

The Cause and Effect of Contemporary Science Communication

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Introduction

The field of science is notoriously cut and dry. There is a rigid scientific method for researching and analyzing information, including concrete steps and parameters for said method. When the time comes to report scientific findings, most scientific journalists choose to abide by simple reporting and restating of their findings. While this method is “tried and true”, it leaves much room for improvement. And, in a field where discovery and development are at the forefront of its purpose, it is imperative that all aspects of science evolve over the course of time. The field of science has continued to evolve since its creation, from technological advancements, new medical cures, and proving and/or disproving old scientific theories. Science communication has evolved as well, but in this growth, there has led to problems arising, problems as grand as distrusting the institution of scientific research as a whole.

This essay is intended to analyze the current state of scientific writing, and discuss the utilization of narrative and story to report scientific findings. Additionally, the paper is going to address the supposed problems with scientific writing, as well as address the multiple possible solutions. Limitations surrounding editing the current method of scientific writing will be discussed and through considering possible solutions, this paper will analyze navigating scientific writing in tandem with the understanding of the current science communication landscape to encourage more people to read, comprehend, and most importantly, believe the findings presented to them.

The Current Problems of Science Communication

The push to revise and rethink the way we write about science stems from growing distrust in scientific communication. As modern communication has grown and expanded in the past twenty years, scientific communication has been given these channels to share research, findings, and scientific developments. However, this has led to scientific research becoming commodified, and a way for people to create an industry. Before the growth of science communication and the

introduction of mass media, there was a distinct view of scientists, their role in society, and the information they provided being viewed as a virtuous service “for the greater good”.

Peter Weingart and Lars Guenther discuss the evolution of science communication and the effects that it has had on the consumers of science communication in their article, *Science Communication and the Issue of Trust*. They highlight three main proponents of the growing distrust in science communication: the commodification of scientific research, multiple agents taking part in delivering and “verifying” science communication, and the vast media landscape of the 21st century are contributing and working together to accelerate the public’s growing distrust in science communication. Weingart and Guenther described science communication as being “democratized”: Science findings should be shared, and scientists should be delivering this information, as it is their “duty” to help the people of their society through research and advancement. While in its purest form, the democratization of science could be seen as a good thing, it has led to a different kind of political involvement in science, as well as a greater presence of public relations within the field. In the past, political involvement in scientific pursuits had been used to bring accomplishment and improvement to major world powers (such as the United States government’s support for NASA to attempt to beat Russia to the moon), whereas now, the use of science/scientific findings is more centralized to pushing individual candidates agendas (this is not to say that in the past it was not also used for this purpose, but it was not nearly as exploitative and dangerous as it is now).

Additionally, the growth and popularization of public relations in science uses the democratization of science to its advantage. Democratization incites scientists to constantly communicate with the public and share, and public relations capitalizes on this need for information as a way to constantly produce content to push to the masses. This can lead to corruption and discrepancies as Weingart and Guenther state, “This demand has attained tremendous popularity, because it appeals to the advocates of ‘democratization’, and, at the same time, it is in synchrony with both political legitimation strategies (strive for voter majorities) and institutional PR [public relations] (reach as many people as possible)” (Weingart et al., 2016).

These motivations cause a fundamental clash in the role of science in our modern society, and damages our society's view of the institution of a whole, since it is "tainted by interests, conflated with persuasive communication, and raises constant suspicion of bias" (Weingart et al., 2016). The introduction of public relations and politics also damages science communication because it "conflates information about science with institutional propaganda, since it is primarily motivated to achieve image building, branding, and marketing" (Weingart et al., 2016). This creates a problem for scientific journalists (which Weingart and Guenther state are the most trusted authorities on science by the current public) working with PR departments since they are under pressure to constantly report and share, which can lead to "blurred demarcation lines between different sources of information. [This] leads to phenomena such as 'churnalism' (uncritical use of PR material)" (Weingart et al., 2016). Furthermore, this leads to PR departments utilizing 'news values' to generate attention, which can include sensationalization, emotion, and personalization. All of which have little to no role in documenting scientific research.

