

An Integrated R&D and Evaluation Approach for Grant-Funded STEM Education Projects

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Specialization in STEM and Workforce Studies

- 12-person for-profit contracting firm
- 12 US DOL TAACCCT workforce development projects – One in Round 1, three in Round 2, two in Round 3, and six in Round 4
- 10 current NSF subcontracts – ITEST, ATE, Noyce, NRT, TUES, and STEP programs

Hezel Associates, Syracuse NY

Autumn 2015 NSF Proposal Partnerships

- Total of 12 proposals submitted or in work – ITEST, AISL, RET, and DRK-12 programs
- Of these, five are very different than the other seven...

The reason why is central to this conversation!

Research and Evaluation

Orientation Questions

- Are you an evaluator? A researcher? Both?
- What programs fund your work? NSF? Other?
- Awarded in the past 2 years?
- Familiar with the *Common Guidelines for Education Research and Development*?
- Have a working understanding of the distinctions among those six types of R&D?

Research and Evaluation

Key Questions to be Addressed

- How is “**research**” framed by concepts relating to the Common Guidelines?
- How might “**evaluation**” be framed to complement that?
- How might reconciling these functions improve grant-supported STEM education research, evaluation, and projects?
- Why should you care about this?

Research and Evaluation

The Problem – *The “NSF Conundrum”*

Historically, distinctions between “research” and “evaluation” have been unclear/inconsistent

- Grantee *Principal Investigators* focused on delivery of program activities
- External *evaluators* often became *de facto* researchers, testing the PI’s innovation
- Quality of both research and evaluation suffered (Ritchie, 2008)

Research and Evaluation

What, if anything, is
the difference
between “research”
and “evaluation”...?

Research and Evaluation

Research is...

Evaluation is...

Research and Evaluation

One Response – *The Common Guidelines*

- The *Common Guidelines for Education Research & Development* (US ED & NSF, 2013) reframe this type of work as development of education *innovations*
- Implication is that anything worth doing in education is worth studying and improving, and we can do better...

This “R&D orientation” supports two functions...

Research and Evaluation

One Response – *The Common Guidelines*

- Innovations should be conceived, improved, and adopted to achieve lasting education outcomes for stakeholders (**NSF Broader Impacts**)
- Learning from such work should advance collective understandings about teaching and learning (**NSF Intellectual Merit**)

But what about “evaluation?”

Research and Evaluation

Research & Development

Reframed as **Research and Development (R&D)**

*Structured study of the **innovation** in terms of its promise of effectiveness*

Internal to the project, working with designers

Program Evaluation

Reframed as **Program Evaluation**

*Study of implementation and results of the **project's R&D** activities*

External to the project, third-party perspective

Research and Evaluation

Research & Development

6. Scale-up
5. Effectiveness
4. Efficacy
3. Design & Development
2. Early-Stage/Exploratory
1. Foundational

(IES & NSF, 2013)

Program Evaluation

- Implementation-Results
- Process-Product
- Monitoring
- Performance Reporting
- Formative Feedback
- *Examines both **research** & **design** activities!*

Research and Evaluation

Research *& Development*



Purposes

6. Scale-up
5. Effectiveness
4. Efficacy
3. Design & Development
2. Early-Stage/Exploratory
1. Foundational

(IES & NSF, 2013)

Iteratively improve the innovation's design; so its promise

Advance collective understandings about teaching and learning

Research and Evaluation

Research
& Development



Purposes

Development

Broader Impacts

Research

Intellectual Merit

6. Scale-up
5. Effectiveness
4. Efficacy
3. Design & Development
2. Early-Stage/Exploratory
1. Foundational

(IES & NSF, 2013)

Implications

So, why should you care?

- Legitimizes foundational, exploratory, and design and development as *research*
- Establishes common distinctions among types of impact study – Efficacy, effectiveness, and scale-up
- Design and Development Research arguably has the most to offer in the real world

Implications

So, why should you care?

