Where Informal STEM Education and Science Communication Meet:

Two Studies Chart the Intersection of ISE and SciComm

A publication of the Center for Advancement of Informal Science Education, authored by:

Bronwyn Bevan
University of Washington

Julie Risien
Center for Research on Lifelong STEM Learning, Oregon State University

Kevin Crowley
University of Pittsburgh

Martin Storksdieck
Center for Research on Lifelong STEM Learning, Oregon State University

JANUARY 2019

Introduction

Informal Science Education (ISE) and Science Communication (SciComm) are two overlapping fields where practitioners and researchers design and study activities for lifelong engagement with science, technology, engineering, and math (STEM) in a variety of settings. Though fluid boundaries and fuzzy definitions make a clear distinction between ISE and SciComm difficult, the two fields nevertheless exhibit differences in core values and goals, based in part on different histories, commitments, and trajectories.

Part of the Center for Advancement of Informal Science Education's (CAISE) charge from its current National Science Foundation award (no. DRL-1612739), under the Advancing Informal STEM Learning (AISL) program, is to build capacity and support continued professionalization of the fields of ISE and SciComm.

To this end, CAISE sought a clearer picture of where the fields diverge and converge by conducting two studies: a survey of leading ISE and SciComm researchers and practitioners and a bibliometric analysis of select ISE and SciComm research journals from 2012 to 2016. The studies were intended primarily to inform and guide CAISE's work through 2020.

The guiding research questions for the **survey** were:

1. What is the state of professional connections between people who identify with the fields of ISE, SciComm, or both?

2. What resources (studies, reports, professional tools, and websites) do professionals from each of the fields rely on for their work?

The guiding research questions for the **bibliometric study** were:

1. What topics and issues are being studied by researchers contributing to key journals where ISE and SciComm publish?

2. Are there common areas of interest between ISE and SciComm based on research published in each field's journals?

Read the Two Studies
bit.ly/baseline-studies

- Charting the Intersection of Informal STEM Education and Science Communication: Results of a Social Network Study

- Are the Fields of Informal Science Education and Science Communications Adjacent or Connected? A Bibliometric Study of Research Journals from 2012 to 2016

Highlights of the Survey Findings

Major findings from the analysis of survey data include:

- **ISE and SciComm communities are siloed.** Few researchers and practitioners in one community named researchers or resources from the other community as influential on their work.

- Not surprisingly, in both ISE and SciComm, **practitioners have less visibility as influencers**. Practitioners and researchers across both fields were more likely to name researchers as influential on their work than they were to name practitioners.

- **SciComm researchers reported being less engaged in the area of "broadening participation"** than did SciComm practitioners and ISE researchers and practitioners.

- For both fields, **measuring programmatic impacts and outcomes relies more on custom-made assessments** than published ones.

- **Practitioners in both fields rely heavily on research syntheses and similar forms of digested information**, rather than on primary research and evaluation literature.

- SciComm researchers were less likely than others to affirm that they "try to keep up with emerging or innovative approaches to either science communication or informal STEM education practices," indicating a **larger research-practice divide in SciComm than in ISE**.

> **A Visual Mapping of the Communities | bit.ly/survey-viz**
>
> Survey questions explored who individuals looked to as an informative resources. From the results, we created an interactive visualization to map these networks of influence.

Major Findings of the Bibliometric Study

Based on occurrence of salient terms, there are distinct and different patterns in the content of academic publications between ISE and SciComm.

- **ISE scholarship tends to emphasize young people and learning**. The field most often addresses students and teachers, and it focuses on education, interests, and engagement. In ISE, the study of experience is prominent.

- **SciComm scholarship tends to emphasize adults and decision-making**. It addresses the public and scientists, and focuses on media, news, and the study of perceptions.

- **ISE researchers study the STEM education pipeline** for youth, including their aspirations, cognition, self-efficacy, and choice. They are interested in tools, professional development, scale, and outreach.

- In **SciComm, the focus is on citizens and general audiences** interacting with messages that are framed by politics, policy, beliefs, and values.

Despite these differences, scholarship in the two fields commonly addresses the topics of climate, nature/environment, and technology. Researchers from both fields explore individual attitudes, identity, and motivation. Work in both fields appears to be taking place amid broader questions of context, culture, and society.

Conclusions and Opportunities

Though differences between the fields are evident, there are also promising areas of overlap between ISE and SciComm, outlined below, which suggest that there is unrealized potential for mutual learning, knowledge-building, and advancement.

1. ISE's experience and expertise in broadening participation of underrepresented audiences can inform issues of growing interest in SciComm, such as the desire to engage with new, diverse publics. SciComm's growing knowledge about decision-making can inform ISE efforts to design for changing behavior.

2. In a landscape where ISE and SciComm researchers and practitioners are mostly siloed within their own domains, there are a small number of people whose activities span the two communities. These dual ISE/SciComm citizens could serve as ambassadors to enhance knowledge exchange between the fields.

3. Bridging research and practice requires more efforts to highlight the work of practitioners as relevant and salient to researchers across the fields. It is also crucial to represent research findings in formats that practitioners can use, ideally with guidance for translating research into practice.

Cultivating lifelong engagement with STEM is an overarching goal for both ISE and SciComm, and efforts to enhance connectivity between the communities can increase capacity in each field, and seed future collaboration across the fields.

One effort CAISE has already undertaken following on the studies is to convene a set of three task forces to address common challenges that both fields are experiencing (informalscience.org/task-forces). The task forces aim to (1) support and sustain generative connections between practice and research, (2) build understanding of and capacity for evaluation and measurement, and (3) broaden participation of underrepresented groups in STEM. Beginning in 2017 and continuing through 2019, the task forces are producing tools and resources designed to be relevant to all who work across this landscape, and complementary to other ongoing initiatives with aligned goals.

Suggested Citation

Bevan, B., Crowley, K., Risien, J., & Storksdieck, M. (2019). *Where Informal STEM Education and Science Communication Meet: Two Studies Chart the Intersection of ISE and SciComm*. Washington, DC: Center for Advancement of Informal Science Education.