

Great public engagement with science is

Reflexive

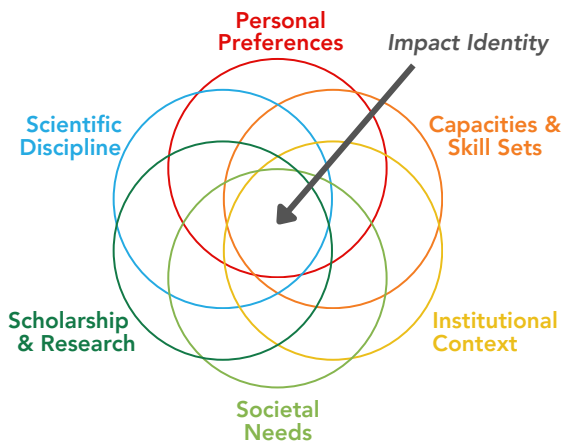
Advancing Public Engagement Across LTERs



Great public engagement with science is:

- **Strategic** - guided by clearly articulated, audience-specific goals and objectives
- **Cumulative** - supports ongoing, positive encounters between scientists and publics via multiple pathways
- **Reciprocal** - grounded in two-way exchange and mutual meaning-making
- **Reflexive** - operates in iterative loops of reflection and adaptation
- **Equitable** - recognizes systemic injustices in science and society, acknowledges biases, and is intentionally inclusive
- **Evidence-based** - builds from knowledge about how people learn about and use science

Intersecting Dimensions of a Scientist's Impact Identity



What does it mean to be reflexive?

Reflexivity is the ongoing practice of examining our own perspectives, expectations, and the power that we as individuals and scientists hold in society, and then applying those reflections to guide communication. This practice is based on the idea of continuous improvement, and the assumption that we all have blind spots in how we communicate. Within the context of public engagement with science (PES), reflexive practice challenges scientists and PES practitioners to consider how their perspectives, expectations, and power might benefit and hinder their ability to communicate about science and then to tailor their PES activities based on their reflections.

Assumptions for reflexive consideration

Scientific ideals suggest that science can be objective and apolitical. Reflexive practice recognizes that science will never reach this ideal because humans conduct research and we can never be fully objective, nor apolitical. These ideas may make some readers bristle, and that's okay—that is what reflexive practice is all about.

Reflexive scientists and PES practitioners consider questions such as: (1) How do government policies, funding, and funders' rules influence and constrain research in your discipline, and communication related to that research? (2) What are ways that your home institution influences and constrains the work you do, and the ways you communicate (or don't communicate) in the context of your science? (3) What are the scientific assumptions that researchers in your field are making (including you!), and how might these affect how you communicate in the context of science? (4) What are your expectations for the people with whom you engage? What might you gain from dialogue with others about your science?

Impact identities as a key reflection point

The idea of impact identities can be a useful way to design PES activities. As shown in the figure to the left, your impact identity is the intersection of both personal and professional dimensions. Each comes with its own perspectives and each also provides the chance for a different entry point for PES. When scientists choose or design a PES activity from their identity as a parent or a person of faith or a birder, they are able to bring forward different perspectives in the ways they communicate. Recognizing and acting on these differences, and considering the needs of specific audiences, are ways to strengthen PES activities. Discussing these topics with audiences also helps build trust in scientists.

Case Study: Reflexive PES in Action

By Nancy Emery, NWT LTER PI

The Niwot Ridge (NWT) LTER has co-developed a consortium of agencies sharing interests and goals with respect to mountain systems: Rocky Mountain National Park, the Denver Botanic Gardens, City of Boulder Water, the Colorado Forest Restoration Institute, and the North Central Climate Adaptation Science Center of the USGS.

The LTER's first steps involved recognizing that they needed to learn more about the goals and interests of their partners. To do so, NWT hosted a kickoff meeting with small and full-group discussions where they identified common interests among all groups. Prior to the meeting, NWT was focused on trying to help partners use the LTER's data, because they assumed that partners needed to use it to understand the patterns and trends in the region. However, through these discussions, NWT learned that partners were already familiar with the trends, but really needed the results packaged in a way that they can easily share with their audiences. NWT had also assumed that it would be valuable to co-produce a "state of the mountain" report every few years. However, partners pointed out that such documents quickly become out-of-date and they preferred a living document that would be updated as new data became available.

Based on these conversations, the consortium decided that NWT would lead the development of a "data dashboard" that features regularly-updated results and data visualizations. The development and maintenance of this website will be an ongoing, iterative process that makes NWT and partner datasets more accessible and aligns the knowledge base of the local mountain ecosystem and its responses to rapidly changing conditions. Through conversations with partners, NWT was able to reframe their thinking about their value to the community and co-create a product that is aligned to community needs.

Reflexive practice should be ongoing

In other settings, we may think of reflection as something that happens at the end of an event. But for PES, reflexive practice should be embedded into all stages of planning and implementing activities. In fact, the most important reflexive practices may happen before an activity begins. By examining perspectives, power, and expectations beforehand, scientists and communicators can apply what they learned from their reflections to design a more effective event.

Reflexive practice benefits from collaboration

Reflexive practice hypothesizes that there are blind spots that affect the choices that scientists and PES practitioners make when communicating about science. Collaborating with others in reflexive practice is one way to recognize blind spots. Within the context of public engagement, collaborations between natural and social sciences can be particularly fruitful. Scientists, PES practitioners and social scientists such as PES scholars are ideal thought partners for reflexive practice; each brings expertise and blind spots that the others do not. Working across the boundaries of these disciplines can strengthen both the knowledge produced through research and PES practice.

Evaluation planning

Evaluating reflexive practice happens both during and after PES activities. Checklists can be a helpful way to make sure reflexive choices are made during PES activity design. Scientists can also use memos immediately after a PES activity to document what they learned and can apply to do their research differently or ways to communicate about science differently in the future.

Learn More

The summary shared here was informed by these publications. The figure on the first page has been recreated, with permission, from the fourth reference shared below. Thanks to Julie and Martin!

Chilvers, J. (2013). Reflexive engagement? Actors, learning, and reflexivity in public dialogue on science and technology. *Science Communication*, 35(3), 283-310. [\(to read more about reflexivity and PES specifically\)](#)

Garlick, S., & Fallon, K. (2023). The ECO framework: advancing evidence-based science engagement within environmental research programs and organizations. *BioScience*, biad037. [\(to learn about formative engagement\)](#)

Peterman, K., Garlick, S., Besley, J., Allen, S., Fallon Lambert, K., Nadkarni, N.M., Rosin, M.S., Weber, C., Weiss, M. & Wong, J., (2021). Boundary spanners and thinking partners: adapting and expanding the research-practice partnership literature for public engagement with science (PES). *Journal of Science Communication*, 20(07). [\(to read about examples of natural and social scientists collaborating to support PES\)](#)

Risien, J., & Storksdieck, M. (2018). Unveiling impact identities: A path for connecting science and society. *Integrative and Comparative Biology*, 58(1), 58-66. [\(to learn about impact identities\)](#)

Salmon, R. A., Priestley, R. K., & Goven, J. (2017). The reflexive scientist: an approach to transforming public engagement. *Journal of Environmental Studies and Sciences*, 7, 53-68. [\(to read about assumptions and reflexivity\)](#)