Training for Communication in Forensic Science

Corresponding Author: Dr. Brenda L Hoffman
Contributing Authors: Dr. Lucina Hackman, Dr. Laura A Lindenfeld

Abstract

Scientists are increasingly becoming better prepared to communicate science in a variety of different settings, yet significantly less attention has been paid to communicating science in the courtroom, a setting which carries major societal impact. This chapter explores key issues surrounding science communication in the courtroom. We outline a conceptual system for communication training that includes ideas about fostering greater collaboration across different stakeholder groups, and training expert witnesses to communicate scientific evidence in ways that are accessible and accurate. Critical to this concept is supporting communication that upholds the integrity of the science, while also maintaining expectations for interactions in the courtroom.

Introduction

Scientists are increasingly becoming better prepared to communicate science in a variety of different settings, as a way to help the general public make more informed decisions about their lives, based on scientific information. This move has been driven by a concomitant increase in research and training focused on areas like public engagement and policy (1-3). Significantly less attention has been paid to communicating science in the courtroom, another setting which carries major societal impact. The courtroom is a setting like no other. Courts are heightened spaces of meaning-making, where the weight that judges, and juries assign to scientific evidence guides impactful decisions about people’s lives. Communication in these settings is prescribed, systematic, and “performed” in front of a lay audience (4), thereby increasing the tension surrounding it. Cultural barriers are significant with scientists needing to communicate their conclusions to a largely non-scientific lay audience (5, 6). The ordinary meanings assigned to verbal and nonverbal behaviors, and the interpretations typically drawn from this communication, become restricted in the courtroom due to the formalized means by which communication is controlled within the court arena, whereby legal personnel control the dialogue. When cultural norms surrounding communication are changed in this way, questions about credibility of expert witnesses and their science may be raised (7). The entire system requires more careful, nuanced, comprehensive efforts to understand how effective science communication can be supported in the courtroom. In this chapter, we explore some of the key issues surrounding science communication in the courtroom. We outline a conceptual system for communication training that includes ideas about fostering greater collaboration across different stakeholder groups and training expert witnesses to communicate scientific evidence in ways that are accessible, accurate. Critical to this concept is supporting communication that upholds the integrity of the way in which science is communicated, while also maintaining expectations for interactions in the courtroom.

Scientific Evidence in the Courtroom
For decades, science has played a major role in the justice system. Judges and juries are presented with scientific evidence commonly presented in courtrooms through expert testimony (8), whereby the expert is brought in to deliver highly scientific and technical information in specialist areas (9). The expert witnesses then hold the power as “conveyers of appropriate information” (10). They are responsible for conveying information about the science itself as well as key indicators of the accuracy of scientific evidence such as, reliability and validity, margin of error, and correlation versus causation in such a way that these are both understandable and understood. If these details are not adequately explained in the context of the evidence presented, judges and juries may draw inaccurate conclusions, leading to misinformed decisions (11). Similarly, expert witnesses therefore are able to make deliberate language choices that can impact the way judges and juries interpret scientific evidence. The use of vague language for example, can actually cater to the accuracy and precision that judges and juries expect, simply because of the credibility the expert witness is afforded (10). Judges have raised concerns about jury comprehension of expert testimony, their tendency to place too much weight on it, and their belief that science is incapable of being wrong (8). Yet, calls for researchers, academics, and criminal lawyers to reform the system have gone unanswered (12).

In 2009 the National Academy of Sciences (NAS) (12, 13) followed by the President’s Council of Advisors on Science and Technology (PCAST) report in 2016 both recognized that there were inherent issues with the scientific language used by scientists within the legal process. This language was so specialized that it had the potential to hinder communication between those presenting science, either within an investigation or within court, and those that had to make decisions based on that information. Others have pointed out issues related to the fact that most scientific evidence presented in courtrooms is correlational, not causal (8). Added to the complications introduced by the use of specialized lexicons, researchers have also shed light on the fact that reliability and validity are context specific, and that the acceptability of scientific tools must be determined on a case-by-case basis rather than being applied uniformly across the board (15). The point here is not to discredit science, but rather to highlight the importance of understanding what can be discerned through science, while also recognizing limitations such as the fact that scientific findings are almost never absolute. Understanding these fundamental scientific principles and philosophies is essential to the use of science in the justice system (16) but more importantly, the people presenting scientific evidence in courtrooms are responsible for communicating these details to judges and juries in such a way that they in turn can understand the strengths and weaknesses of that information and accord it the correct weight in the decision making process. Often this information does not make its way to the forefront of courtroom discourse, or if it does, it is not clearly communicated by the scientists and therefore is poorly understood. Each time an expert witness gives evidence they are entering into a communication with non-scientists, in the same way that speaking with . That there is a need therefore for expert witnesses who give scientific evidence in court to be highly trained in communication methods

