Developing Knowledge-Building Questions

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Advancing Informal STEM Learning (AISL) is a program of the Division of Research on Learning in Formal and Informal Environments

The AISL Solicitation has several *Priority Goals*, one of which is to: *Enhance Knowledge-building*

- **All projects are expected to build knowledge.**
- All projects must make a strong case for how a project advances the knowledge base of the informal STEM learning field.
- The theoretical and empirical justification for the proposed project must be clearly articulated.
- Projects should build from the current literature and practice and may also build from relevant research agendas or literatures about informal STEM learning that have been developed in recent years. **The literature review should inform the proposed research.**

Strategies to Enhance Knowledge-building

- Projects may advance knowledge through **research**, **evaluation**, or a combination of **research and evaluation**.
- Knowledge generation may focus on developing, testing, and/or implementing innovative research, models, resources, and tools for informal learning environments.
- Foci of investigations may include, i.e., "what is happening," "to what extent," "why," "how," "what works for whom," and "under what circumstances."
- Findings of investigations should be compelling to the field at large.

Learning and Knowledge-building

The AISL program recognizes the complexities of measuring* STEM learning in informal environments.

- **Proposals must describe measures* of learning outcomes** for the target audiences—including how the chosen measures* are appropriate for the proposed work and of practical interest and utility to practitioners and decision makers.

- The program welcomes innovative and exploratory assessment approaches that draw from knowledge and practice of learning across environments.

** When we use the term "measures" we are not speaking specifically to quantitative approaches, but to the broader ways of measuring or characterizing phenomena using quantitative, qualitative, or mixed methods approaches.*

Common Mistakes in Knowledge-building Aspects of Proposals

- Does not clearly demonstrate its **potential contribution** to ISL (no roadmap for eventual **impact**)
- Insufficient description of **prior related work**; doesn't place the work in the context of existing literature

- Lack of an appropriate **theoretical framework** that will be used to guide the project & research

- Unclear **research question**
- A research question that is **too broad**
- **Methodology and/or research plan** with insufficient detail or clarity
- **Misalignment** of measures and research questions
- Does not identify **appropriate audience** for the research results and dissemination plans

Logic Models*

Not a required element of proposals, but are useful for crafting (and communicating) answerable, reasonably scoped knowledge building questions

- Helps align questions with:
  - **Prior work**: what are the innovations being tested?
  - **Theory**: how are the innovations derived from theory?
  - **Methods**: how do the proposed measures address the questions?
  - The **scope of work** used to address claims
  - The **scope of claims** being made
  - The immediate and more far-reaching **impacts** of the work

** Logic Models are one tool for communicating how all components of the research/evaluation endeavor will work together to answer the research question. Theories of Change, Design Conjecture Maps, and Data Tables are among other tools that may be appropriate for certain methodologies.*

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