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The Future of Science Communication must be Inclusive

I am often asked what I think the future of science communication will be. I always answer the same way. The future of science communication must be inclusive. Inclusion, equity and social justice are all complex, multifaceted and, as a result, contested political terms. These words can mean different things, to different people, in difference spaces, just like science. Common to most social justice perspectives is a recognition that inclusion efforts are about recognising, ameliorating and transforming the impacts of the structural inequalities that shape our societies, such as, but not limited to racism, sexism, class discrimination, ableism, homophobia, transphobia, ageism and their intersections. And to recognise all this in science communication requires change.

The necessarily inclusive science communication of our future transforms what we mean by science and what we mean by communication. Assimilation is no longer the price paid for inclusion. Inclusive science communication understands the complexity of socio-political and cultural histories of power, of structural inequalities and whose forms of knowledge, whose practices, whose communities have and have not been valued and seeks to transform these patterns. It reframes everyone (not just dominant groups) as asset-rich. It makes space for agency. It supports people to be themselves *and* engage with science. It recognises and meets people's needs in ways that mean they do not have to change who they are in order to engage with science. Its politics are explicit, not hidden, and they focus on inclusion, equity and social justice.

I believe the future of science communication is being hatched amongst groups of young girls co-creating software to support their fan-fiction practices around the latest pop star (Judd, 2017). That it is being built in social housing neighbourhoods where communities run their own grass-roots citizen science projects to collect data & lobby for change (Knowle West Media Centre, 2015). That it is dragged into being amongst activists campaigning for better maternal health outcomes for women from racialised minorities and those who

fought to get PrEP trials underway in national health services (Suarez, 2020; Weil & Ledin, 2019) . It happens in ordinary spaces online where people discuss the pandemic (Pulido Rodríguez et al., 2020). It happens in community-based youth groups where young people mix playing minecraft with learning animation skills (Godec, Archer, & Dawson, 2021). In other words, that the future of science communication is already happening. Perhaps most importantly, that future is inclusive. And if dominant, mainstream science communication practices are to stay relevant and useful - whether in the mass media, museums, university research outreach or elsewhere - they too must change.

I have yet to meet any science communicators driven by a desire to reproduce social inequalities, but research shows that is what many science communication practices risk doing (Bell, Lewenstein, Shouse, & Feder, 2009; Canfield et al., 2020; Dawson, 2019) . As a field it is crucial therefore that we rethink the underlying ideas that frame both science communication and the concept of inclusion, in order to develop meaningfully equitable and socially just practices. Not all motivations behind science communication are informed by social justice perspectives - but they *could be* usefully reimagined with inclusion, equity and justice at their core. The more we can learn together and reflect, the better positioned we will be to transform the field and, clearly, there is a lot to learn. In what follows I briefly outline some key concerns, with the hope that we might then be better able to radically reimagine alternatives that support meaningfully inclusive science communication.

Science, though everywhere, is not accessible for everyone

The pandemic has shown us all the urgent need for inclusive science communication. At the local, national and international levels relationships between science and society have never seemed so crucial. From the mass media, to government policies, to conversations with neighbours, all our lives have been explicitly saturated with science in ways that most of us have likely not experienced before. At the same time, the pandemic has shone a light on the structural inequalities that fracture our societies, making the realities of the health, economic and political inequalities that divide our world impossible to ignore, even for those have obscured or denied them. In the UK, for instance, where I live, data show that COVID morbidity and mortality are marked by 'race'/ethnicity, social class and gender, in ways that mirror exactly the pattern of who is excluded from science communication, engagement & education initiatives (White & Nafilyan, 2020). The COVID-19 pandemic then has demonstrated inescapably that science, though everywhere, is not accessible for everyone.

Whether you like it or not, science plays important roles in our societies. As the pandemic has repeatedly shown us, being able to access scientific information, to ask questions, to enjoy science, to laugh at science, to speak back to science, to use it and to contribute to it are powerful practices in our societies. Beyond the immediate, urgent call for inclusive science communication required by the pandemic, even more is at stake. The

social, cultural, educational and political practices involved in science and society relationships are part of the many spaces where we learn to understand and navigate our selves in relation to others. In these sorts of spaces meanings are made, contested, reproduced and/or disrupted. And we make meanings about more than just science when we engage with the many different kinds of practices that make science 'public'. We make meanings about whose knowledge counts, whose practices count and, ultimately, *who* counts in our societies.