**Collaborations Among Stakeholders**

Despite the challenges associated with science communication in the courtroom, recent work has demonstrated that it is possible to increase the ability of scientists to communicate complex scientific ideas and knowledge to a lay audience. This has concentrated on establishing a
dialogue between the audience and the communicator using a common language that is comfortable for both, something that can be difficult for those who use specialised language in their daily discourse with other specialists (5, 6, 17). In particular, collaborations that transcend disciplines are especially promising and necessary (18). The prescriptive communications that exist within the court space do not allow for exactly the same type of interactions that are possible in public engagement spheres, however there are still transferable skills that can be learnt and applied. Those who study how science is communicated to lay audiences highlight the need for interdisciplinary groups of decision scientists who can identify the scientific results that need to be highlighted, behavioral scientists who can design new ways to convey scientific evidence, and social scientists who can create the channels needed for trustworthy communication (11). It is clear that science communication is critical to the justice system, so it makes sense that academic researchers who study communication in various contexts to apply their knowledge to inform the process. Science communication has become a common area of study to improve communication about topics such as climate change and complex health information. However, few scholars have similarly addressed the problems that arise when evidence from different areas of science are combined in the context of expert testimonies in the courtroom (8), although the issues have been highlighted in recent research (19-21). Collaborations among academic scholars would ensure a “scientific, holistic, and integrated approach” to presenting forensic science in the courtroom, and avoid the silos in which forensic science is often presented (16).

Key Challenges to Science Communication in the Courtroom

The purpose of science communication in many contexts is to inform decision-making (11). To fulfill this mission, individuals communicating science--ideally would identify the science most relevant to the decisions that judges and juries face, determine what these stakeholders already know, communicate to fill the gaps between what they already know and what they need to know, and evaluate the adequacy of their communication (11). However, expert witnesses face a plethora of challenges or barriers to accomplishing this mission, including the need to frame their message(s) in the context of a particular narrative which is set by others, rather than themselves, the requirement to communicate uncertainty and the need to deal with cultural barriers that exist as a result of the tradition that surrounds the court process.

Narrative Messaging. Expert testimony in court is often presented as one piece of a larger narrative created by the legal personnel whose role it is to present the case (22). Narratives are the primary means through which humans communicate information (23). Because one of the primary functions of narratives is to persuade (23), it is no surprise that they are so popular in the courtroom (22). Lawyers use narratives to create or contest threats to defendants’ identities. Men tend to be portrayed as hard workers, good fathers or providers, and rational actors, whereas women tend to be portrayed as mothers, caretakers, and economically dependent (24). Members of the jury have also been shown to use narrative to understand the evidence being placed before them (25). Narratives in the courtroom not only explain action, they are action (24). There is a performative aspect to courtroom proceedings where stakeholders are the actors that “perform” a narrative upon which the judge and/or jury will base their decisions. Research on narrative transportation explains how individuals can be transported into a narrative world through a perceived identification with a character(s).
Scientific evidence, then, functions to support a given narrative. The witnesses that are drawn upon, the way in which the information is requested, and the order that expert witnesses are called to testify, all support a narrative intended to persuade judges and juries. Expert witnesses have a responsibility to ensure that the integrity of science is upheld in the courtroom, but due to the way in which their communication is prescribed within the courtroom, how that information is framed within the context of the narrative is not within their control. Expert witnesses must do their best to not only communicate their science in a bubble, but rather understand how that scientific information fits into the larger narrative being presented to judges and juries.

