

#sciolit14 survey for the “What is Science Literacy?” #scio14 session.  
(compiled by @ng\_dave, n=16)

**1. As a science communicator, journalist, educator, etc – do you see merit in framing your translation of a science story by way of “increasing scientific literacy?”**

Yes.

*college instructor, science blogger  
librarian, parent  
academic scientist, part-time blogger & writer  
physics professor, blogger, book author  
higher ed. science teacher  
multimedia specialist, artist for health organization  
science journalist, past scientist  
science librarian  
science writer, designer, public information officer  
communications manager for scientific publisher  
science communicator  
science teacher  
diversity in science advocate, science blogger  
editor  
professor  
science themed artistic curator*

**2. As a science communicator, journalist, educator, etc – do you generally try to frame your translation of a science story by way of “increasing scientific literacy?”**

Yes.

*librarian, parent  
academic scientist, part-time blogger & writer  
multimedia specialist, artist for health organization  
science librarian  
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science communicator  
science teacher  
diversity in science advocate, science blogger  
professor*

Depends.

*college instructor, science blogger  
physics professor, blogger, book author  
higher ed. science teacher  
science journalist, past scientist  
science writer, designer, public information officer  
editor*

No.

*science themed artistic curator*

### 3. If you do see merit in this mode of thinking (and even practice it), is there a sweet spot of content delivery that you find works well?

For me, the sweet spot is focusing on process and approach to thinking.

*(college instructor, science blogger)*

It works well to demystify and explain science as a human endeavor, in such a way that my listeners feel they could possibly have done the work themselves. Also works well to include elements of critical thinking/information literacy in discussions of science news or articles.

*(librarian, parent)*

I try to leave out the process and focus on the 'facts.' I would like to shift more towards the process but this requires a conscious effort on my part.

*(academic scientist, part-time blogger & writer)*

Start from introducing science as a way of knowing, equal in weight to other ways of knowing.

*(higher ed. science teacher)*

I'm sort of stuck on this, as I'm not sure who the target of the "framing" is in the previous questions. Framing for who? The audience for the stories? The people who run ScienceBlogs? My faculty colleagues/ administrative superiors? My publishers? Myself?

I don't really pitch what I do on the blog as "increasing science literacy" in the sense of telling the audience that that's what I'm doing, but if you asked me to justify spending time blogging, I'd probably say something along those lines. My books are a little more explicitly aiming at increased scientific literacy, some more than others.

The "sweet spot" in terms of content is different in different media, and in different subsets of what I'm doing. If I'm writing about a new experiment published in a journal, the target level is different than if I'm writing about something I did myself for the purposes of posting about it on the blog. There's yet another level for history-of-science pieces, and still another for academic-culture stories, and so on.

In other words, this isn't a well-formed question.

*(physics professor, blogger, book author)*

I'm currently working on story boarding a video series that will hopefully be my sweet spot for this kind of content. I haven't gotten to the point where I can determine if it has worked well or not. But who knows?

*(multimedia specialist, artist for health organization)*

I see science literacy more as an understanding of the scientific process than necessarily conveying facts. I need to incorporate it into the story, but if there is something unique or revealing about the process that I can incorporate into the existing story. Such as the finding coming about from an unusual collaboration, or an unexpected fortuitous discovery.

*(science journalist, past scientist)*

The sweet spot from a librarian perspective, is balancing practical lessons on how to use the catalog, how to use scopus, with discussion on why these critical thinking and research skills are more important than for just finding articles for their papers, it's about learning how to evaluate any information they come across, and learn to recognize, analyze and process information (plagiarism, peer review process etc).

*(science librarian)*

Something that's fun and engaging/interesting is usually what works well.

*(science writer, designer, public information officer)*

Haven't found it yet.

*(communications manager for scientific publisher)*

That would all depend on context. The most necessary thing is to make the subject relevant to the audience, and if not relevant, at least interesting to them.

*(science communicator)*

Presenting real examples that students relate to and giving them the opportunity to identify misconceptions or limitations of their thinking.

*(science teacher)*

Music. Talk about science using sing lyrics as analogy. (Connecting science to something most people like and defining terms around it).

*(diversity in science advocate, science blogger)*

Enough background to clarify the topic without unnecessary side discussion, with reminders of things readers may have encountered and pointers to more info as appropriate.

*(editor)*

Content delivery is about wrapping the science up in a story or having a personal perspective to draw in the reader(s). It's \*never\* about dumbing things down, but rather being clear and careful with terminology. I also think science literacy is (or should be?) more about the process of science rather than an end-point.

