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Exploring the politics of science communication research: looking at science communication from a social justice perspective

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Abstract   What can we say about equity, diversity and inclusion in science communication research over the past 20 years? This is a thorny question because of course we want to be constructive, to recognise change and to respect those whose hard-won research on equity issues has meant so much to many of us. At the same time, it is impossible — given what we know through our research — not to take a critical stance. We critique the status quo of science communication research from a social justice perspective and reflect on how we might change, perhaps bringing what has been marginal (and indeed the marginalised) into the core of science communication research, practice and policy.

"Everyone thinks the door is open, but it's not really, and that's probably because the people in charge are quite comfortable and don't want criticism or to have to change".

Connie (a pseudonym), a participant from an Afro-Caribbean community group involved in a science communication research project with Emily in London, U.K.

What can we say about equity, diversity and inclusion in science communication research over the past 20 years? This is a thorny question because of course we want to be constructive, to recognise change and to respect those whose hard-won research on equity issues has meant so much to many of us.

Today, there *is* research about issues of in/exclusion, social justice, equity and equality, access, structural inequalities and discrimination (racism, sexism, class

discrimination, homophobia, transphobia, ableism, their intersections and more). This is, without doubt, a huge improvement. The more we know about the explicit and implicit politics of science communication, the more tools we will have to create field-wide transformation.

Furthermore, not all projects stop at the descriptive level. Many are collaborative, participatory and seek to share decision-making practices [Rising From The Depths Project, 2017; Chiaravalloti et al., 2022; Shirk et al., 2012]. Many take an active approach to centring equity, inclusion and social justice in their work [Archer et al., 2021; Ballard, Dixon & Harris, 2017; Prepster, 2020]. Many are oriented to action and change [Archer et al., 2022; Finlay & Wenitong, 2020; Hikuroa, Slade & Gravely, 2011].

At the same time, it is impossible — given what we know through our research — not to take a critical stance. As Connie — a participant from a London based, Afro-Caribbean community group involved in a science communication research project with Emily in the U.K. [Dawson, 2019] — put it in the quote above, work on inclusion appears at times like a veneer of social justice stretched thinly over business as usual. What do we mean by this?

Science communication research has been characterised as divisible into "margins" and "the mainstream" [Finlay et al., 2021, p. 1]. Perhaps unsurprisingly, research about queer science communication, anti-racism, the impacts of white settler and extractive colonialism (and more) on science communication, lives in those margins. Meanwhile, as we discuss briefly below, mainstream research on science communication seems little changed over the past 20 years.

Examining science communication from a social justice perspective necessarily calls into question the whole field of science communication research, its motivations, and relationships to policy and practice [Canfield et al., 2020; Dawson, 2018, 2019; Humm, Schrögel & Leßmöllmann, 2020; Rasekoala, 2019; Rasekoala & Orthia, 2020]. We argue that if science communication is worth doing and researching (and we believe it is), then it is worth doing well. And part of that quality judgement *must* be about social justice. What is the point of exclusive, unjust science communication busily reproducing advantages for those groups already most advantaged in our societies, while disadvantaging everyone else?

Understanding science communication research and practice in what will always be complex and shifting politics is not necessarily easy, but it is important if our work is to be meaningful and engage with social justice. What are the various, often contradictory and powerful politics embedded in science communication and in any science communication research moment? Science, research and communication are dirty words to many people, to paraphrase Linda Tuhiwai [Smith, 2012] and her work on decolonising research and indigenous knowledge systems. At the same time, science and its communication are seen as tools in support of alleviating poverty and illness [see for example Parthasarathy, 2019; Sesan, Raman, Clifford & Forbes, 2013]. These specific science and society relationships are, of course, neither always in opposition, nor the only options.

We argue that science communication research (and practice) grounded in the ever-shifting and context dependent landscape of social justice, in the everyday,

and in contemporary geopolitics offers valuable opportunities to open up scientific knowledges, practices, communities and applications in ways that can transform social inequalities.

In what follows we briefly set out some critiques of the status quo of science communication research from a social justice perspective and reflect on how we might change, perhaps bringing what has been marginal (and indeed the marginalised) into the core of science communication research, practice and policy.

