

Understanding Science: How to Fill the Communication Gap¹

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Introduction

The industrialization of society has led to many scientific advancements. These scientific advancements have provided many benefits, but have also created many controversies. Despite sound science, controversies around scientific issues have led the public to make decisions that disagree with scientific evidence. For example, “politicians pronounce that global warming is a hoax, an alarming number of middle-class parents have stopped giving their children routine vaccinations” (McIntyre, 2015, para. 1), and consumers continue to have concerns about genetically modified food (The Hartman Group, 2015). Why does this gap between science and perception exist? This publication will look at the characteristics of scientists, the media, and the public to help explain how the gap in science communication has occurred while also providing strategies for closing that gap in the future.

Scientists

Scientists approach communication from a very logical standpoint and tend to speak in factual terms or words (or jargon) familiar to their discipline (Jarrard, 2001). While the broad field of science includes a variety of topics, scientists, themselves, are very specialized in their field of study. For example, an animal scientist does not study all science, but specializes in science specific to animals. Even within the field of animal science, it is likely that an animal scientist focuses on a specific species, such as dairy cattle,

or on a specific topic within the study of a species, such as dairy cattle genetics or dairy cattle reproduction. Scientists are most comfortable talking about and educating others on their specific area of scientific expertise. Just as an Allen wrench would not be able to do the job of a handsaw, scientists usually are not comfortable speaking about science that falls outside of their specialization. Because of their curiosity and their desire to learn more, scientists are persistent in their work and are willing to fail many times in order to find a solution to a problem (Jarrard, 2001).

Scientists and the Public

Scientists report that they do not not feel the public understands their discipline (Lundy, Ruth, Telg, & Irani, 2006). Scientists believe that the public is scientifically illiterate, which limits them in terms of their personal tasks and goals, civic participation, global competitiveness, informed public policy, and support for science (Nisbet et al., 2002). Additionally, many scientists have agreed that public knowledge of science is a major problem (Funk & Rainie, 2015). Although scientists believe that the public does not understand science, they admit that they have a responsibility to increase public understanding of their scientific discipline (Lundy et al., 2006).

Scientists and the Media

Scientists feel that media coverage of their discipline is often neutral to negative (Ruth, Lundy, Telg, & Irani, 2005). Additionally, scientists believe that the media is more

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interested in sensationalism than truth when discussing science topics (Hartz & Chappell, 1997). When agricultural scientists were asked if they had been interviewed by the media, 70% indicated that they had been interviewed. However, only 34% of the scientists interviewed had ever taken part in media relations training (Ruth et al., 2005).

Public

Individuals who make up the public possess many characteristics that contribute to their understanding of science. When receiving information, individuals perceive with emotion. They think about how the information makes them feel. Additionally, all individuals are shaped by their life experiences. These life experiences shape each individual's beliefs, attitudes, and thoughts (Axelrod, 1973). For example, an individual who grew up on a farm would have different experiences than someone who grew up in a high rise condo in a big city. Individuals are limited by the amount of knowledge or understanding they have about a topic. For example, they may know that growing crops takes nutrients out of the soil, but they may not know what steps are taken to help the soil remain fertile. Individuals are smart, but in most cases their knowledge or understanding of science is limited to the basic science education that they would have received in high school or college (Nisbet et al., 2002). In today's information-rich society (Webster, 2014), individuals have to be selective in what information they choose to pay attention to; they often select information that they feel personally affects them or is personally important to them. Lastly, individuals do not make decisions based solely on facts (Cook, Pieri, & Robbins, 2004). Decisions about science are made by considering not only the facts, but also the moral justifications, social acceptance, politics, economics, aesthetics, and safety (Cook et al., 2004).

The Public and Scientists

The public commonly views scientists as being educated and dedicated (Davis, 1963; Nisbet et al., 2002). However, public perception can influence what work a scientist does or is allowed to do (Basalla, 1976). The public has been known to distrust the unknown outcomes of science, but the National Science Board (2014) reported that the majority of the public believes that the benefits of scientific research outweigh any harmful results. The positive impact of science on healthcare, food, and the environment have also been recognized by the public (Funk & Rainie, 2015).

The Public and the Media

After individuals in the public have completed formal education, media becomes their most available source of information about scientific options (Nisbet et al., 2002). Although all individuals are exposed to media, individuals tend to believe that media influences others more than themselves (Perloff, 1999). The public perceives newspapers and online news media to be more credible than television news (Kioussis, 2001). Additionally, the public tends to believe that the media is inaccurate, biased, and influenced by power (PEW, 2011).