*(professor)*

In our narrative work we explicitly set the line at, "Any exposition must be in service of moving the plot forward." The corollary is that we look for stories where some bit of science is essential to driving the plot.

*(science themed artistic curator)*

#### 4. In the same vein, what are the inherent challenges associated with finding or being able to deliver this sweet spot?

The biggest challenge is conveying thought processes that have become inherently more intuitive to me through science training into a clear explanation that can be understood by someone else.  
*(college instructor, science blogger)*

Audience first needs to be engaged with the topic. It sometimes helps to address the topic through "big questions."  
*(librarian, parent)*

Having to define many terms without it turning into a text book. Losing the story by getting the details straight.  
*(academic scientist, part-time blogger & writer)*

The biggest challenge is time. I have a day job with teaching and administrative responsibilities, and two small kids. Finding the time to refine material to exactly the right level is the biggest challenge.  
*(physics professor, blogger, book author)*

Getting learners to disavow preconceived notions of what science is.  
*(higher ed. science teacher)*

Yes. For me, it's drawing people in with photos, video, graphics or other illustrations without confusing or distracting them.  
*(multimedia specialist, artist for health organization)*

Generally being able to fit it into the story without sacrificing the story. And keeping in mind what a reader is actually going to want to hear and be able to absorb.  
*(science journalist, past scientist)*

I don't teach a semester long class, I usually only get one or two lessons within the context of a semester. I need buy in from faculty to make sure students take my lesson seriously and I also need to make the lesson interesting, which is HARD, I try to convey my passion about it but students often just give me the blank stare response. So I am constantly trying to find relevant pop culture type examples to get their attentions.  
*(science librarian)*

Translating jargon! It's hard to take an academic paper and make it accessible/ understandable to the public & kids  
*(science writer, designer, public information officer)*

Money, changing tech, getting support & buy in from management  
*(communications manager for scientific publisher)*

Working out unexpected or unforeseen relevance.  
*(science communicator)*

The lack of scientific scrutiny in pop culture/media/general public. The misconceptions can be heavily ingrained and reinforced continually.  
*(science teacher)*

Changes with audience. Audience is unpredictable.  
*(diversity in science advocate, science blogger)*

Most notably, providing enough info without providing too much, respecting readers without talking over their heads, and trying to focus on the most relevant context.  
*(editor)*

Avoiding jargon. That is absolutely key. Also, big challenge in describing/writing about areas of science that don't have an easy 'catch' for an audience. It's easier talking about monarch butterflies because everyone can relate to butterflies. It's much harder to discuss the process of, for example, epigenetics.  
*(professor)*

Boringness. So much boring.  
*(science themed artistic curator)*

## 5. Is there a particular area of science literacy that is missing in the general public (process, facts, science culture)? Why is this and how problematic (from, say a civics point of view) is this?

Not understanding the process of building knowledge through the scientific process as a cultural construct distorts how people interpret the information they receive.

It is very problematic as the flaws in critical thinking this reinforces impact decision making in all fields.

*(college instructor, science blogger)*

The process and culture aspects are most often missing. General public science discourse has traditionally focused on technical facts. This can make science seem dry to some.

It's very problematic that many citizens lack a basic understanding of what science is and does. Schools and informal science education environments both need greater focus on how we know what we know.

*(librarian, parent)*

Terms related to process and science culture. Elements concerning science culture is the least known in my opinion. Mostly because the science world is insular and those who are not science literate have no desire to learn about the culture.

It's a problem because it creates a divide that reinforces a lot of class barriers

*(academic scientist, part-time blogger & writer)*

The process is probably the biggest point of confusion.

I think it helps to be explicit about the process, and about the fact that the general process of science is something everybody uses every day, often without really being aware of it. This is the topic of my next book...

*(physics professor, blogger, book author)*

That science is more than fact and the difference between fact, theory, and law.

Problematic because we can't converse about science unless we are all using a common vocabulary.

*(higher ed. science teacher)*

I'm sure there is, or we wouldn't have people who don't know that the earth revolves around the sun.

Hugely problematic, and I think the solution is catching these folks when they are young and creating an interest in being scientifically literate in elementary school.

*(multimedia specialist, artist for health organization)*

The process often is left out. In some ways it's inside the baseball. The general audience doesn't necessarily have to care about this, so the challenge is finding ways to make it a relevant story that people outside of the bubble have some reason to care about.

*(science journalist, past scientist)*

Science culture is hard to get into and hard to leave. I grew up in it, it's a privilege I often forget I have. I think it's human nature to be comfortable in their privilege and to move out of it, whether it's inviting others in, or stepping out of your zone. Change is hard!

