Broader Impacts: Understanding STEM Principal Investigators’ Approaches to Informal Education
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**STEM:** Science, Technology, Engineering, and Mathematics

**Introduction**

The Center for Research on Lifelong STEM Learning worked with the Center for the Advancement of Informal Science Education (CAISE) to assist the NSF Advancing Informal STEM Learning (AISE) program to enhance the quality of investigators’ broader impact (BI) efforts by improving their understanding of and connections with out-of-school educational resources. Center staff conducted 22 interviews with volunteer STEM investigators from a variety of disciplines to better understand how STEM researchers go about designing, planning, and executing the BI portion of their NSF-funded work. This information was used by CAISE to enhance the usability of www.informalscience.org for STEM investigators seeking to connect with out-of-school science education resources.

Participants engaged in a variety of BI activities associated with informal science education (ISE) such as working with museums and science centers, public outreach (e.g., science pubs), news and informational media (print, video, radio), diversity initiatives, after-school and school supplement programs, citizen science, stakeholder workshops, and digital learning interfaces, engaging community partners or policy makers into the research process.

Approximately half of the researchers interviewed were seasoned investigators and the rest were early-mid career. They valued anonymity and spoke freely about their perceptions and practices.

Two widely held assumptions were confirmed: 1) misconceptions and narrow thinking about BI account, and 2) there is substantial confusion about NSF expectations further complicated by inter-program variation.

**Key Findings**

1. Widely held beliefs about BIs and the NSF are influenced by lore, but the actions and words of program managers are more meaningful. More than half of the participants specifically stated the need to hear information about BI expectations, developments, and processes directly from program managers.

2. There is a strong commitment to known, often regionally-based partners with which there is a personal connection.

3. “Outreach” is a catch-all phrase used by investigators for any activity outside of university research life and reward systems. BI professional use a more specific vernacular that is not necessarily meaningful to researchers.

4. Participants perceive high variability between different programs within NSF. Policies and review practices are not perceived as consistent and transparent.

**Broader Impacts Continuum**

- **Having a Broader Impact** is part of my personal mission as a scientist.
- **How I see myself**
- **How I see my colleagues**
- **I don’t have time for Broader Impacts, they shouldn’t be a condition of funding**

**Methods**

Researchers who participated in the study volunteered. The study team made an effort to include disciplinary diversity and a variety of known perceptions and levels of activity with regard to BI. Interview transcripts were broken into content sections: 1) Perceptions about BI; 2) Planning and Processes; 3) Resources and Supports; and 4) Marketing and Communication. A qualitative analysis was conducted on each section to generate:

2. Dominant themes (stated by 2 or more participants).
3. Repeated themes (stated by 2 or 3 participants).
4. Other themes not necessarily repeated but potentially insightful.

This poster offers a small selection of dominant and other insightful themes. The quotes on this poster are not direct, rather amalgamated from several participants. The full report can be viewed at the website below.


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