The politics of exclusive science communication

Science communication is political. Drawing on decades of research in science and technology studies we know science and society are mutually constituted (Jasanoff & Kim, 2015; Latour, 1987). From this perspective we can see how intermediary practices like those involved in science communication inevitably have their own political investments (Lewenstein, 2015; Orr & Baram-Tsabari, 2018; Rasekoala, 2019).

Science communication is not an inclusive field, whether you think in terms of practitioners or publics. If we look at the available data about audiences, visitors, participants or other involved publics, in the UK science communication remains a set of resources and activities for privileged groups (Dawson, 2019; Ipsos MORI, 2011, 2014; Kantar, 2019). When we turn to look at the available data on publics in Spain, the picture is unsurprisingly similar. If you live in town, are rich and hold higher educational qualifications, you are much more likely to take part in science communication activities, whether in museums, festivals, attending science talks or similar activities (FECYT The Spanish Foundation for Science and Technology, 2021).

We can see in these data that science communication operates as an exclusive field. That the exclusion operates at multiple levels, is a core part of the field across different kinds of activities and is experienced extremely painfully by those at the sharp end of exclusive practices (Dawson, 2019). That these patterns remain, despite inclusion, equity, social justice being increasingly discussed may seem like a paradox. But, as I discuss below, this paradox is a core feature of the politics of mainstream science communication.

Making the politics of science communication explicit is crucial if we want to understand what happens in the field and how we might disrupt and transform it. At work within science communication are a number of what sociologist Yasmeen Narayan (2019, 2021) has called "common sense" political ideas or frameworks. These kinds of ideas are so frequently and widely used that they become assumptions, shaping what is accepted, expected and so on. In our case, these ideas include 'the public', 'science' and 'inclusion'. These common-sense political ideas organise and frame how we think and act within science communication, not least the name 'science communication' which itself implies so much. But while commonly used, such ideas demand careful reflection.

You can see the politics of science communication at play if you interrogate how exclusion and inclusion are framed within science communication. Exclusion, as I argue below, is framed as a form of double deficit and the responsibility of the excluded (Dawson, 2019). Inclusion, meanwhile, is framed as a glorious crusade (Ibid). Crucially, these two common-sense political frames operate to limit rather than support change in science communication. Interrogating these ideas helps us to understand the kinds of values that circulate within the politics of science communication and reimagine what is needed to develop a politics of inclusion.

Exclusion as a Double deficit & Inclusion as a Crusade

Not taking part in science communication activities (whether at a museum, in a park, an after-school club, or watching a nature documentary in your own home), is often framed as a choice people make. This choice *not* to take part, is understood quite judgementally as a mistake. The mistake is understood as the result of people first, having the wrong attitudes - in science communication, this is framed as the mistake of disliking science in its various iterations and applications. This dislike or sense of alienation is often framed as the result of ignorance, of not knowing better (Dawson, 2019). In science communication we often talk of this idea as the deficit model, but despite this idea being critiqued for a long time, it persists with remarkable tenacity (Sturgis & Allum, 2004). It seems to me that one reason for the continued role of deficit models comes from the implicit politics of the field. The idea of deficits does a lot of work for maintaining the status quo and concomitant structural inequalities.

The mistake (of not getting involved in science communication) is understood secondly, as the result of people having the wrong behaviours. They don't do the 'right' things, and what is typically meant here is that people don not always line up to take part in dominant cultural or political practices. Again, if they only knew how amazing a visit to a planetarium could be, surely they would change their minds! This is the second form of deficiency conjured up when we look at how exclusion is framed in science communication.

The key take home here is that these attitudinal and behavioural deficits double up. Crucially, they position the responsibility for participation, or 'fault' onto excluded people and their communities. This is a deft slight of hand. It removes responsibility from institutions, from practitioners, from researchers, from policy makers, from funders and places it firmly on the shoulders of people who are often most oppressed by structural inequalities and, in many ways, least able to change the status quo.