It's an issue for populations that need the science! And it also means that we are possibly missing chances to gain perspective from the benefit of diverse minds. I think being online and technology are greatly increasing access and spread of information, but we need leaders and groups who are making an effort to be sure globalization of information is not only free but fair.

*(science librarian)*

## 5. Is there a particular area of science literacy that is missing in the general public (process, facts, science culture)? Why is this and how problematic (from, say a civics point of view) is this?

CULTURE and support from government and industry to encourage science learning

Education is the best way, but this has problems of its own - mostly because the US has lots of *education*.

*(science writer, designer, public information officer)*

Disconnect about value, cost, usefulness of research in bigger picture. Loss of meaning in smaller stories. Loss of threads... Connecting to related content.

*(communications manager for scientific publisher)*

Yes, there is. Neuroscience and psychiatry tend to be under-reported, since these areas are enormously complex, even for those who consider themselves very scientifically literate.

It is very problematic. Take for example the very widespread public ignorance about dementia, and the myths surrounding it, ignorance shared by many medical professionals.

*(science communicator)*

Yes. School curriculums mainly focus on content of science and little on the inquiry of science. Also, the inquiry aspects should be included in most other core subjects, if only as a way of scrutinising knowledge within that subject.

Very problematic. The media should take some responsibility in promoting critical thinking.

*(science teacher)*

The process overall. People don't broadly understand why the process lends to credibility. And when the process is misunderstood or undervalued, science can seem unproductive or lacking in credibility.

*(diversity in science advocate, science blogger)*

(Side-note: Not sure I'd count science culture as part of literacy. Gut reaction, though, so no well thought out reason.)

I think process & culture are more or less completely missing. No one reason -- harder to describe, of less practical import to people, less obvious emotional impact (vs. smoke causes cancer, say).

How problematic? Somewhere between very and not at all? Reasons it's a problem are talked about a lot.

Reasons it's not a problem -- or rather is maybe unsolvable: there are a \*ton\* of things you could potentially expect people in society at large to know. What's the culture of art curation? The process in international manufacturing? It seems impossible that everyone could know all of them.

How to get around that? I think normalizing the idea of science within the culture is the way to go. (Of course, I would.) Point being to get across: "Generally competent human people do these things, and other human & competent people know about and check their work. You might know about some of them, the others work more or less the same way." The trick, of course, is to do that without, "trust us."

*(science themed artistic curator)*

Perhaps science writers focus too quickly on asserting the findings without identifying the conditional nature of those findings.

Without an understanding of uncertainty, and more specifically, probabilities, the civilian lawmaker or voter will tend to see issues as two sided, yes or no, good or bad, not relative and adjustable.

*(editor)*

Fundamentally, there are just not enough scientists entering discussions with people outside their own area of expertise.

Not sure how problematic this is --> it may just take time as the upcoming generation of scientists have a different approach (and in many ways, a better one)

*(professor)*

## 6. If you don't communicate science with a strategic view to "increase scientific literacy", why not? Or put another way, what might be the detrimental effects of overanalyzing this facet of science content delivery?

It depends on the goal. Literacy is very important, but it is also important to convey the joy of a scientific approach to questions and the human-ness of scientists. If the goal is one of the latter two, then always placing a focus on literacy may detract from the effectiveness of the piece, potentially in relation to both goals.  
*(college instructor, science blogger)*

It is most important, first and foremost, to engage the reader/viewer/student.  
*(librarian, parent)*

You spend too much time analyzing ill-formed questions and don't do any actual communicating.  
*(physics professor, blogger, book author)*

I don't think that everything I do tries to increase scientific literacy. I think it's easy to give excuses like "not every story is strong" or "as communicators we are being asked to do too much with little resources" but when it comes down to it, we have to make an effort in making this kind of thing a priority.  
*(multimedia specialist, artist for health organization)*

I think there's a danger in trying to make the communication so "perfect" — from an accuracy or literacy point of view — that it eventually becomes something that no one wants to actually read.  
*(science journalist, past scientist)*

I usually think over analyzing can feed into burn out and the loss of 'fun' in what people are passionate about.  
*(science librarian)*

You lose the magic of the science, and the excitement  
*(science writer, designer, public information officer)*

You might be dumbing down the content.  
*(communications manager for scientific publisher)*

Spend too much time explaining or defining rather than telling the story.  
*(diversity in science advocate, science blogger)*

Nobody likes to be talked down to. Treating all writing as "teachable moments" may sound a lot like preaching. Furthermore, arguing a point with straight facts and logic often helps to solidify the listener's point of view as they review their reasons for believing what they do. Rather than simply focusing on "increasing literacy," writers might consider ways to share stories in a way that increases empathy with scientific perspectives.  
*(editor)*

I always communicate science with a view to increase scientific literacy. I see very few detrimental effects \*except\* the scientists must have his/her credentials - in other words, the science communicator has to have a program/background that provides real credibility.  
*(professor)*

It gets in the way of other goals. We're trying to do an exploration of what it means to be human in a scientific world. Putting in literacy goals will distort that.