Beyond politics and public relations, there are other agents that take part in science communication such as bloggers, science organizations, science journalists and universities. All of these agents are competing to have authority on science communication, and this is leading to more speculation about which sources are honest, and are motivated by generating clicks, revenue, or political support. To summarize, "it may be assumed that science communication originating from governments, PR offices of universities and science organizations, as well as other interested actors is and will be perceived as less credible than science communication originating from academic scientists in universities and science journalists" (Weingart et al., 2016).

The final factor that leads to this issue is our current media landscape, with an emphasis on the growth of social media. Social media websites have posed a new problem for science communication, particularly through the unregulated nature of the platforms, as well as advertisement fees driving the revenue each site generates. Additionally, these sites contain users

that are not human, that can generate attention and promotion to unreliable material. While advertising has always been connected to news outlets and mass media, the advertisements were among the information, not “personalized” advertisements through the use of algorithms to cater to each individual viewer. Weingart and Guenther summarize the detriment this causes for science communication by stating, “The almost unlimited access to the medium and the hitherto complete lack of a quality control raise the question of trust in the medium/channel, apart from the issue of trust in the source” (Weingart et al., 2016). These three components of social media, democratization, and oversaturation of communicators has led to the “convergence of genres of information, particularly the blending of advertising and informational content” (Weingart et al., 2016). This leads to a lack of trust in the channels in which we receive information, and a lack of trust in those delivering the information to us. The trust in science communication is intrinsically tied to the trust of science as a whole, and currently, the trust is declining.

Improving Science Communication

While science communication seems to be an industry that is growing and expanding, there is much room for improvement within the field. As stated previously, the trust in science and scientific research are dependent on the trust of science communication. To bridge this gap, it is suggested that we change the way that we present scientific information and research. One of the biggest criticisms of contemporary science communication is that sensationalist and exaggerated papers are getting published, while honest and seemingly “mundane” stories are left with the authors, and are not published. But what is the difference between the sensationalist false stories, and the mundane true stories? The difference is that the sensationalist stories contain narrative. Narrative, is what Randy Olsen believes to be the key to solving the problems that lie in science communication. In his novel, *Houston, We Have a Narrative*, Olsen offers advice to scientists about how they can engage their audience and expand it, by weaving narrative into the writing of their scientific articles/papers/etc. Olsen suggests that scientists look to those in Hollywood to inspire them to create better writing. He offers that “Hollywood is the place that has figured out how narrative works in the real world. Lots of humanities scholars can babble on endlessly about their theories of narrative, but most couldn’t spot the basic principles at work in our lives”

(Olsen, 2015). While he does not call on scientists to borrow from fiction, he calls on them to borrow a “narrative sense”, and implement tools such as “and, but, therefore”, which is a tool to help add story to a piece of writing. Such as a scenario occurs, and another scenario occurs, but something else happened, therefore the result was this. He also encourages scientists to utilize simple storytelling methods to deliver a complex message.

Additionally, he argues utilizing narrative will encourage more people to engage with the material, as well as draw in new readers and audiences through this. By human nature, our brains are more engaged and activated when we are processing information with a narrative. He supports this through sharing a study conducted by a colleague, which used functional magnetic resonance imaging to measure the brain activity of subjects watching clips that featured narrative (a film), and clips that showed no narrative (a video of a park). The results show, “Their index of similarity in brain activity across viewers shows that strong narrative content results in much greater similarity in brain activity across individuals” (Olsen, 2015). The two major conclusions Olsen draws from this are that “narrative activates the brain” and “narrative unifies the thinking of a group”. He stresses the importance of using narrative to engage an audience by sharing, “For effective communication, what you want is focus-everyone thinking the same thoughts and presumably using large amounts of their brains. Such is the power of narrative: it enables you to pull everyone together. And that, of course, is what clear and obvious problems do-they unify people in their thinking” (Olsen, 2015).

The use of narrative as a medium to unify people’s thoughts about science can also be helpful in combating the issues of distrust in science, as more people are collectively agreeing the information is accurate. Which, also, could spread this information to more people. Olsen highlights the disconnect people feel with scientific material, and he suggests narrative as a way to engage audiences and unify them as well. The problem with science communication is two-fold: He addresses how to combat the problems with science communication, but there is still improvement needed for the channels in which science communication is funneled through.