The next key common sense political frame is embedded in how inclusion is framed in science communication. It is the idea of the crusade. This concept has its roots in the idea of the double deficit. It is premised upon the belief that first, dominant forms of science communication are the ones that matter most (everything else is invisible or irrelevant). And second, that dominant forms of scientific knowledge matter most. In this

set of assumptions science is seen almost as a vitamin, as “especially good for you” as Joan Solomon put it (2012, p. xiii). And being involved in dominant forms of science communication practice operate then as, what Jim McGuigan has called, a form of “moral regulation” (1996, p. 16).

Framing exclusion as the result of deficiencies on the part of the excluded and inclusion as a righteous crusade on the part of those who are included, prevents change and creates damaging practices. As Sara Ahmed (2012) has argued, so-called inclusion practices too frequently work to protect established interests and the status quo. Similarly as the research I have been involved with has shown, andas Gargi Bhattacharya (2018) has argued, work on inclusion risks becoming more about opening up new-markets, than about meaningfully working alongside minoritised and excluded groups. For instance, too often, tokenistic attempts to transform representational politics – for instance a temporary ‘special’ exhibition co-curated with a specific community group that does little to change the broader institution or exhibition practices - can all too easily become exercises in racial capitalism, benefitting institutions rather than the communities they claim to support (Leong, 2013).

The idea of the double deficit and the idea of the crusade work together to build a platform from which non-participation in science communication is almost unthinkable and can only be understood in this framework of common-sense political ideas as a mistake. The politics of these ideas are pernicious. Clearly everyone is involved in cultural, social, education and political practices. Furthermore, everybody is in a ‘science and society relationship’, whether it is good or bad, fascinating or irrelevant or somewhere in between, whether science is happening at, to, for, by, with or without them. And clearly framing certain groups as deficient and in need of saving for their own good is power play. These political frameworks make little to no room to understand, acknowledge or begin to disrupt and ameliorate the harm caused to particular people and communities by the structural inequalities that shape science communication and that, in turn, science communication reproduces (Dawson, 2019).

Of particular note for those interested in the politics of science communication is how these common-sense political frameworks create a situation where inclusion is talked about, inclusion projects happen, but very little actually changes. These politics do not go unnoticed by the people they work to exclude. Connie,[1] an Afro-Caribbean woman in her early 60s, worked with me a few years ago in a project involving several adult community groups in London. Her take on how inclusion in science communication operates was apt: “Everyone thinks the door is open, but it’s not really, and that’s probably because the people in charge are quite comfortable & don’t want criticism or to have to change” (Dawson, 2018, p. 783). This quote speaks directly to the politics of science communication. The common-sense political frameworks that frame exclusion as a double deficit and inclusion as a crusade structure whose practices and knowledges are framed as dominant,

and whose disappear. In other words, who counts and who does not count. They are hegemonic concepts and practices. They are in that sense, deeply political. Crucially, these ideas about inclusion and science communication limit our capacity for change. Built as they are on assumptions and structural inequalities that are in many ways baked into practice and theory, these common-sense political frameworks cannot challenge or seek to transform these inequalities, but rather reproduce them.

Mainstream science communication & the politics of cultural orthodoxy

Science communication is typically associated with a field of activities created for and by dominant groups in our societies. In the UK for instance, where I am from, science communication is measured in national studies by looking at the numbers of people who visit museums, science centres and planetaria, zoos, aquaria and botanic gardens, who attend science festivals, evening talks about science or similar events (Ipsos MORI, 2014; Kantar, 2019). Of course, what is measured is what is understood and thought to be important by the research community, policy makers and practitioners (Dawson, 2019; Gillborn, Warmington, & Demack, 2018; Savage, 2010). And in turn, what is recognised as important is what is measured. This kind of closed loop system tells us a lot about the history of science communication practice, policy and research. Specifically, it tells us a lot about which spaces, content, behaviours and people matter and which do not.

The frameworks of common sense political ideas that have been invoked in attempts at inclusive science communication operate within an "orthodoxy of approach" that is discernible in science communication practice and research (Miles & Gibson, 2016, p. 16). That is, dominant institutions and practices, often supported by government — such as museums, universities, local or national government consultations — represent the most visible, 'high-brow', socially, culturally and politically valuable forms of science communication (Dawson, 2018, 2019). This orthodoxy of approach, where dominant science communication practices are the most recognised, valued and rewarded also works to obscure alternative activities – such as fan-fiction or community citizen science – that could be considered forms of science communication, as well as the kinds of knowledges and behaviours of those involved in less dominant forms of science communication. Thus 'low-brow', 'popular', 'everyday' or 'ordinary' forms of science communication are less valued in the socio-cultural and political hierarchies of mainstream science communication.