The implicit politics of mainstream science communication

Decades of research in science and technology studies shows science is neither neutral nor divorced from socio-cultural and political histories [see for example Cipolla, Gupta, Rubin & Willey, 2017; Hamraie, 2018; Haraway, 1988; Epstein, 1996; Mascarenhas, 2018; Nelson, 2016; TallBear, 2013]. For instance, research on WhatsApp in Chile and India details how science and technology are enmeshed in local, national and international politics with particular consequences for marginalised social groups [Valenzuela, Bachmann & Bargsted, 2021; Williams et al., 2021].

Research on the racialisation of technology within the U.S. shows how algorithms, search engines and the tech industry are enmeshed within and recreate anti-Black racism and racist outcomes [Benjamin, 2019; Daniels, 2015; Safiya Umoja, 2018]. Likewise, research in crip studies has highlighted how ablism, science and technology work together, alongside other structural inequalities, to create unjust outcomes for disabled people [Fritsch, Hamraie, Mills & Serlin, 2019; Slater & Liddiard, 2018; Tremain, 2017]. As you might imagine, these examples are the tip of an iceberg where historic and contemporary examples of the co-construction of science and society (and their politics) abound.

We argue that, like science and technology, science communication and science communication research are embedded within specific socio-cultural and political histories, emerging as so much of it did, from within these same cultural practices. And, as a result, science communication and science communication research share similar problems with science and technology, not least politics that are often implicit and narrow epistemological frameworks that are problematic from a social justice perspective.

Think, for instance, of how differently people experience and relate to science and science communication at local, national and international scales, with their differing contexts and geopolitics. How do ideas shift, change (or not) depending on where they are and who is involved? What can we learn from Hester du Plessis' [2017] study of the politics of science communication research in South Africa? What can Lindy Orthia [2020] teach us in her exploration of how incorporating the knowledge and practices of the Indigenous Australian Yorta Yorta Nation expands our understanding of science communication?

1.1 The view from the U.K.

Although our personal and professional ties spread beyond this particular small and damp island, we write together from the U.K. and use it as an example of how the politics of mainstream science communication might be contextualised.

Like all countries, science communication research and practice in the U.K. have a specific socio-cultural, political history — a history that stretches back before the language of "science communication" was widely used. This history accounts for the particular (narrow, instrumentalist, scientistic and managerialist) ways that science and society relationships were operationalised in the U.K. over the last 20 years.

Scientific research and its applications have long been seen as tied to the growth of the British economy. From nineteenth century botanical research that made white settler colonialism feasible for the British in India, and developments in the material science of glass that made possible significant tax reforms in favour of the British state, science has a long history of literal and rhetorical links to the British economy [Brockway, 2002; Bulstrode, 2018]. It was these links British Prime Minister, Harold Wilson, referred to in his 1963 speech about the dazzling potential of the "white heat" of the scientific revolution for the wealth and well-being of British people [Fielding, 2013]. But in Britain, as elsewhere, the 1960s also saw a shift in how science was publicly framed; it was both lauded, as in Wilson's speech, and increasingly represented a source of anxiety [Agar, 2012; Gregory & Miller, 1998].

By the 1980s, public attitudes towards science and the scientific community in Britain were perceived by people active in the science lobby as a cause for concern [Fjaestad, 2007]. [1] The perceived shift in public attitudes towards science was troubling for the British scientific community and allied politicians because it destabilized the social contract underlying scientific research — that science would be the engine of the British economy and in return be publicly funded. This relationship had been made explicit in Margaret Thatcher's managerialist government policies that tied all public funding to public support[2] in the 1980s [Tlili & Dawson, 2010].

In directly tying public funding to public support, Thatcher's conservative government gave the already anxious science lobby cause to see that public funding for science hinged on protecting and ideally increasing public appreciation for science [Tlili & Dawson, 2010; Lock, 2011]. Consequently, these concerns were taken up as political concerns, which set up a specific constellation of 'problems' with matching 'solutions'.