Improving the Landscape of Science Communication

Since the field of science communication has vastly expanded, it is still being researched and studied by scientists. In a research agenda published by the National Academies of Sciences, Engineering, and Medicine, they draw upon previous research and propose new methods to study and improve the current field of science communication. The research agenda offers some suggestions on how we can systematically solve some of the issues within science communication. NASEM suggests adopting a system approach when both studying science communication to offer potential solutions, and participating in science communication. They define a system approach as an “iterative learning process in which one takes a broad, holistic, long-term, perspective of the world and examines the linkages and interactions among its elements” (National Academies of Sciences, 2017). They believe that a systems approach will help researchers and communicators in science communication “guide communication efforts that would take the complexity of the system into account (i.e., the level at which the communication should be targeted, who should be involved in the communication, what types of content need to be communicated and how, and even whether there should be any communication at all)” (National Academies of Sciences, 2017). Implementing a system approach would require researchers to, “understand empirically the interactions among different elements of the system over time and across and within levels of analysis-individual, group, community, and societal” (National Academies of Sciences, 2017). A system approach would prove effective for science communication both in researching science communication and participating in it. In the aspect of research, it would allow researchers to evaluate trends in the reception of science communication as well as address which groups of people are more prone to believing misinformation or evaluate the most common channels in which people receive science communication.

They additionally suggest adopting registries of scientific research, using registries that exist in health sciences as an example. They argue their suggestion by stating, “Developing such tools would enable building an evidence base that would identify key factors that affect science communication and the elements of various approaches to communicating” (National Academies

of Sciences, 2017). Through centralizing relevant and accurate information, researchers could dive deeper into the study of science communication and its effectiveness, as well as centralize that reliable information, helping combat the issues of distrust.

Furthermore, others have encouraged the solutions of NASEM and elaborated on them, such as Baruch Fischhoff in his article *Evaluating Science Communication*. In his article, he suggests more collaboration from those in the science field, and adopting science-like methods for both those studying science communication and publishing it. Fischhoff elaborates on this method by stating, “It entails staffing with the right people, internal consultation among them, and external consultation with those whom they seek to serve. It embraces both the bounded rationality of disciplinary scientists and the satisficing of practitioners” (Fischhoff, 2019). Fischhoff believes the current landscape of science communication is in crisis, so much so that it should facilitate partnerships with multiple scientific fields and areas of research. On a systematic level of addressing science communication, collaboration, holistic understanding, and centralization are proposed as the solutions for improving the media landscape that science communication currently resides in.

Limitations

While the solutions presented offer solutions to the current problems with science communication, there are still problems that do not have solutions offered for them. As stated in the introduction, science has become increasingly politicized as time has progressed. As science continues to be weaponized by politicians, it is unsure if this will subside overtime, or continue and grow as a tool used by politicians. Until there is an understanding from the public that science can be used as a political tool, and more often than not is, it is reasonable to assume this political strategy will continue, if not worsen, over time. As our society grows more polarized through politics, science communicators have found themselves in a deadlock with certain audiences. As science becomes more intertwined with politics, people will write off science if it does not agree with their political beliefs. Shanto Iyengar and Douglas Massey describe this occurrence in their article *Science Communication in a Post-Truth Society* by stating, “Whenever

scientific findings clash with a person or group's political agenda...scientists can expect to encounter a targeted campaign of fake news, misinformation, and disinformation in response, no matter how clearly the information is presented or how carefully and convincingly it is framed...the information is unlikely to penetrate the cognitive structures of those it threatens and therefore is likely to be either rejected or ignored" (Iyengar et al., 2019). Iyengar and Massey attribute this to the changes in our media environment, a greater political polarization, partisan animosity, and "motivated partisan reasoning in the psychological realm" (Iyengar et al., 2019).

