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A 'work in progress'?: UK researchers and participation in public engagement

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Abstract

The funders of UK research seek to embed public engagement by researchers within the culture of UK research. Within this context, this paper provides a snapshot of the UK public engagement landscape by reporting on new quantitative research that examines the experiences and perspectives of UK researchers (n = 2,454) and public engagement support staff (n = 260). The research suggests that ambitions to embed public engagement by researchers within institutional cultures can be understood as a 'work in progress'. There are indications that public engagement is part of the UK research landscape. At the same time, the research suggests that researchers' public engagement efforts are currently constrained; there is evidence of a disconnect between researchers themselves and broader institutional contexts of public engagement, and the sector is overwhelmingly driven by funding and rewards for research, teaching and other activities. In conclusion, these results indicate that, while current strategies have been helpful, longer term effort is required, perhaps targeting particular domains and, more fundamentally, perhaps featuring greater support and reward for public engagement.

Keywords: public engagement; 'work in progress'; UK; funding and reward

Key messages

- There are many indications that public engagement is part of the UK research landscape.
- However, public engagement by researchers is constrained by systems of funding and reward for research, teaching and other activities.
- If public engagement is to become fully embedded within research cultures, future strategies may need to take account of this.

Introduction

> The funders of research in the UK share a vision for a research culture that values, recognises and supports public engagement.
>
> (RCUK *et al.*, 2010: 4)

As this comment illustrates, the funders of UK research seek to reshape the research culture in universities and other publically funded research institutes, and within UK

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funding bodies themselves. More specifically, funders seek a research culture within which public engagement by researchers – a wide range of forms of interaction between researchers and publics – is embedded in strategy and practice at all levels. Within the context that institutional culture change is always highly challenging and that the higher education sector is especially slow to change (Harris *et al.*, 2003), this is an ambitious objective. When the raft of other ongoing changes that UK universities are facing is factored in – particularly related to funding and measurement – the challenge becomes even greater. At the same time, the public engagement agenda, and particularly some of its constituent parts, have been critiqued by some social scientists, and we review these briefly later.

However, the objective of this paper is more normative. Specifically, the objective is to provide a snapshot of the current UK landscape of public engagement by researchers, and to identify challenges in ways that might, alongside other evidence, inform the development of future strategies to better support public engagement by researchers. In particular, the paper examines: the extent of participation in public engagement by UK researchers, the ways in which participation varies across different groups (such as science, technology, engineering and maths (STEM) and arts, humanities and social science (AHSS) researchers), some of the factors that appear to support or not support participation and the perspectives of public engagement support staff (who we refer to in this paper as 'enablers').

The paper does this by reporting on two quantitative studies that were conducted in 2015: the first examined the levels of participation, attitudes, experiences and demographic attributes of UK researchers across all disciplines, in both universities and other research centres, and the second examined the experiences and attitudes of enablers. These studies were carried out as part of the *Factors Affecting Public Engagement by Researchers* project, which was funded by a Consortium of 15 UK funders of public research (see list at www.wellcome.ac.uk/PERSurvey). The research was specified and managed by a Steering Group drawn from the Consortium, led by a project team at the Wellcome Trust, and was carried out by social research agency, TNS-BMRB, supported by the Policy Studies Institute (PSI) at the University of Westminster (TNS-BMRB and PSI, 2015; TNS-BMRB, 2015; Burchell, 2015; Wellcome Trust *et al.*, 2015). This paper extends the analysis that was documented in these earlier reports by offering a more comprehensive picture of patterns of researchers' participation in public engagement, and the factors that appear to shape participation.

The research suggests that the embedding of public engagement with research in UK institutional research cultures might be best understood as a 'work in progress'. We use this term to encapsulate the mixed picture that is presented by the research results; more specifically, there are indications in the results *both* that public engagement is now part of the landscape of higher education and research institutions, *and* that challenges remain. For instance, in the past year, almost all UK researchers appear to have participated in public engagement and communication. For around a third, this is at relatively low levels (on between 1 and 10 occasions), and the numbers participating decline as the extent of participation increases up to 40+ occasions. We discuss this pattern later as a 'pyramid of participation' (Stigsdotter and Grahn, 2002; Chanan, 1999; Burchell *et al.*, 2014a; Burchell *et al.*, 2014b; Burchell *et al.*, 2016). In addition, most researchers have positive attitudes towards public engagement, and most researchers and enablers sense that public engagement is part of the landscape to a greater extent than it was ten years ago. At the same time, the research suggests that researchers continue to cite funding and reward structures as constraints on public engagement, that the uptake of training for public engagement is very low and that

there is something of a lacuna between researchers and their institutions. Notably, the research also suggests that public engagement is more firmly embedded in the AHSS disciplines than it is among STEM researchers.

The paper proceeds as follows. In the next section, the emergence of the public engagement agenda since 1985 is described; in addition, some of the broad-based critiques of the agenda are briefly reviewed. This is followed by a review of the previous literature that examines the attitudes of researchers towards public engagement and then by a section describing the research methodology. The research findings are presented in three sections, focusing on: levels of participation, the ways in which experiential and attitudinal factors shape participation and the ways in which demographic attributes shape participation. In the final section, we discuss the implications of this research, drawing particular attention to strategic developments that it might imply, and to the fundamental questions about public engagement that are posed by the importance of structures for funding and reward in the determination of researchers' priorities.

The emergence of public engagement

Over the past 30 years, the relationships between UK researchers and broader society have been the subject of attention from the institutions that govern and fund research (for more detail, see Burchell, 2015). Since the early 2000s, the phrase 'public engagement' has been used to encapsulate the wide and varied range of perspectives, languages, objectives and activities that might be mobilized as part of these efforts. Thus, public engagement is an increasingly important activity for many researchers, senior managers and support staff within UK universities and research centres. Importantly, public engagement by researchers, specifically, should be understood as part of the broader categories of public engagement with research (which may not involve researchers) and broader public or civic engagement by universities.

Although the public engagement by researchers agenda has varied origins and has evolved over time, it is notable that its assumptions have remained more or less constant throughout: mutually supportive relationships between research and society are important for both, and such relations are best ensured through high levels and varied forms of interaction between the two. The earlier phases of this agenda proceeded in two distinct streams that can be fairly straightforwardly identified with the STEM and AHSS disciplines.

Within the STEM disciplines, attention to this issue was instigated by the *Public Understanding of Science* (PUS) or Bodmer report (Royal Society, 1985). Prompted by a perceived crisis of public support for scientific and technological developments, and based upon faith in the maxim 'to know science is to love it' (Miller, 2001), this agenda focused on public education in the form of one-way science communication. Over 15 years, the PUS agenda consolidated around 'outreach' activities, such as: media work, public lectures and debates, writing for lay audiences, science festivals, work with museums and schools and open lab events. In 2000, the agenda was redirected by the House of Lords Science and Technology Select Committee's *Science and Society* report (House of Lords, 2000). While this report retained earlier concerns about a lack of public support for science and technology, it shifted the focus on to public trust, and identified a need for two-way dialogue and engagement with society. Reflecting this shift, since 2000 the list of relevant activities has been revised to emphasize a more two-way model (such as, the involvement of the public in citizen science projects, and a range of policy-focused public dialogue processes) and to distinguish between

activities in which communication is emphasized and those in which engagement is emphasized.

