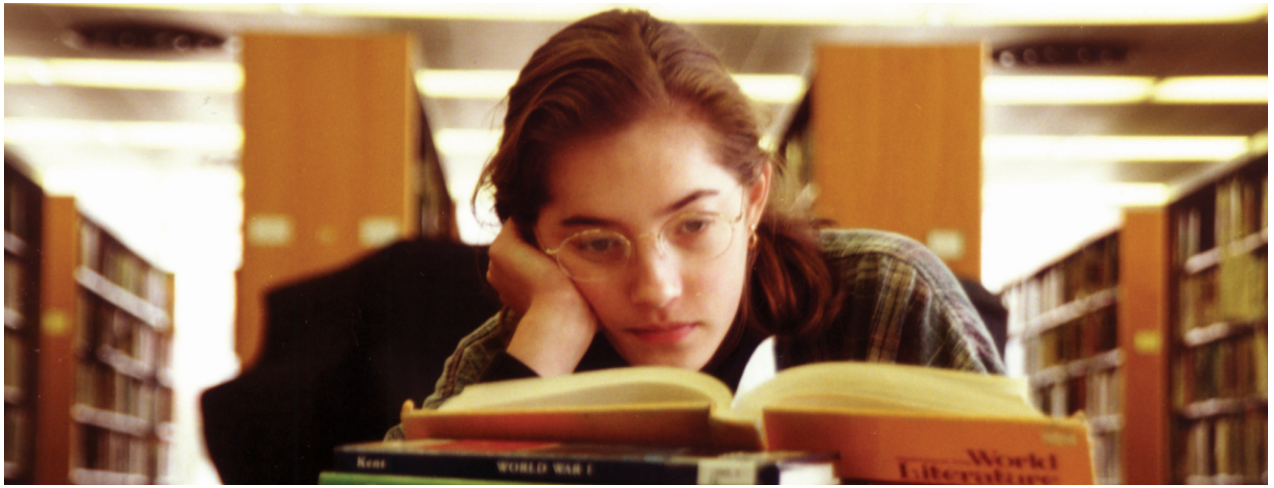
Overview

- Research vs. Evaluation
- ISE Learning Sciences Highlights
- Some Research Questions Related to B.I.
- ISE Evaluation Highlights
- Some Evaluation Questions Related to B.I.

Research	Evaluation
Produces generalizable Knowledge	Judges merit or worth
Scientific inquiry based on intellectual curiosity	Policy & program interests of stakeholders paramount
Advances broad knowledge and theory	Advances broad knowledge and theory
Controlled setting	Conducted within setting of changing actors, priorities, resources, & timelines

Blome, J.M. (2009). Office of Program Analysis and Evaluation, National Institute of General Medical Sciences.

Research in the Learning Sciences



- Learning Across Time and Space - Learning Ecologies
- Social Facilitation & Apprenticeships - Communities of Practice
- Interest & Motivation as Drivers of Learning
- Science Identity Formation
- Use of Designed Spaces & Problem Based Learning
- Digital Media & Gaming

Science learning is cumulative, public uses a diversity of science learning resources to build understanding.

Most people learn most of the science they know outside of school.

	R^2	X^2-value	p-value
Formal Education Model	0.17	133.08	< .001
Childhood Free-Choice Learn. Model	0.17	122.61	< .001
Workplace Model	0.20	152.61	< .001
Privilege Model	0.23	152.95	< .001
Adult Free-Choice Learning Model	0.39	323.95	< .001

Overall Model: $R^2 = 0.51$, $X^2 = 369.43$, $p < .001$

Falk & Needham (2013)

Informal programs typically incorporate 6 learning strategies shown to support effective learning.

- Build on Learner Interests
- Hands-On
- Inquiry/Problem-Based
- Connect STEM to Everyday Life and Experiences
- Knowledgeable Mentors
- Collaborative, Encourage Peer-to-Peer Interactions

National Research Council (2009). *Learning Science in Informal Environments* Washington, DC: The National Academies Press.

Some Possible Broader Impacts Learning Research Questions

- How do informal education experiences influence undergraduate and graduate students' career trajectories?
- How does participation in citizen science efforts influence the STEM research enterprise?
- What would make a broader public more attentive to STEM research messages in the media and why?

From Impact Evaluation to Broader Impacts

Friedman, A. (Ed.). (March 12, 2008). Framework for Evaluating Impacts of Informal Science Education Projects [On-line]. (Available at: http://insci.org/resources/Eval_Framework.pdf)

Some Possible Broader Impacts Evaluation Questions

- What ISE impacts do Centers and large facilities have in common and what methods are being used to measure those impacts?
- Can common measures used within Centers and large facilities provide new learning about what works, for whom, and in what contexts?