Bridging the gap between scientists and the public through communication

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A baby lake sturgeon is small enough to be cradled in a child's hand. However, lake sturgeon can grow to over eight feet in length and weigh up to 800 pounds, and they can attain ages of up to 100 years old. Destruction of food sources, invasive species and dam construction along spawning rivers have led to lake sturgeon being listed as a statewide threatened species in Michigan. Credit: Marty Holtgren

In recent years, more scientists have begun to realize that it's not enough to just do science. Researchers have to be able to explain their work in words that make the discoveries relevant and understandable to decision makers and the public.

"I've learned that the people side of things is just as important as the technical side," says Alex Mayer, professor of civil and environmental engineering at Michigan Technological University, who studies water resources. Specifically, Mayer focuses on ways to ensure safe and

affordable water supplies. "We need to be able to explain quite well to the rest of the world how it is we do our work. When you think about it, our goal as scientists really is to achieve a consensus of rational opinions about a particular issue. Another part of our job is to convey to the world how we reach that rational consensus."

To this end, he is using several approaches to help train doctoral students in a National Science Foundation- (NSF) sponsored "GK12" program on how to communicate water issues, including the importance of working with members of the media as well as with those who have a stake in the outcome, such as legislators, local officials and other policymakers.

"I've learned, working on water issues, that you have to go beyond proposing engineering solutions that you think can solve the problems," he says. "You also have to understand the politics, and the needs of the people you are working with. I've worked with sociologists, anthropologists and economists to look at all sides of the issue."

Additionally, the program brings docatoral students into middle school classrooms to teach young people about watershed science. In the middle-school classroom, the grad students hone their communication skills, and, hopefully, cultivate the next generation of scientists. However, the most important objective is to, "increase each doctoral student's ability to communicate the content of their research, and how they go about doing it," Mayer says. "Putting them into middle-school classrooms, and having them develop lesson plans and activities that convey their work, turns their esoteric science into material that is appealing and engaging--and also turns [the students] into better communicators."

Meagan Harless, a doctoral student from Ohio, discovered during her first day in class how little the youngsters knew about the kinds of things scientists study, and the process.

"They pictured a scientist as an often-depicted 'mad scientist' lurking about in a dark laboratory with big glasses, out of control hair, a white lab coat, goggles and surrounded by test tubes oozing various colored liquids," she says. "They were surprised to learn that there are scientists involved in many disciplines and how these scientists are working to improve the lives of all people. In particular, they were surprised to learn about ecological and environmental scientific disciplines. ... Science is all about curiosity, developing questions about what we observe and designing experiments to answer those questions. I think students are naturally very curious, and they appreciate the opportunity to use their innate curiosity in class."

With that in mind, Harless introduced an activity to her eighth-graders that enabled them to better understand her research focus--conservation and management of water resources--and allowed them to develop questions and design experiments to find the answers.

The activity involved a fictional groundwater contamination scenario in a small town. "The students were taught about what groundwater is, and how different pollution sources may affect its quality," she says. The students were given background information on a pesticide spill in a small town, and a map of the town. They worked in small groups to develop a hypothesis as to where the pesticide spill originated.

"We used groundwater samples taken from wells throughout the town to model the plume of the pesticide contamination in the groundwater," adds Harless. "Students acted as hydrologists and were excited to be in control of where and how they sampled their water." Ultimately, the students wrote a report of their findings, including the hypothesized origin of the pesticide spill. "I think this lesson was particularly effective as it was very applied in nature, and the students were able to use their science research to benefit members of the community," Harless says.

Along with their classroom experience, the doctoral students also became involved in a communications project that focused on climate change. They read materials on the subject, participated in discussions, and drafted a press release about climate change research at their university. They also learned how journalists operate because, "these are the people who should become your allies in getting the word out," Mayer says.

"We chose climate change because it's just so rich with communications issues," he adds. "It's a great example. It's controversial, and you have people who squawk about it all the time--so it's important to be able to communicate clearly about climate science. Our students' research may never be as controversial and political as climate change, but the students now have learned that when they go on to their own science careers, they have to speak out about what they do know, and what the science is."

Harless has come to understand this very well through the program. "I think there is a big misunderstanding between the public perception of how the discipline of science works and how conclusions drawn from scientific research may be interpreted," she says. "It's up to the scientists to close this gap with knowledge. When scientists provide this information, and stress how important science is in society, they will gain public support for their research."

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