all the fellows express the importance of a formal and informal recognition and rewards system. Our findings suggest that in order to make public engagement an integral part of open science, universities should invest in institutional support, create awareness, and stimulate dialogue amongst staff members on how to 'do' good public engagement.

29 **Keywords**

30 Public engagement; open science; rewards & recognition; citizen science; stakeholder
31 engagement; co-creation; science communication; reciprocity

32 **Key messages**

- 33 1. Public engagement has the potential to support the realization of open science, if a broad
34 diversity of motivations for public engagement is explicitly connected to open science policy
35 narratives.
- 36 2. Successful integration of public engagement in academic work requires collaboration
37 between academic and support staff together with consultation of societal stakeholders in
38 order to change necessary policy and support systems and academic culture.
- 39 3. Acknowledging public engagement as inherent to open science means acknowledging a
40 broad array of public engagement activities, including engagement with societal
41 stakeholders as well as with citizens and social communities.
- 42 4. Recognising and rewarding academic and support staff for meaningful public engagement
43 activities is crucial for advancing the societal impact of academic work.

44 ***Declarations and conflicts of interest***

45 ***Research ethics statement***

- 46 • *The authors declare that research ethics approval for this article was provided by*
47 *Utrecht University's Faculty of Social and Behavioural Sciences Ethics Review Board.*

48 ***Consent for publication statement***

- 49 • *The authors declare that research participants' informed consent to publication of*
50 *findings – including photos, videos and any personal or identifiable information – was*
51 *secured prior to publication.*

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56 *The authors declare that this submission is original except for the two figures which are*
57 *available in the public domain.*

Introduction

“Public engagement is essentially about science in society. Positioning science as part of society needs to be done better than it is now, in many ways. Making research accessible, letting the public participate--showing that you listen, that they make a difference--that the image of the ivory tower is not how we want academic research to work. To me, these are the big goals behind open science. Public engagement is hugely important for that.” (interview E2)

Open science is increasingly considered to be a necessary condition for improving the reliability, efficiency, and relevance of research (European Commission, 2019; Miedema, 2021; UNESCO 2021). Open science is generally understood as making science and scientific research available to all. Whereas the open science movement started with, and still is sometimes equaled to, calls and policies for open access to academic publications (e.g., Plan S, <https://www.coalition-s.org/>), its scope has been extended to other phases and products of the research process, including public, community or societal engagement (Vicente-Saez & Martinez-Fuente, 2018). In the Netherlands, the Dutch National Plan Open Science emphasises public engagement as one important dimension of open science: “Engagement with society, for instance via Public Engagement and Citizen Science projects, should be encouraged to provide for open, inclusive, and participatory processes for knowledge creation. This requires building capacity at knowledge institutions and creating and sharing good practices.” (NPOS 2022: 9).

Public engagement is thus at the heart of the rationale behind open science (Stilgoe et al. 2014; Grand, 2015; Garrison, et al. 2021), whereby engagement with societal partners and citizens is seen as crucial for the accessibility and legitimacy of science (Nowotny et al., 2001; Duncan & Oliver, 2021). In practice, however, public engagement activities are sometimes viewed as a welcome, yet nonessential, by-product of academic work. Even among scholars favouring public engagement and open science, views on the relation of public engagement with open science vary (Besley et al. 2018).

To establish public engagement in the service of open science, it is crucial that academics can explain how public engagement activities are meaningful to their academic work. Also, a shared vision about ‘good and effective public engagement’ is needed to assess its value for an open academic community. To that end, we initiated a research project with a group of public engagement fellows at Utrecht University from a variety of academic and professional disciplines. They participated in the project as both interviewer and interviewee to explore their perspectives on the role and value of public engagement in light of open science.

Method

The reflections provided here were drawn on 12 semi-structured, online interviews conducted in 2021 among members involved in Utrecht University’s public engagement network. Participants came from five different faculties and the academic hospital; all had experience with public engagement. Each fellow who was interviewed also conducted an interview with another fellow, focused on five questions: 1. What does public engagement mean to you? 2. Why do you do public engagement? 3. Why is public engagement part of open science? 4. What is needed for successful public engagement? 5. How does public engagement contribute to societal impact? Interviews were recorded, transcribed verbatim and coded thematically in the qualitative data analysis software programme NVIVO. Coding was done in dual-faculty teams per thematically informed question using a deductive and inductive approach, involving an iterative process in which codes, concepts and identifying overarching patterns were developed (Diercks de Casterlé et al 2012). As part of this process, codes, concepts and patterns were discussed in plenary sessions with the larger group to develop a shared coding tree.