Media

Media is no longer limited to news, but includes many forms of media including social media and other forms of user-generated online media. All of the different sources of media compete for the attention of the public. Those creating media content tend to be generalists, meaning that they cover a variety of topics rather than specializing and creating expertise in one specific topic. While scientists can be viewed as very specialized like an Allen wrench, media can be viewed as a Swiss army knife. Swiss army knives offer many tools in one, but the functional ability of each tool is limited by its size. Similarly, those in media cover a variety of topics, but they are limited by their depth of expertise in each topic. The media is also time-sensitive and strives to release information in a timely fashion. When released via media, information has the ability to reach the masses in a short period of time.

Media and Scientists

Studies of different media have revealed that scientists are commonly depicted as evil, geeky, privileged, isolated, very smart, and mad (Nisbet et al., 2002; Shanahan & Morgan, 1999). An analysis of television shows identified that scientists are killed off in television shows more often than any other profession (Shanahan & Morgan, 1999). Science is perceived in the media as either being mysterious, magical, and dangerous (Long & Steinke, 1998), or as the solution to problems (Nisbet et al., 2002).

Media and the Public

The media offers a lot of information to the public, but the presence of information does not lead to knowledge gain. In fact, the information provided by the media may lead to confusion, especially when several complex or competing arguments exist for one topic (Felt, 2000; Nisbet et al., 2002). Those with higher television viewing habits have been shown to have less knowledge and increased reservations about science than those who watch less television

(Nisbet et al., 2002). Today, 85% of US adults are internet users (Rainie, 2012), and of those, more than 56% create media (PEW, 2013). Despite the prevalence of user-generated content on social media, individuals are unlikely to share information with others if they feel that their peers will disagree with that information (Hampton et al., 2014).

Strategies for Scientists and Agriculturalists

In the descriptions above, it is evident that the media, public, and scientists are all influencing each other and could all take steps to help close the gap between science and perception. For scientists and agriculturalists, the following steps can be taken.

- Understand your audience. When possible, do preliminary research on your audience before communicating with them. Who are they? What is important to them? What are their values or beliefs? Understanding your audience can help you communicate in a way that is meaningful to them.
- When speaking to a lay audience, remove scientific jargon from the conversation. Speak about the science in terms familiar to your audience and consider the use of analogies to help explain a scientific concept.
- Share with others why you support science as a person—not as a scientist, but as a father, husband, wife, mother, partner, or friend. Removing your “scientist hat” will allow you to get on the same level as the person you are talking to. Find the common ground that you share with your audience and start the conversation from that point.
- Recognize that others are going to have different opinions. When in conversations with others, tell them that it is okay if they do not agree with your opinion and listen carefully to their opinion. Then, in a tactful manner, share with them why you have formed your opinion.
- Do not get stuck on the facts. When communicating with others about controversial issues, the facts are important, but individuals are not making decisions on facts alone, so it is important to expand the conversation. Discuss the moral justifications, social acceptance, politics, economics, aesthetics, and safety of the science (Cook et al., 2004).
- Do not keep science conversations to yourself. It is human nature not to share information we feel our peers will disagree with (Hampton et al., 2014). However, the gap between science and perception can only

be narrowed if individuals start communicating about science in a proactive manner.

- Get to know your media. News media outlets work on a tight timeline. It is important to build relationships with your local media and be available for interviews when they are covering stories about your area of science. If they do not know you, or you are not available for an interview, they will seek an interview from someone else, quite possibly someone who is not a scientist and/or is opposed to the scientific stance.
- Consider media training. If you are going to make yourself available for media interviews, it is important that you are familiar with how to properly interact with the media. Consider partaking in a media training workshop or refresher. For more information on media relations see the EDIS document series on [media relations](#).
- Generate media yourself. Consider sharing your story and your science through internet-based media. If you are not telling your story, who is? By taking this proactive approach to generating your own media, you will help facilitate the conversation about science. For more information on telling your story, see the EDIS document series on [story telling](#).
- Keep your cool. Telling your story and participating in conversations about science can lead to tense conversations and criticisms. Keep kindness in mind and keep your communication polite. Do not respond in rage. This may mean that you need to take time to gather yourself before responding to an email or social media comment.

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