Online science communication and the importance of empathy

December 12 2016, by Nicole Miller-Struttmann

Science communication remains as challenging as it is necessary in the era of big data. Scientists are encouraged to reach out to non-experts through social media, collaborations with citizen scientists, and non-technical abstracts. As a science enthusiast (and extrovert), I truly enjoy making these connections and having conversations that span expertise, interests and geographic barriers. However, recent divisive and impassioned responses to the surprising election results in the U.S. made me question how effective these approaches are for connecting with the

public.

Are we all just stuck in our own echo chambers, ignoring those that disagree with us?

How do we break out of these silos to reach those that disengage from science or stop listening when we focus on evidence? Particularly evidence that is increasingly large in volume and in scale? Recent research suggests that a few key approaches might help: (1) managing our social media use with purpose, (2) tailoring outreach efforts to a distinct public, and (3) empathizing with our audience(s) in a deep, meaningful way.

Social Media

Many of us attempt to broaden our impact by sharing interesting studies with friends, family, colleagues, and the broader public on social media. While the potential to interact directly with non-experts through social media is immense, confirmation bias (the tendency to interpret and share information that supports one's existing beliefs) provides a significant barrier to reaching non-traditional and contrarian publics. Insights from network analyses suggest that these barriers can be overcome by managing our connections and crafting our messages carefully. We might think that those individuals that have the most links are the most effective communicators. However, individuals that reach across different types of groups (aka connectors) are better at transferring information than individuals who merely have many connections. These results suggest that modest yet true outreach efforts spread ideas to previously isolated communities.

The key to creating connections outside of our silos, according to Williams et al. (2015), is fostering respectful interactions with those that do not share our views.

Networks (creative commons license)

Twitter discussions on climate change exhibited confirmation bias but also depolarization through open forums. Negativity polarized the debate, but respectful discourse among those with differing attitudes depolarized the debate, leading to more substantive discussions.

Citizen Science and Crowd Sourcing

Technology has revolutionized how the public engages in science, particularly data acquisition, interpretation and dissemination. The potential benefits of citizen science and crowd sourcing projects are

immense, but there are significant challenges as well. Paramount among them is the reliance on "near-experts" and amateur scientists. Domroese and Johnson (2016) suggest that understanding what motivates citizen scientists to get involved – not what we think motivates them – is the first step to deepening their involvement and attracting diverse participants. In their study of the Great Pollinator Project, they found that many participants wanted to learn more about the study organism (bees) and to contribute to the scientific process. They were less concerned with helping the environment, as had been presumed. In response, the authors suggest aligning the project goals with those of the citizen participants, both while designing and implementing the project. However, as Domroese and Johnson point out, the diversity of the participants in this project was very low. The vast majority of participants were white (89%), female (76%), over the age of 50 (64%), and highly educated (>75% had college degree or higher). This pattern is surprising given the location of the project: New York City (arguably one of the most diverse cities in the world), which begs the question: How do we effectively encourage diverse citizen populations to participate in science?

Design Thinking

Design Thinking may provide a framework for reaching diverse and under-represented publics. While similar to scientific thinking in several ways, design thinking includes a crucial step that scientific thinking does not: empathizing with your audience.

It requires that the designer put themselves in the shoes of their audience, understand what motivates them (as Domroese and Johnson suggest), consider how they will interact with and perceive the 'product', and appeal to the perspective. Yajima (2015) summarizes how design thinking can "catalyze scientific innovation" but also why it might be a strange fit for scientists. We are trained to think (to the degree possible)

without emotion, to focus on the data, the facts, and not respond to or portray our results in an emotional way. However, we are all human and cannot disassociate from the emotional reality of our experience. Understanding what is important to our audience allows us to integrate that perspective – not only into our 'products' – but into our own thinking. Now let's be clear: there are many publics. We will not be able to involve all, or even most, groups of people with any one program or design, so we need to focus. Collaborating with a specific under-represented group to design a project that addresses their needs and interests is a crucial first step.

Pollinator (creative commons license)

Next Gen Data Visualization

Connecting the public to big data is particularly challenging, as the data are often complex with multifaceted stories to tell. Recent work suggests that art-based, interactive displays are more effective at fostering understanding of complex issues, such as climate change.

Thomsen (2015) explains that by eliciting visceral responses and stimulating the imagination, interactive displays can deepen understanding and may elicit behavioral changes.

She states, "Consequently, 'seeing' is reconceptualized as questioning, not believing", encouraging analytical thinking while allowing the audience to come to their own conclusions. While visualizations improve comprehension and decision-making, scientists generally rely on a common suite of display types (graphs, tables, etc.) that are often ineffective for expressing patterns in large, complex data sets. Augmented reality (think Pokémon Go) and game-based platforms have the potential to make data visualizations truly interactive, visceral, and tangible. Technological advances in interactive media have simplified the processes for creating these experiences and opening them up to the masses.

It is an exciting time to be a science communicator. Social and interactive media offer a plethora of ways to connect with the public, and data is everywhere in our society – not just the sciences – making our jobs even more important. As big data becomes engrained into nearly every aspect of our lives (including presidential campaigns), we science communicators need to work with those less familiar with how these data are collected, analyzed and interpreted. There will always be disagreement on the societal implications of the results, but in today's society, data literacy is imperative for creating an informed public capable of coming to their own, evidence-driven conclusions.