Results

A common pattern emerging from many interviews was the shift for various fellows from viewing open science narrowly (e.g., open access for publications, data, and software) towards increasingly viewing it as a broader movement that creates and arranges partnerships between academia and society, with the aim of positioning the university as an integral part of society (which aligns with Utrecht University's open science strategy in Figure 1).

<insert Figure 1 near here> Figure 1: Infographic illustrating the mission and vision of the Open Science Programme at Utrecht University (Source: https://www.uu.nl/sites/default/files/UU_OS_Infographic_2022.png?mt=1649760714)

While all fellows laud open access goals as part of open science, they feel more is needed to engage societal stakeholders and the broader public in the scientific process. Most fellows view public engagement as an essential enabler of open science for four reasons:

1) At the heart of open science is the conviction that academic work should *serve the public good*; not least because it is publicly funded. For science to be aligned with the needs of society, interaction between academics and society is essential.

2) Open science aims to secure *trust in science* and the university as a public institution. This entails improving the accessibility of research data, publications, and insights in research methods, as well as organizing open discussions and input sessions about the goals, methods, results, and implications of research.

3) The belief that participation of society *improves the quality and impact of science*. Public engagement activities enable, for example, citizens to engage with science; and academics to consult societal stakeholders, thereby broadening and sharpening their views on problems, questions, and possible solutions. Furthermore, societal stakeholders can contribute

to collecting and analysing data (citizen science), thereby increasing the reliability and efficacy of scientific research; and

4) The impact of other open science practices such as making data and publications freely available can benefit when embedded in meaningful public engagement activities that enable societal stakeholders to truly engage with science and its products.

Most fellows see open science, with public engagement as its cornerstone, as crucial in sustaining the university as a more reliable and relevant public institution. As one of them put it: *“For me, the higher aim of open science is to be in open contact with society. About your goals, how you get on with it, which are the results – in all those aspects of doing research, and also of education, there is contact with society. (...) And we do it in a way that everybody can follow, and we are open about the results. (...) That is what public engagement is for me. And that is why it is part of open science”* (interview A2).

Summarizing, the fellows see public engagement as means to an end; the overarching strategy is open science, with public engagement as an essential contributing component. The open science movement strives for more transparency and societal impact, and public engagement is a way to achieve this because on the one hand, it is a way to share research and results with societal partners and citizens, and on the other hand, a way to ensure that academics are addressing questions that matter to society.

Another theme emerging from the interviews is that university-wide recognition, as well as support of public engagement endeavours, is crucial for its successful and sustainable integration into the academic system. Three common aspects emerged as being key for successful integration of public engagement in academic work: skills; institutionalisation; and recognition and rewards. *Skills* to do public engagement include, but are not limited to, storytelling and accessible (i.e., jargon-free) communication, translating questions from society

to science and vice versa, and the ability to interact with various publics. According to the fellows, most benefits can be obtained by training early-career scholars (MA and MSc students, PhDs, postdocs) as they are important conveyors of the (future) public engagement culture and valuable collaborators in public engagement projects. Moreover, increasing the range of academics involved in public engagement reduces the risk of a core group of intrinsically motivated, skilled and experienced academics being over-burdened with public engagement tasks and requests, while colleagues who are also motivated but less experienced remain invisible and unsupported. It also allows for teamwork, which fellows found to be important.

Institutionalisation is about establishing public engagement in the culture, structures, and procedures of the university (see also Rose *et al* 2020). In this context, fellows often mentioned the need for resources. Without structural financing, many initiatives lack continuity. Finding time to develop and execute public engagement activities is a concern as well, as is the lack of a platform where academics can find and learn about public engagement practices, and procedures for incorporating public engagement in the early stages of research projects and teaching activities. Furthermore, creating a formal public engagement community and an internal communication network are considered important conditions for good public engagement practices. Existing support offices within universities can also help scholars clarify their public engagement goals.

Currently, fellows experience what some of them call a “public engagement paradox”: what they are recognized for most, is rewarded the least. As one of them illustrated this: “*My podcast is perhaps the most appreciated thing I do [in comparison to getting a research project funded for example, red.] (...) Yet getting a grant for a methodological research project is more highly valued than getting one for a public engagement project, although the amount of funding may be similar*” (interview B2).