The answers to this 'problem' for British science in the 1980s centred on more communication and information provision about science by scientists [Royal Society of London, 1985]. And by 2000, in the face of changing political headwinds, public scientific controversies and sustained critique by STS scholars, the 'answers' centred instead on increased dialogue, debate, and discussion *with* publics [House of Lords Select Committee on Science and Technology, 2000; Gregory & Lock, 2008]. Although the terminology had shifted, as we argue below, little else had changed in the underlying 'problem'/'solution' framing of science communication in the U.K.

The House of Lords [2000] 'science & society' report was touted as a watershed for the much-critiqued deficit model to be replaced, according to the report, with

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[1]Whether the attitudes of people in Britain were becoming more negative towards science is debatable, was much researched and remains a key rhetorical point in arguments about the need for science communication today [see for example Irwin & Wynne, 1996].

[2]In essence, Thatcher's government explicitly positioned British taxpayers as hybrid customer/stakeholders who needed value for money on their public investments.

practices rooted in participatory democracy [Stilgoe, Lock & Wilsdon, 2014; Smallman, Lock & Miller, 2020]. Yet, 22 years after that report, mainstream or dominant science communication in the U.K. remains largely a set of narrowly-defined, instrumental practices and policies for massaging public support for science, and a political commitment to preventing publics getting in the way of innovation and innovations' imagined impact — economic growth [Thorpe & Gregory, 2010].

Where we have seen growth in participatory practices, these are, in general, heavily framed by the social, cultural and political imaginaries of scientists and politicians, with little scope to question or critique of these processes [Wynne, 2006]. For instance, the majority of publicly funded public engagement (through ScienceWise, the U.K. government's deliberative dialogue programme or related programmes) asks invited publics to contribute to questions and issues preframed by government science, technology and innovation priorities [Burchell, 2007; Smallman, 2020].

Mainstream science communication in the U.K. is therefore still constrained by a narrow epistemological focus, rooted in its particular socio-political history, that continues to reverberate in contemporary research, with problems for equity and social justice, as we discuss next.

The implicit politics of science communication research: two problems of a narrow epistemological focus

In discussing the U.K. as a case study, we have argued that science communication is tightly linked to politics. We build on that in this section to argue that the same is true for science communication research, and, for us, that making the politics of science communication research more explicit is important from a social justice perspective. Although a longer list of problems exists, here we concentrate first on the difficulties posed by the conceptualisation of science and society relationships and second, on the emphasis in research on the Global North.

Science and society relationships have typically been formulated as science 'versus' society in science communication research [Burns & Medvecky, 2018; Medvecky & Leach, 2017]. This divide reinforces the 'scientistic' notion that science is somehow divorced from its socio-cultural, political and historic contexts. As a result, science and society relationships are narrowly instrumentalised through activities that seek to mediate between science on one side and society on the other. Not only is the epistemic asymmetry of such framing evident (scientific knowledge counts most) but it also creates significant epistemic violence (other knowledges, feelings, practices and people do not count) [Dotson, 2014; Vidal, 2018].

Over the last 20 years researchers have restricted their epistemological concerns to those dominant practices, institutions and groups already involved in highly visible, often government supported, mainstream forms of science communication that mediate between science and society (i.e., dominant practices and dominant publics count most). As a result, we know a huge amount about the practices of socio-scientific policy consultations, of newspaper coverage of particular scientific issues, scientists' views about communication, and the activities of visitors to elite 'public' science institutions.

Research therefore reifies the attitudes, experiences and practices of these dominant social groups. While these studies are interesting, the research focus on mainstream

formulations of science communication works to the detriment of our understanding of other forms of engagement with science, including engagement that flies below the radar of the dominant, visible and explicitly valued formats, publics and topics. The narrow epistemological concerns of mainstream science communication research too often render practices and people that fall outside its remit irrelevant and/or invisible.

At the same time, scholars of science communication have tended to limit their epistemological remit to the industrialised regions of the global North, with other countries pulled only rarely into view [Finlay et al., 2021; Orthia, 2020; Rasekoala & Orthia, 2020]. What we did not include in the U.K. case study above, was how many of the ideas about science communication cooked up in Britain over the last 20 years went on to travel further afield.