A range of similar kinds of activities have been undertaken in the AHSS disciplines over many years (Levitt *et al.*, 2010; Hughes *et al.*, 2011), and the public or society has always been a central research subject in these domains. In addition, in the social sciences (and to some extent in the arts and humanities), a number of more critical engagement agendas were emerging in the latter years of the twentieth century, for instance *community-based participatory research* (Minkler and Wallerstein, 2003, 2008; Israel *et al.*, 2005), *action research* (Reason and Bradbury, 2001) and *community research* (Goodson and Phillimore, 2012) (see Hughes *et al.*, 2011 for an institutional perspective). In these domains, research is undertaken through collaborative action or co-enquiry by researchers and social groups, and the objective of the research and action is a blend of mutual learning, and social change and empowerment. These forms of research are typically undertaken within the context of social issues (such as: health, migration, race and ethnicity, community development and sustainability). In contrast to the STEM disciplines, these agendas emerged from within the AHSS research disciplines themselves and largely independently of official institutions.

Increasingly widespread use of the term 'public engagement' can be discerned from around 2002/3. Since this time, the UK funders of public research have gradually reoriented many of their efforts around this term and its varied disciplinary and institutional perspectives and definitions. In addition, largely catalysed by the barriers identified in the Royal Society's (2006) survey of scientists' attitudes and experiences of public engagement, funders have deepened their commitment to public engagement by researchers, both as part of the research process and as part of the broader culture of universities and research institutes. Central to these efforts, in 2008 the National Coordinating Centre for Public Engagement (NCCPE) was established to provide expert advice, training and tools relating to planning, promoting, incentivizing, supporting and evaluating public engagement activities. The NCCPE published a manifesto for public engagement in 2010 (NCCPE, 2010). As well as funding the NCCPE, UK funders of research have also funded 6 Beacons for Public Engagement (2008–11), Research Councils UK has funded 18 Public Engagement with Research Catalysts (8 from 2013 to 2015 and 10 from 2015 to 2016) (RCUK 2011, 2015a) and the Wellcome Trust has funded the strategic development of public engagement in 28 universities since 2011 (Wellcome Trust, 2016). In addition, in 2010, Research Councils UK led on the publication of a *Concordat for Engaging the Public with Research* (the *Concordat*) – a statement of a shared vision and expectations for public engagement by researchers, as well as a commitment to support public engagement activities (RCUK *et al.*, 2010).

Official definitions of public engagement have evolved over time and are varied. The *Concordat* defines the term by providing a list of some of the activities that it considers constitute public engagement: participating in festivals; working with museums/galleries/science centres and other cultural venues; creating opportunities for the public to inform the research questions being tackled; researchers and public working together to inform policy; presenting to the public (for example, public lectures or talks); involving the public as researchers (for example, web-based experiments); engaging with young people to inspire them about research (for example, workshops in schools); and contributing to new-media-enabled discussion forums (RCUK *et al.*, 2010: 4). Reflecting a desire to emphasize the two-way characteristics of public engagement, it is notable that this list encompasses all of the activities that were mentioned in the

previous sections, except for work with traditional media and journalists and writing for lay audiences.

In recent years, the public engagement agenda has been augmented by two associated policy trajectories. First, in the UK, an 'impact' agenda has emerged. Here, public engagement is a subcategory within a broader notion of 'impact' outside of the academy, which also includes impact on 'economy, society, culture, public policy or services, health, the environment or quality of life' (HEFCE, 2011: 71). The 'impact' agenda appears in two key guises, the Research Excellence Framework (REF), which partly determines funding for UK universities (HEFCE, 2011; King's College London and Digital Science, 2015), and the Pathways to Impact statement within research grant applications to Research Councils UK (RCUK, 2015b). Second, since 2010, public engagement is highlighted as an important element within the *Responsible Research and Innovation*, and *Science with and for Society* frameworks that are promoted by the European Commission (European Commission, 2015).

For the most part, this paper accepts the public engagement agenda on its own terms. However, it is important to briefly review a number of the critiques that have emerged from the social sciences. In the STEM context, it is important to recall that critics challenged the 'to know science is to love it' framing and the educative response of the earlier PUS agenda as a flawed knowledge-deficit-model approach (Wynne, 1992). Of course, this view was officially embraced in the *Science and Society* report of 2000 (House of Lords, 2000). Nonetheless, more recent critics argue that, although the funders of science are speaking the language of public engagement, they also often enact the *public-deficit* and *public as threat* assumptions, objectives and practices of the PUS agenda (Wynne, 2006; Levidow, 2015). With specific reference to the participatory and deliberative elements of public engagement, sceptics argue that these are tools of neo-liberal governance designed to smooth a path for technological trajectories that have already been decided, as opposed to imbuing them with public values or desires (Irwin, 2006; Wynne, 2006; Thorpe and Gregory, 2010). In the context of the broader public engagement agenda as it now applies to all researchers, Watermeyer (2015) highlights links between the extent to which the public engagement agenda is defined and designed from outside academia, and broader critiques that suggest that the professional culture of UK higher education and research is increasingly or overly prescriptive, commercialized and managerial.

Previous research

The objective of this section is to provide a very brief summary of the literature that specifically examines the perspectives of researchers themselves (for more detail, see Burchell, 2015). Starting in around 1985, this literature addresses a range of: disciplinary populations (scientists, specific scientific disciplines, all researchers and so on), topics (science communication, outreach, public engagement and so on) and ways in which these topics are understood. While these distinctions inevitably lead to a varied and somewhat confusing picture, it is possible to identify a number of key themes. First, the literature often points to the somewhat ambiguous place that public engagement and its precursors have in the set of professional commitments and priorities of researchers. It is striking that research consistently suggests that many researchers have an instinctive commitment to such activities. This is with a wide variety of objectives in mind, very often relating in some way to the relationship between research and society. There is considerable interest – particularly in the STEM disciplines, but also more broadly – in the extent to which scientists' motivations for public engagement are transitioning

from the communication- or educative-oriented objectives that are associated with public understanding of science to the more dialogic or two-way concerns of public engagement. Some of the UK literature on scientists' attitudes suggests that changes are taking place in some quarters. However, the literature also suggests that this remains a mixed and complex picture in which the terms 'public engagement' and 'public understanding of science' are often used interchangeably, and in which activities that are associated with public engagement are often undertaken for reasons that have more to do with communication and education (see Burchell, 2015).