If we look closer, we find dominant science communication institutions and practices rehearse the same kinds of scientific content, through remarkably similar representational and communicative techniques, working with the same kinds of dominant social groups (as trustees, employees and audiences/users) in a kind of institutional homology (Powell & DiMaggio, 1991). These then are the features of hegemonic science communication, or, to put it another way, what we might call mainstream science communication (Finlay et al., 2021). These dominant science communication practices are

exclusive in the Bourdieusian sense; their value to dominant groups is premised on inaccessibility (Bennett et al., 2009; Bourdieu & Johnson, 1993; Bourdieu & Passeron, 1990; Warner, 2005). Mainstream science communication revolves around narrow views of which kinds of knowledge, which practices and which people matter most, reflecting and reproducing structural inequalities as a result (Ballo, Das, Dawson, Mignan, & Perronet, 2021; Dawson, 2019; Finlay et al., 2021). Thus, as argued above, exclusion is no sad accident or a by-product of a few mistakes. It is a core feature of the politics of mainstream science communication (Bourdieu & Johnson, 1993; Dawson, 2019).

There is power in how inclusion in science communication is framed. And without sustained effort to disrupt and transform the politics of mainstream science communication, that power will work to maintain the status quo.

How can we understand inclusive science communication?

How might we usefully understand what inclusive science communication involves? This question calls upon us to try to make sense not only of the disparate practices that make up science communication, but at the same time, to try to understand what inclusion, equity and social justice entail. But if we understand science communication as a socio-cultural, politically situated activity, this complex task is clearly necessary.

The ideas and languages of inclusion are used across different practices, fields of activity and countries. Unsurprisingly, their meanings and enactments change accordingly. The main features of inclusion — whether in science communication or other fields of practice — acknowledge how structural inequalities affect all our lives, not least how some people's actions are respected and valued (or not). Ideas about social justice, equality, equity and inclusion are political. As such, how these ideas are used, enacted and understood are often contested. Issues of social justice are inevitably multifaceted, constantly shifting and context dependent. What constitutes a meaningfully inclusive experience for one group might change from one week to the next, from topic to topic, from one space to the next, from country to country, and from the local, to national, to international levels. As a result asking exactly what makes something inclusive is inevitably a specific and contextual question, one that is always framed by shifting power geometries over space and time (Hill Collins & Bilge, 2016; Massey, 1994).

Decades of research in science and technology studies had shown how science (understood broadly as scientific knowledges, communicates, practices and applications) is socio-culturally, politically and historically situated (Jasanoff & Kim, 2015; Latour, 1987; Longino, 1990) . What this means in the context of inclusive science communication, is that science, just like social justice, is political and cannot easily be divorced from context. And, that science too sits within a constantly changing landscape, with different emphases across time, space and power geometries (Hikuroa, Slade, & Gravley, 2011; Longino, 1990; Medin & Bang, 2014; Orthia, 2020; Rasekoala, 2019) .

If we pull these pieces of the puzzle together, it helps us think through what inclusive science communication requires from us. A commitment to understand the nuances, contexts and socio-cultural political histories of science communication such that they can be reimagined in more equitable ways. A commitment to learning from one another in ways that are neither extractive nor seek to impose particular theories and practices imperialistically. Perhaps most importantly, a commitment to centring equity, inclusion and social justice since it is clear that not doing so does not lead to any form of neutrality, but rather perpetuates inequalities. From this perspective, with socio-cultural politics and values explicitly foregrounded in science communication rather than obscured, we can see that inclusive science communication likely follows no set recipe. Rather multiple formulations, concepts and practices are likely to emerge, each appropriate to their own shifting landscape of socio-cultural politics and histories. As such, every case study, every data set, every concept and every national study helps us to better understand what inclusive science communication, in all its beautiful, contextual complexity, requires of us.

[1] "Connie" is a pseudonym

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