Developing Evidence-Informed Science Engagement Programs with the ECO Framework

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Abbreviated abstract: Scholarship on science engagement is fragmented across the discourses of science communication, informal learning, participatory research, and sustainability science. This fragmentation contributes to siloed practice and persistent science–society divides. A critical need exists to better integrate these streams of research and to incorporate insights from practice into the design of science engagement programs. The ECO Framework addresses this need by defining three essential interacting modes of engagement: formative engagement (E), co-design and co-production (C), and broader outreach (O).

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Why is the ECO Framework needed?

Intentional use of three "modes of engagement" helps practitioners overcome critical barriers and forge stronger connections between science and society.

Barriers

***Formative engagement (E)**: Practices that prioritize active listening and building trusting relationships among scientists and stakeholders.*

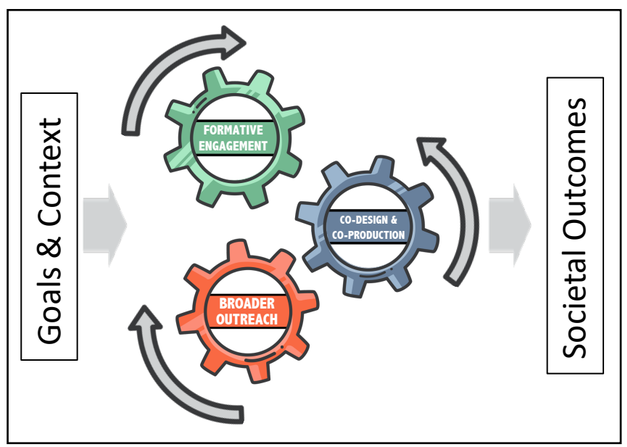
***Co-design and co-production (C):** Practices that bring scientists and partners together to co-create ideas, data, products, and actions.*

***Broader outreach (O):** Practices that focus on expanding networks, increasing visibility, breaking out of echo chambers, and broader dissemination.*

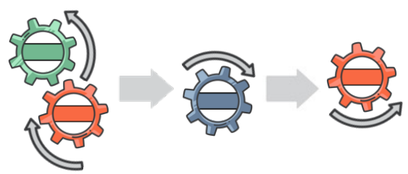
Modes of Engagement

What is the ECO Framework?

An actionable and evidence-informed framework for designing effective science engagement programs within research groups and institutions.



The ECO Framework structures the "how" of science engagement around three interacting modes.



The ECO Framework in Action

In a project related to an experimental ice storm in a research forest, an early-stage listening session with stakeholders and intentional outreach to media ("E" and "O" modes) led to unanticipated opportunities for research co-design and co-production ("C"), which was followed by additional broader dissemination of results ("O").

How to use the ECO Framework?

The ECO Framework begins with articulating goals for science engagement and desired societal outcomes. With this context, the following questions can guide the design process.

- What activities can you design that allow scientists to listen to and build relationships with stakeholders? What might scientists gain and learn from engaging with stakeholders?
- *Equity check:* Relationships require reciprocity. Sometimes too many "listening sessions" can feel extractive. How might you give in addition to receiving from stakeholders?

- What activities can you design that allow scientists and stakeholders to work together to co-create outputs of shared value (e.g., ideas, data, programs, synthesis products, solutions)?
- *Equity check:* Who participates and decides what is valued? What steps can you take to actively include non-dominant populations?

- What activities can you design that allow you to reach audiences beyond your existing networks? What do you want these audiences to do/think/feel once you reach them?
- *Equity check:* What steps are you taking to consider the interests and assets of non-dominant populations?

Key take-home message

An intentional focus on E-C-O as critical modes of engagement can help practitioners and scientists design strategic, evidence-informed programs that address persistent barriers to effective science engagement and strengthen connections between science and society.