After 20 years of work in science communication in the U.K., it seems wildly unlikely to us that theoretical models dreamed up on this small, wet island apply without significant reformulation to other countries or parts of the world. Not least because, as our research has shown, these ideas do not apply to science and society relationships *in* the U.K. when you change focus away from dominant publics, practices, institutions and knowledges [Dawson, 2019].

What new theories and practices might come into view if the Global South were centred in science communication theories and research in ways that did not reproduce the politics of colonialism? What might we share and learn working in mutually supportive, non-extractive ways with publics and practitioners outside the Global North?

Drawing on the two problems outlined above, we argue that the narrow epistemic parameters of mainstream science communication research constrain work (research, practice, and policy) on social justice and equity. For us, it is therefore crucial to recognise that science communication research, like science and science communication practice, is not an ethereal, detached or somehow apolitical process, but rather *is* part of our societies and *has* politics. These politics can be implicit or explicit and, we argue, it is easier to navigate and contend with such politics when they *are* made explicit. To do this we have to recognise and reckon with the social and historic conditions in which we carry out science communication research. And, if we hope to move away from reproducing the patterns of the past, we need to engage with imagining science communication research differently.

Broadening the socio-historic imaginary of science communication

Broadening the socio-historic imaginary of science communication and related research requires us to challenge and change how we understand science and society relationships, as well as pulling politics more clearly into view. How might we reimagine science communication in ways that are meaningfully inclusive, mutually respectful and make space for more people, more stories, more theories and practices? What kinds of research do we need if we are to de-construct and re-construct those spaces, behaviours and assumptions that shape science communication? What research does meaningfully inclusive science communication require from us?

There are, of course, multiple ways we can disrupt and reimagine mainstream science communication and related research from a social justice perspective, and below we explore just two: valuing other forms of knowledge and valuing feelings.

3.1 Valuing other ways of knowing and seeing

The impetus for inclusivity and equity can sometimes elide the understanding that it is underpinned by a knowledge and a skillset. The COVID-19 pandemic has illustrated that when we are delivering science communication, we must meet our audiences where they are. Respect for multiple gazes means developing the skills and capacity to communicate in ways that are meaningful for various audiences. One way to do this is to generate information that is translatable or can be considered 'engaged universals' that can be appropriated and comprehended in a plurality of contexts [Tsing, 2005]. At other times messages need to be made particular, which is a perspective that disrupts views of science as universal. Science communication researchers need to not only shift our perspective from the deficit model that assumes ignorance on the part of the audience, but also come to grips with the idea that, in order to be effective, we have our *own* learning curves to surmount.

Culture is always the conduit and frame for science communication. This idea is not controversial when operating in the dominant culture. Marginalised group members often develop a double consciousness that allows them to interact with scientific information and make it legible for them. What if such assimilation were simply unnecessary?

Given the foundational and epistemic assumptions built into mainstream science communication, embracing the perspectives and experiences of marginalised groups may not be straightforward, but it can be done, as projects from the Rising from the Deep fund demonstrate. Through collaborative partnerships, coastal communities in Kenya consolidated traditional ocean stewardship systems, rooted in oral community practices, in order to reduce conflict and support the rights of local people [Rising From The Depths Project, 2017]. This science communication research integrated the spiritual and marine cultural heritage of various coastal communities into communication about sustainable development. It is an example of what can happen when science communication research and activity takes peoples' practices and knowledge seriously and attempts to resolve the deficits of normative science communication.

Such research risks characterising Indigenous/'local' communities as groups who have maintained their connection to pre-colonial lifeways. But it is important to remember that many Global South communities have experienced heritage loss from colonial conquest, modernisation and science communication programmes (not least health and education campaigns). Rather than perpetuating further erasure, reviving connections to lost cultural heritage through our approaches to communication can make these engagements restorative [M. I. J. Davies & M'Mbogori, 2013]. This requires integrating retrieved knowledge with what scientific knowing can offer, today. All these strategies represent a process of collaborating with our audiences to develop understandings of how best to reach them, and caring about what they care about and even 'feeling' as they do.