However, the ambiguity that surrounds public engagement emerges in the context of the extent to which professional incentives – as reflected in funding, reward, recognition and career progression – focus on research, primarily, but also on teaching and administration (plus – where appropriate – clinical work). The effect of this is that public engagement activities – and, previously, public understanding of science activities – have tended towards being a relatively low priority for most researchers, and such activities are inevitably often squeezed out by more pressing matters (Wellcome Trust, 2000; Royal Society, 2005; Royal Society, 2006; Burchell *et al.*, 2009; Vitae-PIRLS, 2011; Vitae-PIRLS, 2013; Porter *et al.*, 2012; Watermeyer, 2015; Pew Research Center, 2015). Watermeyer (2015) has considered the place of researchers within this ambiguous set of various and shifting objectives and priorities that are experienced by researchers via the institutions in which they work and the institutions that fund their research. On the basis of his analysis and empirical work, Watermeyer concludes that UK researchers are 'lost' between their own commitments to public engagement and the complex, ambiguous and contradictory contexts within which they are working.

While it is not easy to find compelling evidence that levels of participation in public engagement are either increasing or decreasing over time, research consistently suggests that more public engagement and communication is carried out by researchers in the AHSS disciplines than by their colleagues in the STEM disciplines (Kyvik, 2005; Vitae-CROS, 2009; Vitae-CROS, 2011; Vitae-CROS, 2013; Vitae-CROS, 2015; Jensen, 2011; Kreimer *et al.*, 2011; Pew Research Center, 2015) and that there is greater participation among more senior researchers (Wellcome Trust, 2000; Kyvik, 2005; Royal Society, 2005; Jensen *et al.*, 2008; Burchell *et al.*, 2009; Dunwoody *et al.*, 2009; Bauer and Jensen, 2011; Bentley and Kyvik, 2011; Jensen, 2011; Dudo, 2012; Besley *et al.*, 2013; Pew Research Center, 2015). These papers present a mixed picture with respect to gender, with some suggesting that more men undertake public engagement and others suggesting that more women do.

The literature suggests that training in public engagement is typically valued by researchers and is associated with greater confidence and levels of participation (put another way, a lack of training can be regarded as a barrier or hindrance to participation). However, research also suggests that the uptake of training among researchers is typically low (Wellcome Trust, 2000; Royal Society, 2006; Ruth *et al.*, 2005; Vitae-CROS, 2013). Systems of reward and recognition for public engagement tend to be supported by researchers (with some caveats, such as concerns about coercion) and appear to support participation. Again, this implies that a lack of rewards and incentives acts as a barrier to participation in public engagement and communication (see Burchell, 2015).

Research methods

Box 1: A note on the use of questionnaires

Online questionnaire surveys are often advocated as an appropriate means of understanding attitudes and behaviours. In part, this is because online surveys offer the opportunity to cost-effectively gather data from relatively large numbers of people, based upon a consistent research instrument. This means that the results from an appropriate survey sample can be understood as representative of – and can be generalized to – an entire population. At the same time, questionnaire surveys are criticized because they can achieve only a relatively superficial understanding of a phenomenon (compared to more qualitative approaches), and because terms and questions within the survey can be interpreted in different ways by different respondents (Bryman, 2012). Given the aforementioned difficulties associated with defining public engagement, the challenge of interpretation should be borne in mind when considering the results of the surveys described in this report.

This paper draws on two web-based surveys, both administered between May and July 2015. The population for the first survey was researchers working in UK higher education institutions (universities), research institutes and clinical research settings. The population for the second survey was public engagement support staff working in UK higher education institutions, who we refer to as 'enablers' in this paper. The surveys were different, but both were designed to explore respondents' understandings of, attitudes towards and participation in public engagement, as well as a range of factors that may constrain or facilitate participation. Both questionnaires were tested and validated using cognitive testing techniques. In the case of researchers, an initial representative sample of 11,557 was selected from email lists provided by a sample of 50 universities and 13 research institutes/clinical settings. Links to the web-based survey were emailed to respondents. Following several reminders, 2,454 responses were usable in the analysis (representing a response rate of 22 per cent, which can be considered very good in this context). In the results sections, n = 2,454, except where stated. Researcher data were weighted to compensate for unequal selection probabilities and observable bias caused by differential non-response. However, it is possible that some sample bias remains because it could reasonably be hypothesized that researchers who were more interested in public engagement would have been more likely to participate. In the case of the survey of enablers, little is known about this emerging professional group, so neither representative sampling nor weighting were possible; for this reason, the results should be regarded as explorative. For the enablers survey, 840 individuals were surveyed, and 260 responses were usable in the analysis for this paper (31 per cent). In the results sections, n = 260 throughout for the enabler data.

The survey data were analysed in SPSS, one of the most commonly used statistical packages in the social sciences. The analysis relies upon frequency data, supported by relatively simple inferential tests of difference and correlation to establish whether patterns in the data – for instance, differences between males and females – are statistically significant. For more details about the survey methodology and the questionnaire, see the main project report (TNS-BMRB and PSI, 2015) and the technical report (TNS-BMRB, 2015).

A 'pyramid of participation'

We present the results in three sections. In this, the first, we examine levels of participation in public engagement by researchers, and the objectives of public engagement that researchers emphasize. In the second, we examine a range of attitudinal and experiential factors and the ways in which these shape participation in public engagement, and we examine some aspects of enablers' attitudes. In the final section, we focus on the relationships between the demographic attributes of researchers and participation in public engagement.

In the researcher survey, respondents were invited to indicate the number of times that they had participated in 18 different public engagement and communication activities over the past year; six response categories were offered, ranging from 'None' to 'More than 10 times'. The 18 activities were made up of the 10 participatory activities that feature in the *Concordat* definition (RCUK *et al.*, 2010), plus 8 more that are more associated with communication (see Table 1). As we have mentioned, public engagement is defined in a variety of ways across disciplines and domains, and can comprise a wide variety of specific activities. With this in mind, it is unlikely that this list of 18 activities in exhaustive. Nonetheless, we are confident that this list includes most, if not all, of the mainstream public engagement and communication activities that are currently undertaken in the UK.