Cultural Barriers. The culture of the courtroom is distinct, and expert witnesses who are unfamiliar with it are at a disadvantage when they attempt to communicate within it. The courtroom disables ordinary meanings about observed cues and behaviors that we are used to, because guilt and liability are the prescribed focus, while pleasure and sociability are irrelevant (7). The sequence of communication and controlled interaction is highly unusual, and as a result, the formality of the interaction gives words more weight compared to traditional conversations, whilst at the same time constraining the potential for elaboration and explanation which facilitates full understanding (26). Communication, at its core, is culturally bound and subject to cultural norms and rules that guide the interpretation of messages among stakeholders. Figure 1 highlights various stakeholder groups to whom scientists must communicate scientific evidence. These stakeholders all enter the courtroom at different levels of knowledge about the cultural context, some with advantages over others. Judges and lawyers who frequent the courtroom, for example, use and expect contextual cues to highlight things like inconsistencies in testimony (7). It has been highlighted that one way to bridge the cultural gap is for scientists and lawyers to participate in effective pre-trial information sharing to increase the effectiveness of communication within the courtroom (20). Certainly this approach, combined with effective training in communication assists in crossing silos. However, the norms for communication may differ for lawyers compared to judges or juries. Expert witnesses must therefore familiarize themselves with the cultural norms and expectations for communication in the courtroom to ensure that scientific evidence is not misconstrued by any stakeholders.

Communicating Uncertainty. All knowledge on which decisions are based holds some degree of uncertainty. This is true for everything from medical evidence to government policies (27). In the courtroom, scientific evidence can be used to either convict or cast doubt about a defendant’s wrongdoing. However, this type of evidence is rarely absolute and typically carries some margin of error or degree of uncertainty. The communication of uncertainty to a lay audience who have an expectation that science can provide a definitive answer is challenging (28-31). Expert
witnesses communicate this uncertainty by avoiding absolute values or facts, summarizing their subjective confidence in various claims, listing various possibilities for a claim, or offering caveats (27). The problem is that people respond to uncertainty differently, and judges’ and juries’ interpretations of scientific evidence ultimately decides defendants’ fates. People’s interpretation of information can be shaped by situations in which the topic is contested or politicized, or the stress associated with the situational context in which the information is presented (27) – both of which are heightened in the courtroom.

Expert witnesses have to balance the need to communicate whilst maintaining the validity of the science that is being communicated (29, 30, 32-34). Yet, the reality is that trust in scientists remains high in both the United States and United Kingdom (35, 36). The level of trust and credibility that judges and juries place on expert witnesses guides their interpretation of the testimony (7), which not surprisingly, concerns many witnesses, especially since trust is hard to build and easily destroyed. The problem for many experts is that they often come across as competent and knowledgeable, yet lack warmth, which is a key component of trust (37). Some argue that warmth can be obtained through openly sharing scientific information. Although the question remains of whether greater transparency about scientific uncertainty increases perceptions of incompetence or signals honesty (38). Research is urgently needed to address these questions so that expert witnesses can be best prepared to communicate the uncertainty associated with scientific evidence in the courtroom.

**Opportunities for Science Communicating Training**

Given the issues surrounding communicating the uncertainty of science, communicating within cultural expectations, and the persuasive power of narratives, scientists are at a clear disadvantage in the courtroom. Therefore, it is no surprise that the same expert witnesses are often called upon to testify about a variety of scientific evidence in a variety of courtroom proceedings (39). The problem with these “career expert witnesses” is that their testimony can become tainted, because there is a perception that the lawyer has shopped for a witness that will justify a proposed theory (39). It also undermines the potential participation of more expert witnesses from diverse backgrounds. These issues highlight the importance of integrating the scientists who are actually conducting the science into courtroom proceedings (20). If scientists are to be called upon to testify about scientific evidence, they need to be adequately prepared for the science communication challenges they will face in the courtroom. While efforts to support more transparency, collaboration, and integration across scientists and policymakers has received significant attention (8), less attention has been paid to how we can build stronger bridges between science and law (20).

We recommend the design of a communication training system that attends both to the needs of individual scientists who provide expert testimony, and to key stakeholders within the legal domain who engage with scientific evidence. This systemic approach should draw on best practices in science communication and stakeholder engagement that encourage trust-building, empathic listening, and audience-centered communication (40-44). Improvisational-based training methods rooted in active listening, genuine connection, and spontaneous collaboration with others have gained traction in recent years as a way to train scientists to effectively engage and communicate with various stakeholder audiences. We suggest that similar approaches be
used to train scientists providing expert testimony, as well as the lawyers and judges interacting with them. Improvisation requires empathy, or the ability to listen to another person and understand their motivations and needs, coupled with a willingness to adjust one’s own communication to meet those needs (45). Effective communication in the courtroom requires the ability to pay close attention in the moment, think on the spot, and pivot – or improvise as needed to respond to another person’s communication.