Additionally, while Olsen suggests scientists change their methods of presenting scientific information, there are also limitations to this as well. The most obvious limitation is that it is not guaranteed every scientist will read his novel, or put his suggestions into practice. Moreover, Matthew Nisbet addresses another limitation in science communication that is the fault of the scientists in his article, *What's Next for Science Communication? Promising Directions and Lingering Distractions*. Nisbet describes a deficit model that communication and science communication have been operating under. A deficit model, when used in communication, is defined as "a process of transmission, the facts are assumed to speak for themselves and to be interpreted by all citizens in similar ways. If the public does not accept or recognize these facts, then the failure in transmission is blamed on journalists, "irrational" public beliefs, or both" (Nisbet et al., 2009). Operating under this model raises concerns for those trying to improve science communication, and allows scientists to pass blame on the public for their misunderstanding. Through operating under this model as well, "many scientists ignore the possibility that their communication efforts might be part of the problem" (Nisbet et al., 2009). While those are limitations that can be put on the messenger, there are also limitations that are put on audiences as well, as stated previously.

As for the suggestions made by the NASEM and Fischhoff, there are limitations in creating a registry, in terms of standardizing it and curating it. Additionally, collaboration is encouraged, but not guaranteed, and until there is a dire need for science communication to be saved, the

landscape will remain the same. While there are limitations facing proposed improvements to science communication, most of these suggestions are within the realm of possibility.

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Analysis

Through researching the current state of science communication, it is evident that multiple factors contribute to the struggles of communicating science. Initially, the problems appeared to be surface-level, something as simple as scientists changing their style of writing and breaking free from the seemingly “rigid” rules of science. Upon research, however, the problems that plague science communication are rooted much deeper in our society than meets the eye. The politicization of science has caused the biggest detriment in science communication, as well as the introduction of social media, and the business models that social media sites operate under. These factors create a domino effect that explains perfectly why there is so much distrust of science in our contemporary society. As science becomes weaponized and politicized, it becomes sensational and emotional by nature. This then pairs with social media, as a way to communicate information, or misinformation and disinformation. The internet is also largely unregulated, and with the use of algorithms, can cause misinformation and disinformation to be spread even further, and causes users to go further down “the rabbit hole”. Then, when you account for the business aspect of science, politics, and social media, they work together to create an environment that lacks integrity, thrives on sensationalism, and allows science to be a commodity. To summarize this connection, Brauch Fischhoff and Dietram Scheufele in their article *The Science of Science Communication* state, “Effective science-public communication depends, in part, on foundations laid years earlier. The more laypeople have absorbed in science classes and informal science education, the better chance they have of grasping the science relevant to the decisions that they face” (Fischhoff et al., 2013). It is important to emphasize, as well, that the “foundation” in question takes on a new meaning in the twenty-first century, and that foundation is the use of science by those in authoritative powers before us.

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Conclusion

Science communication is facing challenges both internal to its discipline and externally to its discipline. Despite the limitations that are presented currently, it is hopeful that they can be overcome and corrected. Politics and education play a major role in combating these issues, as the use of science for political gain has caused major setbacks in addressing real scientific issues. Additionally, the lack of both media literacy and scientific literacy beyond the basic principles of science are desperately needed to fix succumbing to misinformation, disinformation, and ignorance. While there are institutional issues at hand, communication and the attitudes surrounding styles of communication also are a factor in advancing science communication. Through the use of narrative and holistic research, scientists can reclaim their voice and authority and activate the public's interest and belief in their pursuits. The transformation of our current media landscape has directly contributed to the distrust in science, as well as the proliferation of "churnalism" in the field of science. When given vast platforms and channels for communication, there will be changes in the way people process and disseminate information. At its core, the problems plaguing science communication are propelled by our current media landscape, and capitalized on by those looking to gain revenue or political power. Without media literacy or science communication literacy, the belief in science could continue to devolve and worsen. Despite that, the solutions presented are within the realm of possibility and could work together to dismantle society's current distrust and disengagement with science.

Works Cited

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Addresses a solution to the problem of ineffective scientific communication. Suggests weaving in a narrative to scientific writing, as well as gives examples on how it can be implemented currently.

Weingart, P., & Guenther, L. (2016). Science communication and the issue of trust. *Journal of Science communication, 15(05)*, C01.

The article gives context to how there began to be a distrust in scientific communication. It describes the reasons why people do not trust scientific communication, the actors in scientific communication, and offers some solutions on how to combat the distrust.