Table 1: Participation in public engagement and communication activities

Activities	%	What does this mean?
Communicated via social or digital media	57	Among the activities that are part of the *Concordat* definition, overall participation rates were highest for public lectures (48%), working with schools (36%) and public dialogue events (29%). Perhaps not surprisingly, among the activities that are not in the *Concordat* definition, communication via social media (57%) was the most frequently cited activity, and writing for the public (40%) and engaging with policymakers (39%) also scored highly.
Institutional open day	55	
Given a public lecture	48	
Written for the public (media, articles etc.)	40	
Engaged with policymakers	39	
Worked with teachers/schools	36	
Public dialogue event/debate	29	
Engaged at festival, fair (science, arts etc.)	30	
Engaged with NGOs	29	
Projects involving the public or patients	27	
Worked with the public/patients' groups	26	
Worked with museums, galleries etc.	23	
Other informal events (e.g. 'sci bar')	23	
Interviewed by a newspaper journalist	23	
Interviewed on the radio	18	
Judged competitions	13	
Engaged via theatre, performance, film etc.	11	
Collaborated with the entertainment industry	10	

Assessing overall levels of participation in public engagement is not straightforward for a number of reasons. One is that there is a wide variety of views about which activities 'count' as public engagement. In addition, different activities have widely different implications in terms of the time and effort that might be involved in participation in communications and public engagement; for example, a single contribution to social media and participation at a fair or festival are very different propositions. While

acknowledging these challenges, to construct an overall picture of participation, we have combined this broad-based set of 18 activities into a single composite measure.

Box 2: Creating a single composite measure

1. We attributed a score to each individual public engagement and communication activity for each individual researcher that – as accurately as was possible – reflected the number of occasions of participation in that activity.
2. We combined the scores for all 18 individual activity questions to produce a composite measure.
3. We separated out the total scores into six categories, which we labelled from 'no participation' to 'very high' participation (see Table 2).

Table 2: Overall levels of participation

Level of participation	18 engagement and communication activities (%)	What does this mean?
No participation	6	The overall participation rate is 94% (and the rate of high or very high participation is 17%). It is important to bear in mind that this is a somewhat crude and arbitrary picture. However, it indicates that: a very small number of researchers are not participating in public engagement at all, a lot of researchers are participating in public engagement at relatively low levels, and numbers decline as the extent of participation increases.
Very low (1–10 occasions)	37	
Low (11–20)	25	
Medium (21–30)	15	
High (31–40)	9	
Very high (41+)	8	
Total: Very low to very high	94	

The pattern of UK researcher participation in public engagement and communication described in Table 2 conforms to the classic 'pyramid of participation', within which numbers of participants decline as the extent of participation increases (Stigsdotter and Grahn, 2002; Chanan, 1999; Burchell *et al.*, 2014a; Burchell *et al.*, 2014b; Burchell *et al.*, 2016). Later in the paper, we use this picture of overall participation to provide a basis for examining the attitudinal, experiential and demographic variables that influence participation.

The questionnaires also contained questions that were designed to support understanding of researchers' and enablers' perceptions of changes in the public engagement landscape over the past ten years, and of researchers' future ambitions for the amount of time that they spend on public engagement. It is worth noting that these questions were framed with reference to the *Concordat* definition of public engagement, though – of course – we cannot be sure that this is what respondents had in their own minds when they responded. The set of questions regarding the past ten years was answered only by researchers with more than ten years' experience, and therefore yielded a lower responses rate of 1,316. However, the same questions were answered by all of the enablers, however long they had been working in this area; this was because of the relatively low numbers of enablers in the population and in the sample. Although these are clearly subjective perceptions, meaningful change in the public engagement landscape is suggested by the fact that 70 per cent of researchers and 72 per cent of enablers said that they felt that levels of

participation in public engagement had increased over the past ten years. As an adjunct to this, 54 per cent of researchers and 66 per cent of enablers said that they think that the quality of public engagement has increased over the same period. With respect to the question about future ambitions, pointing towards an appetite for more public engagement, 54 per cent of researchers responded that they wished to spend more time on public engagement in the future, 33 per cent responded that the wished to spend about the same amount of time and just 1 per cent indicated that they wanted to spend less time.

Given the shift in official focus from one-way communication to two-way engagement, a key concern for UK funders of research is the extent to which researchers and enablers understand public engagement and its purposes in these terms. In response to an open-ended invitation to comment on, 'what, if anything, does public engagement mean to you?', 41 per cent of researchers and 59 per cent of enablers wrote responses that alluded to two-way engagement or dialogue, while 34 per cent of researchers and 20 per cent of enablers referred to one-way dissemination. This somewhat mixed picture is reinforced in the responses to a question that asked researchers to identify one 'main benefit' of public engagement from a list of 13 ('no benefits' and 'other benefit' options were also offered). The results are shown in Table 3.

Table 3: Researchers' judgements of the single main benefit of public engagement, top 5 responses

Main benefit of public engagement	%	What does this mean?
To inform the public/raise awareness about research	20	The responses paint a mixed picture of answers that illustrate the ongoing understanding of public engagement as a communicative or educative undertaking (e.g. informing, raising awareness and maintaining public support) and others that emphasize a more two-way or dialogic understanding of public engagement (e.g. ensuring relevance of research and contributing to public debate).
To ensure that research is relevant to society	18	
To contribute to public debates	9	
To maintain public support for research	9	
To be accountable for the use of public funds	5	

Attitudes towards and experiences of public engagement

Our analysis of attitudes towards, and experiences of, public engagement proceeds in four parts:

1. attitudes towards public engagement
2. institutional encouragement and support
3. confidence
4. perceptions of constraints on participation.

Attitudes towards public engagement

The researcher survey included nine statements that were designed to explore – in a variety of ways – how positive researchers are about public engagement. The results are shown in Table 4.

Table 4: Agreement* with attitudinal statements

Statement	%	What does this mean?
Researchers have a moral duty to engage with the public about the social and ethical implications of their research	71	The results from these questions suggest that researchers are broadly positive about public engagement.
I don't think my research is interesting to the general public	17	
I would be happy to take a public stance on the issues raised by my research	72	
Engagement with the non-specialist public is best done by trained professionals and journalists	23	
My research is too specialized to make much sense to the public	20	
I would be happy to take part in a public engagement activity that was organized by someone else	80	
There are no personal benefits for me in public engagement	17	
Public engagement improves the quality of my research	51	
I don't believe the public can add value to my research	17	

* Slightly or strongly agree

By combining the responses to the nine statements in Table 4, we were also able straightforwardly to derive a composite understanding of how positively researchers feel about public engagement, as shown in Table 5.

Table 5: Extent of positive views towards public engagement

Positivity towards public engagement	%	What does this mean?
Low	1	Although inevitably somewhat crude, this analysis also suggests that UK researchers are typically broadly positive about public engagement.
Medium-low	10	
Medium-high	46	
High	43	

Institutional encouragement and support

As part of our attempts to understand the institutional contexts within which researchers undertake public engagement, we asked a number of questions about encouragement and practical support for public engagement from: departmental colleagues, employer institutions and the funders of research. With respect to some of these issues, we also asked researchers and enablers about their perceptions of change over the past ten years (note, again, that these questions were answered only by researchers with more than ten years' experience and by all of the enablers). Responses to these questions provide further evidence that public engagement is an accepted part of the landscape of higher education and research, but also highlight some challenges in the relationship between researchers and institutions with respect to public engagement.

