

VIEWPOINT

Beyond citations: Why scientists need to engage with public

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“Interestingly,” I wrote, “we observed an interaction between x and y ...”

I was a second-year college student crafting one of my first drafts of a scientific paper. My mentor at the time, the organic chemist **S.V. Eswaran**, crossed out “interestingly.” He said it was up to the reader to decide whether the observed interaction was of interest.

I have since become frugal with adverbs. Passive voice and past tense dominate my academic writing. But I cannot help wondering where all the deleted adverbs, those fleeting glimpses of the scientist as human, have gone.

Despite the impersonal style of academic writing that is in fashion, science is thriving as a distinctly human enterprise. The breath of humanity in science is evident in posts on a plethora of new platforms.

Scientists can tell the story of an experiment to a large audience in a tweet, blog or Facebook post. These spaces provide outlets for tales of discovery, such as how a cool idea or the demise of a dear hypothesis came to be.

Engagement isn't just about outreach. It also may involve defending one's own work when it comes under attack. One of my all-time favorite examples involves Galileo. After the Catholic Church demanded he recant his statement that the Earth moves around the sun, Galileo allegedly made the poignant declaration, "*E pur si muove*" (and yet it moves).

It is paramount that the voices of scientific progress regularly speak if the public is to understand and contextualize new findings. To encourage scientists to embrace outreach as an essential part of their job, research and educational institutions must support such communication. Not doing so risks restricting science to its ivory tower and impeding the cross-fertilization of ideas.

Getting it right:

Engaging with the public is a task that many scientists brush aside as, at best, a chore, and at worst, something that other academics do to achieve easy popularity. These sentiments stem in part from the assumption that public communication waters down the nuances of 'real' science.

Ironically, it is precisely for this reason that scientists themselves must participate. By talking directly about their work to the public, researchers can minimize the oversimplifications and misunderstandings often seen in the popular media.

I cannot recall the number of times I have read something along the lines of: "Scientists have discovered the gene for love/happiness/loyalty/any massive psychological construct," in the popular press. Yet most scientists would never claim to have performed this feat.

For those of us working on health-related research, the responsibility to communicate our work to the public exists at two levels.

First, a large part of our research is funded by the taxpayer, making regular public engagement good form — at a minimum. People need a sense of the real working conditions in laboratories, as well as the perspective of the researchers themselves, to balance exaggerated claims from third parties.

Autism research is especially vulnerable to dangerous hype — and families have suffered for it. Misled by the media and vested interests, many families have **expected miracles from dubious**

'cures,' such as stem cell injections or chemical castration.

These approaches have little or no peer-reviewed evidence to back them up. In this context, it is imperative to remember that communication about science is not just about one's own work.

Social media platforms provide scientists with an opportunity to play ombudsman and encourage critical discussion of a paper after it has been published. The creation of **PubMed Commons**, an online platform for such discussions, and comment features alongside major journal articles highlight the growing recognition of this need.

Second, regular direct engagement with the public and clinicians is likely to expedite the translation of new research into clinical practice. For example, the identification of autism subgroups might inform the choice of interventions for specific individuals.

Broader impact:

Yet scientists face real obstacles to sharing their work with the public. These include time and money. Academics are under pressure to do **more work for less** reward. Researchers review grants and papers for free. They also undertake a large number of journal editorial responsibilities without compensation. Adding public communication to this growing list of unpaid routine activities may be overwhelming.

To encourage people to participate in outreach, there must be incentives and support. Some researchers may be sufficiently motivated by enhancing their reputation, as the father of modern neuroscience Santiago Ramón y Cajal noted in his famous "**Advice for a Young Investigator.**"

But for others, an established framework for recognition, implemented by journals and institutions, could push them to prioritize public engagement. Critics have written extensively about **improving the current system** by formally recognizing reviewing and editorial efforts.

Fortunately, there is slow but definite movement in that direction, as evidenced by dedicated funding schemes and prizes **for public engagement** and **science communication** from charities, **research councils** and learned societies in the United States and Europe.

By adding public engagement to the criteria for academic promotions, universities might significantly boost such activities. It is not difficult to foresee a world in which today's h-indices, which track academic publications and citations, slowly make way for **'altmetrics,'** which incorporate broader impact such as public outreach.

Beyond the world of metrics and hard sell, public engagement represents a necessity. At a time when anti-intellectualism is rampant, scientists across disciplines must rise to the challenge of communicating to the general public effectively and often.

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