



What Does Learning Have to Do with Science Communication?

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What Is the Issue?

Learning is a lifelong, life-wide, and life-deep process. People learn in all kinds of situations and settings, all day long, all their lives—in relation to their beliefs, value systems, and cultural perspectives. Learning includes—but is more than—conceptual knowledge or recall. Narrow definitions of learning as consisting only of conceptual knowledge can limit how we engage people with and in STEM. Science communicators and educators can miss opportunities to build on prior knowledge to help people make sense of new ideas and experiences in ways that can guide decision-making as well as future choices. Furthermore, decades of research on learning shed light on how science communicators can make ideas interesting, relevant, and meaningful to learners of all ages and backgrounds.

Things to Consider

Research has revealed that learning is a social, cultural, and contextual process that includes identity, interests, concepts, skills, and values. Learning is a process, rather than an end point. It is a form of human development. The term “learning ecology,” coined by Urie Bronfenbrenner in the 1970s, describes the context (the settings, the historical eras, and the social and political milieu) in which learning develops. Learning is cumulative and context-dependent; it can give meaning to even the briefest of encounters. Short-term exposure to new ideas does not happen in a vacuum but rather builds on prior experiences and ideas. People learn by relating new ideas to existing experiences and knowledge systems.

Why It Matters to You

- **Science communicators** can draw on tested educational strategies for engaging audiences with the ideas, phenomena, and meaning of science and scientific enterprises.
- **Leaders of science communication programs or initiatives** can build partnerships with other organizations and individuals in order to intentionally connect learning in those other settings with learning in their own science communication activities.
- **Trainers** can give science communicators insights into how science communication relates to, reinforces, or catalyzes people’s ongoing engagement with and learning about a subject or an idea.

Things to Consider (continued)

Learning is also a social process. Though educators often focus on individual learners, it's important to see learning as a social activity that involves people in specific cultural contexts. Within these contexts people develop culturally-relevant resources for and patterns of learning and engagement. Making meaning of ideas (e.g., decision-making and sense-making), can, in some cultural groups, be highly collaborative and explicitly connected to detailed cultural histories, rather than an individualistic act independent of historical contexts.

There are similarities as well as differences across cultural contexts. Simply assuming that your audiences learn in the same way you do—that they have the same motivations, interests, and prior experiences—will undermine efforts to broaden participation in STEM.

Measurement of learning is a complex enterprise. Evidence of learning comes from many sources, including audiences' comments, questions, challenges, and reflections during science communication events. These are signals that learning (sense-making) processes are underway. You can notice these processes at work by the increasing sophistication of participants' questions or ways they are connecting new ideas to prior experiences. These short-term experiences lay the groundwork for future engagement and learning.

Tools You Can Use

See these research briefs from Relating Research to Practice to conceptualize how short-term experiences can play a role in longer-term outcomes: [Communicating Science Also Communicates Cultural Orientations](#) (brief #431), [A Four-Phase Model of Interest](#) (brief #122), and [Everyday Moments Doing Science Shape Interest and Identity](#) (brief #432).

Reflection Questions

- + **What are the goals of your science communication activities? Specifically, what outcomes do you seek in terms of changing how participants think, understand, or act? How can you structure your activities to promote this type of learning?**
- + **How can you design your activities so that participants have moments to talk with one another to help with their meaning-making?**

Recommended Actions You Can Take

- Design your science communication events in ways that surface participants' existing interests and knowledge, so that you can build on those assets. You can get this input from advance work with knowledgeable community partners or from activities that encourage participants to share their ideas and questions before the program starts.
- Identify your learning goals. Develop goals that focus less on content and more on the implications of the ideas in a larger context, such as community or personal decision-making.
- Create opportunities for participants to reflect on ideas you are sharing. Allow time for them to consider the implications for their communities or for themselves, whether by talking to one another, writing, or using other media.

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PORTAL TO THE PUBLIC WORKSHOPS STRESS THE IMPORTANCE OF DEVELOPING A PERSONAL CONNECTION WITH VISITORS AND RESPONDING TO THEIR INTERESTS.



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