3.2 Thinking about feelings: valuing messiness

What can greater attention to affect and emotion bring to conversations about science communication and social justice? We need a sophisticated account of the embodied dimensions of science communication. Building on a small but growing body of research, we suggest this embodied approach would reveal and dismantle the structural inequalities in accounts that foreground science as a largely cognitive, discursive and disembodied enterprise [see for instance Smolka, Fisher & Hausstein, 2021; Lindén, 2020; Steinert & Roeser, 2020; Wray, 2018; S. R. Davies, 2015, 2014]. In foregrounding the diverse, intersected and uneven affective experiences involved in communicating science, we have access to different political registers of meaning and engagement, including urgency, suffering, anger, love, empathy, care, and solidarity, with which we can reimagine and rebuild new science and society relationships [Táíwò, 2022].

Margaret Wetherell helpfully defines affect as practices of "embodied meaning-making" [2012, p. 4]. We believe that acknowledging the politics of embodiment in the communication of science is critical - many of the questions about who science should serve are also questions about whose bodies are on the line. We need only think about how the production of knowledge about trans bodies, disabled bodies, and the bodies of Indigenous peoples and people of colour is consistently used to grant or remove their rights. Caring for bodies and supporting them to flourish and thrive in their interconnected difference provides opportunities for radical new modes of technosocial engagement [Puig de la Bellacasa, 2011; Tronto, 1998].

Relationships are at the heart of science communication, and relationships are complex, messy, and emotional affairs. To ignore the affective dimension in favour of the cognitive in these relationships (as is typically the case) is to miss a crucial aspect of science and society relationships. Take trust, for example. This is a topic of great interest amongst science communication practitioners and researchers, most recently discussed in relation to vaccine hesitancy [Goldenberg, 2021], misinformation [Xiao, Borah & Su, 2021], and historical and ongoing scientific injustice [Bajaj & Stanford, 2021]. So often, trust is unproblematically assumed to be an objective and measurable quality that can be increased or decreased in a given group or community, as well as something key to 'selling' science. From a social justice perspective, what this approach misses are the powerful affective dynamics involved in trust relationships - fears of vulnerability and dependency, anger at histories of gendered, sexist, ableist, classed, and racist discrimination and injustice, or feelings of love and belonging that underpin trust and faith in certain groups.

In conclusion

We have argued for taking a social justice lens to science communication research to better explore, but also challenge the political, cultural and social framings that continue to dominate our field. In particular, we argued that recognising and making explicit the politics of science communication research, as well as science communication practice, is a crucial move to make.

Drawing on the arguments made above and the work of Black feminist epistemologists, including Patricia Hill Collins and Kristie Dotson, we suggest one way to think about science communication and social justice is in the form of a

both/and problem [Dotson, 2015; Hill Collins, 2000]. That is, drawing on Black feminist epistemology, we argue that rather than falling into binary thinking (we *either* change dominant practices *or* burn it all down) it would be more useful to think in about science communication research from a social justice perspective in terms of *both* these forms of change *and* more.

In other words, that we need research that helps us: 1) to change established and dominant mainstream science communication: 2) reimagine, recognise and develop alternative forms of science communication. *And* we also need to keep pursuing *more* avenues for change — those that we have yet to imagine. Working towards inclusive science communication will require research that helps us to reimagine science and society relationships to be as open-ended, multiple and shifting in nature as social justice issues.

There is a world of science communication activity that goes under the research radar because the people, practices, venues, content, geopolitical context, or something else about it is not considered worthy of our attention [Finlay et al., 2021]. Rather than conceptualising science communication as an invention of particular peoples in the industrialised Global North, we could instead understand science communication as the science mediating practices of people everywhere. If we accept this contention, then we can challenge and change the narrow political and epistemological frameworks embedded in mainstream science communication research and practice, that inform what, and who, counts.

We can reframe science communication in ways that make visible a broader range of communities, knowledges, feelings and practices. Arguably, they are already there anyway, we have simply failed to recognise or value them.

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