The potential solution to this paradox is viewed by many fellows to relate to another open science component, namely *recognition and rewards*. One respondent summarized this as: “*It starts with inspiration, then support, then acknowledgement*” (interview B2). Recognizing and rewarding public engagement activities refers to the informal and formal ways in which public engagement is valued within the academic community: to create *formal* appreciation of public engagement, these activities should be facilitated and rewarded (including for example with prizes), allowing for a diversification of academic careers from PhD level onwards. At the same time, fellows indicated that academics who cannot, or do not, want to engage with the public, should not be forced to do it. Academics have different interests and talents, and this diversity should be appreciated and fostered. Regarding the *informal* appreciation of public engagement, fellows highlighted the importance of a stimulating and positive work culture, where supervisors and colleagues explicitly express their acknowledgement of the importance of public engagement.

The interviews indicate most fellows regard public engagement as an integral part of open science, yet some common concerns emerged. A first concern is that some academics may feel the incentive to only demonstrate their individual scientific findings, thereby inadvertently mispresenting research as very siloed and monodisciplinary. Additionally, fellows expressed that while every academic must adhere to open access and FAIR data norms, not all academics are and should be required to actively participate in public engagement activities. In that sense, public engagement is considered being less dictated than other aspects of open science. There may be good reasons why individual scientists decide to temporarily stay out of the public eye, for example, because they concentrate on research where societal value is not immediate or is hard to define. There must be space in academia and understanding for such individual considerations. Despite these concerns, fellows felt that every academic needs to be aware of

the ‘social contract’ between science and society, which means supporting a broader scientific commitment to public engagement.

Conclusion and discussion

Our analysis demonstrates the dynamic, interactive process of considering public engagement in the context of open science. The perspectives and behaviour of academics shape and are shaped by the institutional context in which they operate. Our findings do not suggest a fixed prescription for doing public engagement within the broader context of open science. Rather, the nuanced reflections of fellows from multiple scientific domains demonstrate a consensus that strategic commitment to open science needs to be substantiated by investment in the structural embedding of public engagement in the organization of universities, with respect for the *diversity* of ways in which people shape their public engagement activities.

Engaging academics rather than *addressing* them as performers of public engagement requires a continuous dialogue, with room for personal motivations for involvement in public engagement, and for including the perspective of the publics and societal actors that academics engage with. To support that dialogue in the academic community, we have created a visual representation of public engagement as a collective of already existing practices that can be embedded more productively and sustainably when integrated in the movement towards open science and the accompanying transition to new frames for rewarding and recognizing the value(s) of academic work (Figure 2).

<insert Figure 2 near here> Figure 2: conversation starter on public engagement and open science at Utrecht University (Source: <https://www.uu.nl/en/research/open-science/tracks/public-engagement>)

All fellows are committed to public engagement and believe it can contribute to better, more relevant research and education. However, they also point out that the focus on public engagement does not automatically lead to better science and that it entails some dilemmas and challenges. The concerns voiced in the interviews resonate with those of others (Katz 2013, Weingart 2017) who have expressed concerns about clarifying how public engagement improves the quality of research and education. Tensions arise when a non-academic audience is given a greater say in determining the value and relevance of academic work. For example, rather than focusing on well-founded and reliable output, academics may feel incentivized to make claims that capture the attention of a larger, non-scientific audience. Opening the research process to external audiences has the potential to enhance quality and relevance. However, it remains important to establish quality standards for public engagement to ensure scientific robustness, reliability and independence.

A further underlying challenge emerging in the interviews is the importance of defining, recognizing, and rewarding “good” public engagement in the context of open science, which relates to distinguishing between “high quality” versus “low quality” public engagement. For example, in the field of science communication studies, the deficit model (i.e., the idea that the public lacks knowledge and the role of science communication is to fill these gaps), was abandoned decades ago (Bucchi & Trench, 2016). But in practice, many academics, including the fellows, struggle to find their way in new modes of communication that truly foster dialogue and mutual learning (Reincke et. al. 2020) and deficit-like communication is still dominant (Jensen & Holliman, 2016). Does that mean that many of our public engagement activities are of low quality? And if so, how can we bridge this theory-practice gap?

In short, it is up to the academic community to implement the necessary quality standards and checks and balances so that public engagement activities make a positive contribution to the quality of open academic research and teaching. Making public engagement

part of open science is a good start, but this vision also requires further elaboration to ensure its success.

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