In the context of departmental peers, 62 per cent of researchers indicated that their departmental peers are 'very' or 'fairly' supportive of those who participate in public engagement, while 15 per cent responded 'not particularly' or 'not at all' supportive. Examining this issue from a different perspective, 25 per cent of researchers agreed ('slightly' or 'strongly') with the statement: 'Researchers who do a lot of public engagement are not well regarded by other researchers'. The corresponding figure for enablers was 33 per cent. Within the context of the perceived increases in participation in public engagement that were discussed earlier, it is striking that one quarter of researchers and one third of enablers have this somewhat negative understanding of the terrain; for an in-depth examination of this issue, see Burchell *et al.* (2009).

Table 6 reports the responses to three more of the questions that asked researchers with more than ten years' experience and all of the enablers about change over the previous ten years. The findings in Table 6 are interesting in two key ways, both of which point towards challenges in the relationships between researchers and institutions in the context of public engagement. First, with respect to the researchers only, it is noticeable that increases in practical *support* from institutions and research funders are not perceived to the same extent as increases in institutional *encouragement* to undertake public engagement. This could be interpreted as suggesting that researchers feel that institutions and funders have increased the extent to which they are talking about or encouraging public engagement, but have not backed this up with increases in tangible support. That said, in the context of another question, 63 per cent of researchers said that their institutions were 'very' or 'fairly' supportive, while 12 per cent said 'not particularly' or 'not at all' supportive. This relatively positive picture is perhaps reinforced by the fact that when both researchers and enablers were asked to identify three main constraints on their participation in public engagement, less than 10 per cent identified insufficient support from either senior staff or departmental heads as a constraint.

Table 6: Researchers' and enablers' views on the institutional landscape

	Researchers	Enablers
	Increased over past ten years % response	
Institutional encouragement	64	88
Practical institutional support (e.g. training)	37	84
Support from research funders	49	82
	Generally supportive* % response	
Institution	63	89

* 'Very' or 'fairly'

The second interesting element in the results in Table 6 relates to the notable distinctions between the views of the researchers and of the enablers. More specifically, Table 6 is striking because it suggests that many more enablers than researchers perceive increases over the past ten years in institutional encouragement and practical support, and in funder support, and that many more enablers than researchers perceive their institutions to be generally supportive of public engagement. It is particularly noteworthy that the difference in perceptions of an increase in practical institutional support is almost fifty percentage points. This sizeable difference is also reflected in

the responses of the researchers and the enablers with respect to the uptake and provision of training for public engagement. On one hand, 79 per cent of researchers indicated that they have not undertaken any formal public engagement training in the past five years (with 47 per cent saying they had not been offered any training). It was not possible to compare this with training in other aspects of researchers' professional lives, and investigation of this would be valuable in future surveys. However, in contrast to this, only 7 per cent of the enablers said that their institutions offered no training for public engagement.

Taken as a whole, this set of findings seems to provide evidence of a disconnect between, on the one hand, researchers and the institutional contexts for public engagement, and, on the other, the enablers who are liaising between institutions and researchers. For instance, while most enablers perceive increases in institutional and funder encouragement and support for public engagement, far fewer researchers share this view. In addition, while many or almost all institutions appear to offer training in public engagement, many researchers are not aware of being offered training and relatively few have undertaken training in the past five years.

Confidence

As indicated in Table 7, we investigated the issue of confidence by asking researchers whether or not they feel confident of their public engagement skills and how well equipped they feel to engage. Against both of these measures, more than half of researchers gave positive responses. More specifically, 56 per cent of researchers agreed ('slightly' or 'strongly') with the statement: 'I feel confident in my public engagement skills' (with 24 per cent disagreeing 'slightly' or 'strongly'), and 64 per cent indicated that they feel well equipped ('fairly' or 'very') to engage with the public (with 30 per cent feeling 'not very well' or 'not at all' equipped).

Table 7: Feeling confident and well-equipped for public engagement

	Agree* (%)	**Disagree* (%)**
I feel confident in my public engagement skills	56	24
	Equipped (%)**	**Not equipped† (%)**
How well equipped do you feel to engage with the public	64	30

* 'Slightly' or 'strongly'
** 'Fairly' or 'very'
† 'Not very well' or 'not at all'

Perceptions of constraints on participation

Respondents to both the researcher survey and the enabler survey were invited to identify what they consider to be the three main constraints on researchers' participation in public engagement. The results are shown in Table 8.

Table 8: Main constraints on researchers' participation (above 10% only)

	Researchers (%)	Enablers (%)	What does this mean?
Competing pressures on time	61	67	Consistent with previous research, competing pressures on time emerges overwhelmingly as the key factor in the minds of both researchers and enablers. As is also reported in existing research, a lack of funding, recognition and reward for public engagement emerge as the key reasons why public engagement currently loses competitions for time and attention from researchers.
Lack of opportunities	26	11	
Lack of funding	26	35	
Lack of recognition	18	53	
Don't have the right skills/ training	14	–	
Does not help career progression	14	29	
Difficulty in encouraging (more) researchers to get involved	–	38	

Table 8 highlights some key differences in the views of researchers and enablers in the context of the availability of opportunities to participate in public engagement. More specifically, while 26 per cent – more than a quarter – of researchers cited this as a constraint on participation, only 11 per cent of enablers highlighted this; we can conclude from this, perhaps, that enablers are aware of many more opportunities than researchers. This sense is reinforced by the observation that 38 per cent of the enablers also identified difficulties encouraging researchers to do public engagement as a key constraint.

The attitudinal factors that constrain and support participation

In this section and the next, we focus on associations between a range of factors and participation in public engagement and communication by researchers. In this section, we examine the ways in which some of the issues that were discussed in the previous section – confidence, training and positive attitudes – are associated with levels of participation in public engagement. We address demographic attributes in the next section.

As previous research has indicated, and as would perhaps be expected, the data show both strong and very strong positive associations between:

- formal training
- informal training (comprising: mentoring, peer support and other informal skills development, but not learning through experience)
- feeling confident
- feeling well-equipped
- positive attitudes towards public engagement
- participation in public engagement (in the ten *Concordat* activities).

With these findings in mind, we can refer to these as a set of variables that are *typically* associated with greater levels of participation by researchers in public engagement. That said, we also need to be cautious about making assumptions about causation, overemphasizing specific facts over others and assuming that there are not other relevant factors. Looking at these findings in more detail, Table 9 contains the results from a set of Spearman's rank correlation tests.

Box 3: Statistical tests

To find out whether or not two categories of researchers (such as researchers in STEM and AHSS disciplines) are different from each other, based on a particular variable (such as extent of participation in public engagement), we have used the chi-square test. When interpreting the results from this test, it is important to remember that the higher chi-square (X^2) values denote greater differences and that *p*-values need to be between 0.00 and 0.05 to be statistically significant (with 0.00 denoting the most statistically significant chi-square values).