Two specific areas emerge as critical to advancing the development of this system. First, professional development for judges and lawyers rooted in active listening, genuine connection, and spontaneous collaboration, can aid in the development of accurate interpretations of scientific evidence and minimize misrepresentations or overgeneralizations of science in the courtroom. In particular, focusing on these efforts as they apply to interprofessional communication in the courtroom, can help to bridge cultural differences across the science and legal spheres and enable a greater sense of community among key stakeholders in service of justice. Stakeholders in the courtroom represent a variety of different fields and professions, levels of training, and personal expertise that allow them to function as an interdisciplinary “team,” where each offers a different perspective on an issue. At the core of interdisciplinarity is communication that offers new insights through connections and combinations among key stakeholders (46), similar to how scientific evidence is utilized in the courtroom. Research on science teams suggests that spending time together, developing trust, and engaging in discussions of language differences enhances communication among stakeholders (20), while sarcasm, debating expertise, and jockeying for power hinders communication in these settings (47). Similar connections can likely be applied to communication among lawyers, judges, and scientists in the courtroom. There is an entire branch of science called the Science of Team Science, which is devoted to understanding the collaborative processes and outcomes associated with interdisciplinary initiatives (48). Such efforts must be expanded to include a research and training focus on the interdisciplinary communication present in courtrooms. Focusing training in this area is essential to building bridges between lawyers’ narratives, scientists’ testimonies on scientific evidence, and judges’ and juries’ interpretation of this information. Clearly, there is built-in opposition in the courtroom setting and we are not suggesting that such training bring everyone together in agreement. Rather, the goal is to foster a deeper understanding of how science functions in the courtroom, so that it can be used more effectively in service of justice.

Second, new approaches to training for scientists targeted toward collaborative engagement across different cultures in the courtroom are urgently needed. Such programs should leverage existing training offerings for scientists that prepare them to focus on their audiences and contexts and adjust their communication accordingly. The addition of specific modular approaches that focus on understanding courtroom culture and communication expectations, as well as the individual cultures that each stakeholder in the courtroom represents, is key to helping scientists successfully communicate scientific evidence in these contexts and feel more comfortable and willing to engage in providing expert testimony in the courtroom. Similar trainings that help scientists engage with different public audiences have successfully increased scientists’ willingness to engage in communication with the public (40, 41). These training approaches may be offered in either professional development settings for practicing scientists or through certificate programs that allow students to navigate cultures and communication in the courtroom while they are pursuing their degrees to become scientists. These certificate programs
could be jointly fostered through the integration of programs in science communication and in forensic science.

While the courtroom is inherently defined by conflict, that does not mean that conflict must inform all aspects and dynamics of this domain. A communication system that fosters careful listening, respect, and dynamic information flow is critical to the pursuit of justice. Science communication training is a critical component that should be integrated thoughtfully and thoroughly into career preparation for scientists, and as part of ongoing professional development for scientists, judges, and lawyers.

Summary

- Among communication scholars, little attention has been paid to science communication in the courtroom. The lack of research and communication training for scientists contributes to potential misinterpretations of and overgeneralizations about scientific evidence in the courtroom, among key stakeholders not trained in science.
- Scholarly research on science communication in the courtroom requires collaborations that transcend disciplines. Communication in the courtroom is culturally-bound, and scholars examining this communication must understand competing goals among key stakeholders.
- A communication training system that attends to the needs of scientists who provide expert testimony and key stakeholders who engage with scientific evidence, is urgently needed.
- Professional development for judges and lawyers must be rooted in active listening, genuine connection, and spontaneous collaboration. Training for scientists must target collaborative engagement across different cultures in the courtroom and focus on communication adjustment.
- Preparing scientists to successfully communicate scientific evidence in the courtroom should help them feel more comfortable and willing to engage in providing expert testimony.

Declaration of Competing Interests
The authors reported no conflicts of interest.

Funding
This manuscript was not supported by funding.

Author Contributions
Brenda L. Hoffman, PhD: Conducted research and wrote chapter. Formatted manuscript, citations, and completed submission including abstract, revisions, etc. Laura A. Lindenfeld, PhD: Contributed ideas in planning and outlining stages. Reviewed and provided edits on each draft of manuscript. Lucina Hackman, PhD: Addressed all revisions. Edited manuscript and contributed new ideas based on reviewer comments.

References

10. Mengna L. A study on vagueness used by the defendant in courtroom discourse from the perspective of adaptation theory. Canadian Social Science. 2020;16(10):37-44.
39. Giannelli PC, McMunigal KC. Prosecutors, ethics, and expert witnesses. Faculty Publications. 2007;625:1493-537.