Degrees of separation – internal vs external evaluators

- Formative evaluation – much can be done in-house
- Rigor is most important, whether internal or external
- NIH investigators need to be able to design (or work with someone to design) a well-designed study
- SEPA projects need to publish their evaluation results – both those that show a positive effect as well as those that show null results
- Informalscience.org – anyone can upload evaluation results
- External evaluators can be a "critical friend" to PI
- In-house person can have the time to develop new methodologies and instruments
- It's important for evaluators to build trust with practitioners for self-reflective practice

- It's important to not just do programs that can be evaluated
- Internal evaluators can help create a whole-project culture of evaluation
- An external evaluator can provide professional development for project staff, so that they can carry out internal formative evaluation
- An external evaluator can collect more un-biased data/feedback from participants, who may be reluctant to give less than positive feedback to project staff

How can we evaluate how students learn science?
- Cognitive psychologists are working on this question
- Students learn biology differently than they learn chemistry, physics, etc.
- We don't have good every-day science measures/instruments to measure what students know.

Involvement of evaluator in pre-proposal stage vs later
- If an evaluator is involved in the project from the beginning, they can help shape the project so that its is evaluable
- If the evaluator is truly a team member, they can help shape the evaluation, even if they are brought in at the beginning of the project, as opposed to the proposal stage.

How do you have control groups, especially in informal settings?

Metrics that ACC has proposed for informal and outreach programs are not identical to those for K-12 programs. They may not require control groups and RCT.
- NCRR hopes to develop a repository of metrics that can be used by SEPA projects

- Evaluation needs to be tailored to the goals of the project
- Informalscience.org website is a repository for evaluation studies

Control groups and evaluation issues
- Hawthorn effect – people outperform others because they know they are involved in a project that is being evaluated
- If you scale up, the effect of intense involvement with research subjects may be diluted.
- Dissemination provides an opportunity to send a project to another area without the founding team
- Ensure that control group teachers receive the same amount of interaction and number of new programs as with treatment group
- Can provide treatment in 1st semester to half of students and teachers, and to control group in 2nd semester

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The SEPA website can be a repository for SEPA evaluation reports.

An issue is few informal science educators on SEPA review panels.

Informal-higher education partnerships may be able to bring more rigorous evaluation to some projects.

Basic research, applied research and evaluation research are different.

Perhaps informal science evaluation techniques might be fruitfully be used in evaluating student inquiry in the classroom.
- No one has proof that "aha" creates smarter kids – but it creates important interest

- There is little proof that inquiry approaches are effective.

If different types of programs are forced into the same format for evaluation, it will stifle SEPA project creativity. However, it is appropriate to find metrics that similar projects can report.