Of course, that doesn't mean literacy-aimed projects can't be all good.

They might be bad, for example, if the focus is on how stupid people are for not knowing things. I think that approach does a lot of damage.  
*(science themed artistic curator)*

## 7. At what point does considering scientific literacy become a stepping stone towards science advocacy? Is this a bad thing? Or, in other words, is it for everyone? Should it be for everyone?

Literacy and advocacy can exist separately. Advocacy without literacy is potentially damaging in the long run. Literacy should be paired with material to also present the process as joyous.

*(college instructor, science blogger)*

Science as a career or hobby isn't for everyone, but everyone should have a basic "science appreciation" -- an understanding and appreciation for what science is and does.

*(librarian, parent)*

It's not a bad thing. Music and sports journalists are allowed to like their topics...

*(academic scientist, part-time blogger & writer)*

Science absolutely is for everyone, or should be.

*(physics professor, blogger, book author)*

I say advocacy is good - it means we are passionate about what we say. It should be the basis for communicating science, not the other way around.

*(higher ed. science teacher)*

I think it's hard to separate the two. But no, I don't think it's a bad thing.

*(multimedia specialist, artist for health organization)*

It doesn't need to be for everyone. There are many different types of outlets and stories, they don't all need to be doing the same thing.

*(science journalist, past scientist)*

Everyone plays a part, and it's good to be cognizant and be an ally. But there is also the risk of having too little information, and hindering instead of helping. I also think sometimes it feels like a responsibility which has been placed on you rather than something you volunteered for. It's a personal choice to be an active participant, but I also think if you aren't going to take an active role, you should be willing to be open and help 'spread the word' when asked to be a support.

*(science librarian)*

Not a bad thing.

*(communications manager for scientific publisher)*

The problem is not so much science advocacy, as unconscious fallacies in it, such as appealing to a mythical objective morality in the guise of science.

*(science communicator)*

Scientific literacy in societies in general has been increasing constantly since the dawn of humans. It seems there is no other way and if there was, ironically, it would be a scientifically literate society that finds the other way. Unless, of course, we follow a N Korean model (which we did in some way or another). Therefore, the question of advocacy as a negative thing is only relevant when talking about specific scientific issues (especially politically charged ones).

*(science teacher)*

It is science policy from the moment it conveys a need for something. Not bad. But not for everyone.

*(diversity in science advocate, science blogger)*

I suppose it's a bit naive to operate as if a reader must understand the context and background of every point to qualify as understanding anything at all. If using stories can elicit empathy, writers may find it possible to share science without ensuring, or insisting, that the reader will become literate.

*(editor)*

It's not for everyone because not everyone has the right skills for all forms of communication, but those willing to enter this discourse should and should be supported in doing so. But too few people do... and that's a problem. E.g., it's ALWAYS the same 2-3 profs in my Department doing this -we need our peers to take part more actively.

*(professor)*

Haven't thought much about it. Based on the thoughts above the answer to the last question is probably no..

*(science themed artistic curator)*

**8. How does the literature in PUS (public understanding of science) help you become a better communicator? (Or does it even?) How does it compare to other tactical devices? Are there defined metrics that allow analysis of the utility in different scientific communication methods?**

I'm not well familiar with PUS research. In my limited familiarity, I have found discussion of PUS to be very thought provoking about my approach.  
*(college instructor, science blogger)*

I am not familiar with this literature.  
*(librarian, parent)*

Not familiar.  
*(physics professor, blogger, book author)*

I'm not familiar, but I would like to be.  
*(multimedia specialist, artist for health organization)*

Not familiar  
*(science journalist, past scientist)*

The PUS literature can be very helpful indeed - but then so can too a study of rhetoric and the history of rhetoric, or the history of narration.  
*(science communicator)*

Sorry, have to leave this blank.  
*(professor)*

It doesn't for a very frustrating reason. All the journals are closed access, so I almost never read them.

I honestly think this is the biggest barrier, by far, to the theory-> practice movement. The articles need to be available, or a lot more translational work needs to be done.  
*(science themed artistic curator)*