To find out whether two variables (such as participation in public engagement and positive attitudes towards public engagement) are related, we have used the Spearman's rank correlation test. When interpreting this test, it is important to remember that correlation coefficients (or *r*-values) that are closer to +1 or -1 reflect stronger positive or negative correlation and that *p*-values need to be between 0.00 and 0.05 to be statistically significant (with 0.00 denoting the most statistically significant chi-square values). Importantly, correlation tests tell us nothing about causation.

Table 9: Factors that support participation (*r*-values are given here; all *p*-values are .000, i.e. the correlations are statistically significant)

	Positive attitudes	Confidence	Well-equipped	What does this mean?
Participation (18 activities)	.390	.323	.352	These coefficients of correlation of between .3 and .5 suggest that there is a set of moderately strong – yet important – relationships between: participation in public engagement, positive attitudes towards public engagement, and feeling confident or well-equipped to undertake public engagement.
Positive attitudes		.352	.357	
Confidence			.572	

As an illustration of the phenomena described in Table 9, we can note that the percentages of researchers in the 'high' and 'very high' participation categories are 0 per cent among researchers with the least positive attitudes towards public engagement and 6.3 per cent among researchers with the most positive attitudes. Further, the percentages of researchers in the 'high' and 'very high' participation categories are 1 per cent among researchers with the least confidence and 9 per cent among researchers with the most.

Table 10 presents the results of the chi-square test, described in Box 3, examining whether there is a relationship between formal training and informal training (mentoring and other approaches) and participation in public engagement, positive attitudes, confidence and feeling equipped.

To give an idea of these differences, the percentages of researchers in the 'high' and 'very high' participation categories are 24 per cent in the context of training and 15 per cent in the absence of training, and the percentages of researchers in the 'high' positive attitudes category are 55 per cent in the context of training and 38 per cent in its absence.

Table 10: Differences in outcome between the presence and absence of formal and informal training (all *p*-values are .000) (As described in Box 3, higher X^2 values denote greater differences between the two groups of researchers, i.e. those who have participated in training and those who have not.)

	Training X^2	Informal training X^2	What does this mean?
Participation (18 activities)	67.219	77.935	These high and very high X^2 values indicate that undertaking both formal and informal training is associated with greater levels of participation, more positive attitudes towards public engagement and greater feelings of confidence.
Positive attitudes	65.513	35.714	
Confidence	31.894	39.966	
Well-equipped	67.556	50.522	

Demographic factors that shape participation

In this section, we describe the ways in which a range of demographic factors – for instance, academic discipline and gender – are associated with levels of participation in public engagement and communication, as well as the set of supporting variables that we discussed above (positive attitudes, feeling confident and so on). In each case, we provide the test values (the *p*-value for all tests is .000 – that is to say, as high as it could possibly be – except where stated) and we provide an illustration of the differences within the data.

Box 4: Demographic factors

We examined the following demographic characteristics:

- age and seniority
- gender
- ethnicity
- English as a first language
- academic discipline
- working in a higher education institution or a research institute
- working full time or part time
- contract type.

Academic discipline

Table 11 shows the average number of public engagement and communication events in which respondents estimated that they had participated during the past 12 months, broken down by different demographic attributes. Only demographic attributes where statistically significant differences were found are shown. As illustrated in Table 11, the most significant demographic determinant of participation in public engagement appears to be academic discipline. As was discussed earlier, the literature often identifies greater levels of participation among researchers in the AHSS disciplines than among STEM researchers. This pattern is strongly reproduced in the 2015 survey. Table 11 highlights three key points. The first is that, on average, researchers in REF Panel D: Arts and humanities have undertaken more public engagement events in the past 12 months (according to the participation criteria described in Table 2) than researchers in

the other three REF Panels together ($X^2 = 145.480$), and more when compared with the social sciences only ($X^2 = 46.010$; n = 864). Table 11 also shows that researchers in the AHSS disciplines more broadly undertook more public engagement than their peers in the STEM disciplines ($X^2 = 126.903$). Finally, Table 11 shows that – within this context of relatively low levels of participation in public engagement among STEM researchers – researchers who also do clinical work undertake slightly more public engagement than other STEM researchers ($X^2 = 28.590$; n = 1,559).

Table 11: Average number of public engagement and communication events per researcher in the past 12 months

Researchers	Average number of public engagement and communication events per researcher in past 12 months	What does this mean?
All researchers	17	This table shows that: researchers in the AHSS disciplines undertake considerably more public engagement than those in the STEM disciplines; researchers on research-only contracts do less public engagement than other researchers; and that senior and older researchers undertake more public engagement than others.
ACADEMIC DISCIPLINE		
REF panels		
REF Panel D: Arts and humanities	26	
REF Panel C: Social sciences, design and humanities	23	
REF Panel A: Clinical and biosciences	14	
REF Panel B: Physical, mathematical, computer sciences, engineering	13	
STEM vs AHSS		
STEM disciplines	14	
AHSS disciplines	24	
Clinical researchers		
Researchers on 'research and clinical' contracts	20	
TYPE OF CONTRACT		
Research only	13	
Research and teaching	20	
Teaching only	19	
Research and clinical	20	
SENIORITY		
Junior researchers	14	
Senior researchers	21	
OLDER RESEARCHERS		
Aged 51 and over	21	
All others	16	
GENDER		
Female	18	
Male	17	
RUSSELL GROUP		
Russell Group universities	15	
Other universities	18	

Applying the X^2 test to explore differences between AHSS and STEM researchers in terms of the supporting variables that were discussed earlier, researchers in AHSS disciplines also:

- have more positive attitudes towards public engagement (X^2 = 52.527): while 52 per cent of AHSS researchers fall into the category with the most positive attitudes, the corresponding figure for STEM researchers is 38 per cent
- have more confidence (X^2 = 56.993): while 32 per cent of AHSS researchers strongly agree that they are confident, the corresponding figure for STEM researchers is 19 per cent
- feel better equipped (X^2 = 54.338): while 18 per cent of AHSS researchers feel very well equipped, the corresponding figure for STEM researchers is 11 per cent
- have undertaken more informal learning (X^2 = 15.953): while 19 per cent of AHSS researchers state that they have *not* undertaken informal learning, the corresponding figure for STEM researchers is 26 per cent (no difference is observed with respect to formal training).

This pattern (differences in levels of participation and with respect to one or more of the associated variables) was present with respect to a number of other demographic variables, though never to the same extent as the STEM/AHSS differences. For these reasons, we do not provide such comprehensive descriptions for these variables.

It is also striking that researchers in AHSS differ from their colleagues in STEM disciplines in the context of their understandings of the objectives of public engagement. More specifically, as shown in Table 12, AHSS researchers consistently favour objectives that are more closely associated with two-way models of engagement, while their peers in STEM disciplines consistently identify benefits that are more associated with one-way models of communication.

Table 12: Researchers' understandings of the benefits of public engagement (all *p*-values are .000)

	% of AHSS researchers who selected this benefit	% of STEM researchers who selected this benefit	X^2 (higher values denote greater differences between the two groups of researchers)	What does this mean?
Emphasis on one-way communication				
To maintain public support for research	20	50	113.897	Greater emphasis in STEM
To inform the public/raise awareness about research	42	56	47.163	Greater emphasis in STEM
Emphasis on two-way interactions				
To contribute to public debates	54	19	323.797	Greater emphasis in AHSS
To learn from public groups	33	20	50.858	Greater emphasis in AHSS
To ensure that research is relevant to society	50	41	16.515	Greater emphasis in AHSS

Type of contract

Analysis of the 'contract type' data that informs Table 11 highlights one key issue. This is the considerable extent to which researchers on research-only contracts conduct *less* public engagement and communication than their peers as a group (on average, the number of times a researcher has participated in public engagement and communication activities in the last 12 months is 13 for those on research-only contracts and 19–20 for their peers ($X^2 = 98.694$)).

Seniority and age

Our analysis with respect to seniority conforms to much previous research. ('Senior' means: senior research fellow, principal researcher, associate professor, senior lecturer, reader, professor, (executive) dean, department head; 'junior' means: PhD student, research assistant, research associate, research fellow, postdoctoral researcher, lecturer, assistant professor.) Table 11 shows that public engagement and communication is more prevalent among senior researchers than it is among their junior counterparts (on average, 21 and 14, respectively; $X^2 = 97.269$). A similar – though less prominent – pattern is also discernible with respect to age. Across the age range, age is positively correlated with participation, but only to a very limited extent ($r = .130$). We also examined differences between particular age groups and the others. As predicted by the correlation test, and shown in Table 11, this analysis suggests that researchers aged 51+ undertake *more* public engagement than younger researchers (on average, 21 and 16, respectively; $X^2 = 21.729$, $p = .001$).

Gender

Our analysis of gender produced interesting results because, whereas analyses of most of the demographic variables showed patterns among the supporting variables (such as confidence), a slightly different pattern is discernible with respect to gender. More specifically, although female researchers participate marginally more than their male counterparts, men have marginally greater feelings of confidence and being well-equipped for public engagement. Table 11 suggests that female researchers participate very marginally more than males across the 18 engagement and communication activities (on average, 18 and 17, respectively; $X^2 = 35.344$). Female researchers also have more significantly greater positive attitudes towards public engagement than male researchers ($X^2 = 82.560$). However, while across all of the researchers these factors are reflected in feelings of greater confidence and being better equipped, this is not the case here. In contrast, in the context of gender, it is male researchers who feel marginally more confident ($X^2 = 80.555$) and better equipped ($X^2 = 45.421$) than their female peers.

Russell Group universities

As shown in Table 11, researchers in the Russell Group universities – which might also be seen as more research-intensive universities – conduct marginally *less* public engagement and communication than do their peers in the other universities (on average, 15 and 18, respectively; $X^2 = 16.502$, $p = .006$).

We also examined the following demographic attributes but did not unearth significant differences:

- working in a higher education institution or a research institute
- working full time or part time

- ethnicity
- English as a first language.

These results suggest that public engagement is notably more prevalent among researchers in the AHSS disciplines (and particularly in the arts and humanities), senior researchers (and those aged 51 and over) and researchers who are not on research-only contracts. The results also suggest that public engagement is marginally more prevalent among female researchers (with the unusual context of greater confidence among male researchers) and researchers outside of the Russell Group universities. Although we do not have the space to explore this here, it will not be surprising to note that as these dimensions of greater participation are combined, greater differences between groups can be discerned; for instance, women in the AHSS disciplines undertake considerably more public engagement than other researchers.

Discussion

In this final section, we have two aims. The first is to summarize the objectives and findings of the study, and particularly to place these within the context of the term 'work in progress', which we have used to encapsulate our findings. Our second aim is to consider these findings within the broader contexts of: institutional ambitions for culture change, the reward and funding structures for research, and future strategies for public engagement. In this latter context, we offer some suggestions for future support of researchers, but also ask some more fundamental questions.

Summary

The objective of this paper has been – on the basis of two UK quantitative surveys, administered in 2015 – to examine: levels of participation in public engagement by researchers; the attitudes and experiences of researchers and public engagement enablers with respect to public engagement; the ways in which these factors shape participation; and the ways in which demographic attributes shape participation. We are examining this issue within the context of bold ambitions among the funders of UK public research to embed public engagement by researchers within the professional culture of UK research. Although we are mindful that there is a long-standing critique of the institutionalized public engagement agenda, our approach in this paper is to accept the agenda on its own terms.

On the basis of this analysis, we have described the extent to which public engagement is embedded within institutions as a 'work in progress'. We use this term to try to encapsulate both signs of progress and indications of constraint and challenge that our snapshot of the UK public engagement landscape has revealed. The study suggests that there are a number of ways in which public engagement could be considered a part of the terrain or culture of higher education and research centres in the UK. For instance, the study suggests that many UK researchers are participating in public engagement at low levels, and that a much smaller number are participating at higher levels, although, as we have mentioned, it is not straightforward to assess levels of participation in public engagement and communication. When considering the past ten years, it is striking that most researchers feel that levels of public engagement have increased, and more than half consider that the quality of public engagement has improved. It is also notable that most researchers appear to have very positive attitudes towards public engagement. Further, the data indicate that more than half of the respondents: wish to spend more time on public engagement in the future, feel

that their departmental peers are supportive of public engagement, feel that their own institutions encourage public engagement, and feel confident and well-equipped to conduct public engagement.

At the same time, our analysis of the survey data also raises a number of more challenging issues; of course, these provide stimulus for future strategies and we return to this later. These challenges fall within two key categories. The first relates to the ambiguous and uncertain relationships between the researchers who do public engagement, and the broader local and national institutional contexts within which they work. To sum up this challenge, there appears to be something of a lacuna or disconnect between researchers, and both the institutions within which they work and the national drivers of public engagement. It is perhaps this disconnect that explains Watermeyer's (2015) description of researchers as somehow 'lost' between their own commitments and those of institutions. The disconnect between researchers and institutions is manifest in a number of ways in the data. For instance, although – as mentioned above – well over half of researchers indicated that they feel that encouragement from their institution for public engagement has increased over the past ten years, the corresponding figure for practical support (such as training) is well under half (and a lack of support and training inevitably appears on the list of important constraints for researchers). In addition, the extent to which enablers perceive these latter changes is far greater than the researchers (although it is important to remember that these questions were answered by some enablers who have less than ten years' experience). Although it is important to be cautious about causation, our analysis highlights the importance of formal and – in particular – informal training in public engagement as a factor in generating participation, as well as positive attitudes towards public engagement and feelings of confidence. However, it appears that only one in five researchers have undertaken training in public engagement over the past five years, and almost half claim to have not been offered any training. The fact that the enablers report widespread offers of training provides further indications of a lacuna between researchers and institutions. This sense of a gap between researchers themselves and the broader institutional contexts for public engagement is perhaps deepened when we consider the widely differing views of researchers and enablers with respect to the prevalence or not of opportunities to do public engagement. As we have mentioned, previous research has highlighted the challenges experienced by researchers in finding time for public engagement, within the context of a profession in which the structures for reward and recognition are largely oriented around research and teaching. This issue is also prominent in the list of constraints that emerge from this study. A further constraint that emerges strongly from this study concerns the ways in which public engagement activities, including the staff time required to execute them, is funded (or not).

The second category of challenges relates to the identification of particular demographic groups among whom participation in public engagement is less prominent. Most significantly, this refers to researchers in the STEM disciplines, but also to junior researchers, and researchers on research-only contracts. With respect to gender, however, a different challenge is suggested by the data; here, it appears that confidence to do public engagement is lower than might be expected among female researchers and that this might be a constraint on greater participation.

Future strategies and broader questions

With these challenges in mind, our second aim in this Discussion is to comment on the implications of this research for future strategies to better support public engagement

by researchers, within the context of national ambitions to embed public engagement by researchers within UK research cultures. The findings that we have reported in this paper offer some pragmatic strategic pointers, and we address these first. At the same time, however, the outcomes of this research also pose some broader questions about the professional culture of research. Above all, perhaps, the research suggests that the relationships between public engagement and UK research cultures are complex and diverse. With this in mind, we would not want our comments here to be interpreted as silver bullets or panaceas (which would be far too simplistic), but would instead note that these are a set of comments or observations that can be made on the basis of the data at hand.

The study has highlighted a lacuna between researchers themselves, the enablers whose role is to support them and the broader institutional structures for public engagement; as Watermeyer (2015) has described it, researchers seem to be 'lost' in this space. This might point institutions and funders towards strategies based around trying to close or bridge this gap 'on the ground' within higher education and research institutions. It is significant that, notwithstanding this research, relatively little is known about enablers as a novel professional group. Therefore, efforts in this direction might first include further in-depth research among enablers – perhaps focusing on institutions that are anecdotally understood to have strong public engagement cultures – to better understand: the variety of institutional arrangements that exist between researchers and enablers, where their lines of accountability lie, the extent of support for public engagement in academic departments, the relationships between strong public engagement cultures and institutional arrangements, the kinds of informal training and support that are available, the variety of other services that might be available, the ways in which enablers communicate their services, the links between these factors and strong public engagement cultures and so on. Such research might then support a set of guiding principles or statements of best practice or indeed foster new approaches – with respect to institutional arrangements, training, communication and so on – that could be shared among the enabler community. The results also strongly suggest that informal forms of training – such as mentoring and peer support – are also associated with participation (and a range of other positive variables); this might suggest that enablers focus on these forms of training and learning.

As a pragmatic response, the findings relating to demographic attributes readily suggest that future public engagement strategies might usefully place greater emphasis – or, in the context of ongoing work in these areas, *even* greater emphasis – on the STEM disciplines, junior researchers and those on research-only contracts (though the STEM disciplines arguably already receive a significant proportion of funding in other ways).

At the same time, as we suggest above, the research also poses some broader questions for the sector. First, when the findings from this study are considered within the systems of funding and reward that prevail in UK research, they also pose fundamental questions relating to the place of public engagement in UK public research cultures. As has been discussed, a prominent finding in previous research on this topic has been that public engagement inevitably struggles to compete for time and attention within the context of a structure for funding and reward that overwhelming focuses on research, as well as teaching and administrative work (and clinical work where appropriate). This research appears to conform to this narrative to a considerable extent, with the obvious conclusion, as Wellcome Trust *et al*. (2015: 2) themselves put it, that '[m]ore needs to be done to … reward … researchers so as to embed public engagement as an integral part of a research career'. As we have said, higher education

institutions and research centres are increasingly urged to act according to commercial principles, and this suggests that rewards in terms of funding – including for staff time – are likely to be increasingly important in determining priorities and strategies. To put this another way, addressing structures for funding and reward appears central to placing public engagement firmly at the heart of researchers' and institutions' priorities, strategies and practices, such that training and participation in public engagement would become an instinctive choice, and public engagement support teams would be as familiar to researchers as research support teams. One approach to this challenge might be for funders to more consistently incorporate public engagement into their application processes for research funding, so that the costs associated with public engagement are included within research project budgets. As mentioned earlier, this model is used by Research Councils UK and by Wellcome Trust, but is not universal. Thus, the more fundamental – and challenging – questions for the UK higher education and research sector are perhaps these – across the UK research base: how much public engagement is considered enough; to what extent should and could the rewards for public engagement be increased; within this context, what would be an appropriate balance of funding and rewards between research, teaching and public engagement (as well as other matters); and what would the implications of such a change be for research and teaching (and other activities)?

The findings with respect to female researchers – that female researchers participate in public engagement to much the same extent as men, but feel far less confident of their capabilities – also pose broader questions. This is because they appear to be new manifestations of familiar challenges in society and academia. More specifically, they chime with research that shows that women are less confident than men in a range of professional contexts (Bertrand, 2011), including academia (Sarsons and Xu, 2015), and research that highlights ongoing gender inequalities in academia (Morley, 2015). With this in mind, while addressing this challenge may be beyond the gift of the public engagement agenda, efforts could certainly be made to make public engagement a more explicit part of the Athena SWAN Charter for advancing the careers of women in higher education and research.

Similarly, it is also plausible that the findings of relatively low levels of participation among researchers on research-only contracts should be understood within the context of broader concerns about the insecure and peripatetic career trajectories of such researchers (Fazackerley, 2013). Given that such researchers rarely have the luxury of a stable working life, it is not surprising that rates of participation in public engagement and communication are relatively low among this group. Within this context, making public engagement a more explicit part of the work that Vitae does supporting UK researchers who are in this situation would be very helpful.

Within the context of official ambitions to embed public engagement by researchers in UK research cultures, the objective of this paper has been to provide a snapshot of the terrain of UK public engagement in 2015, from the perspectives of researchers themselves. On the basis of our analysis of quantitative data, we have used the term 'a work in progress' to encapsulate the combination of signs that public engagement by researchers is part of the research landscape and subject to a number of constraints. Importantly, the current questionnaire and methodology provide a template for future studies – both in the UK and in other country contexts – that will provide a more meaningful understanding of change over time. The paper might also prompt greater discussion of ways in which the challenges associated with measuring participation in public engagement might be overcome. In our discussion, we have highlighted a number of quite prosaic strategic responses that might emerge from

this analysis, and we have also identified the issue of funding and reward for public engagement as a core issue that is likely to become increasingly important in the coming years. The authors of this paper look forward to contributions and critiques from others.

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