- Methodology – Impact study of an under-developed innovation is as dumb as using case studies to prove that an innovation works
- Bears on project budgets (e.g., 5-7% versus 25-80% of total funding)
- Proposal effort for R&D research study (e.g., Design-Based Research) is much greater than for an external evaluation

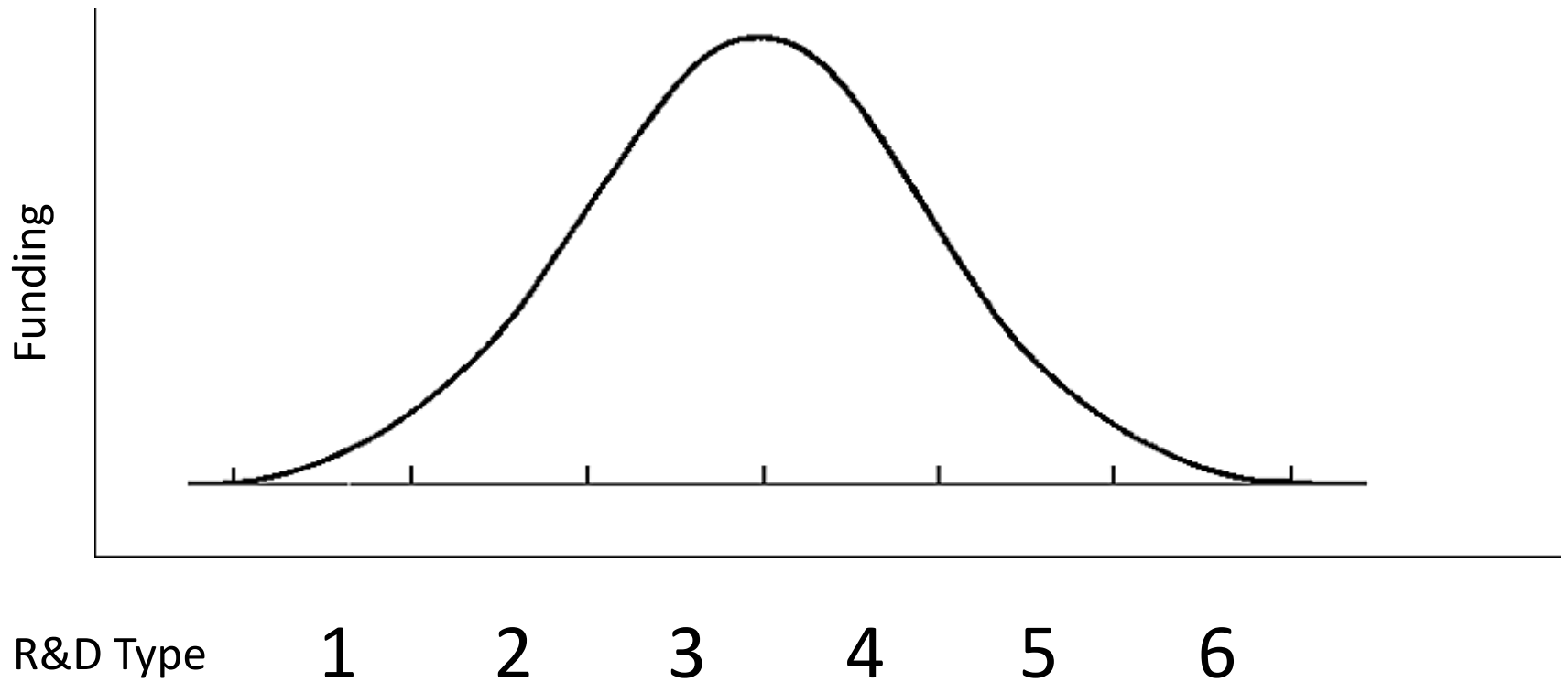
Implications

| Development | Research |
|--------------------|-----------------|
| Internal PI | |
| Internal PI | Internal Co-PI |
| Internal Co-PI | Internal PI |
| Internal PI | External Co-PI |
| External Co-PI | Internal PI |

“Internal” vs. “external” relative to grantee

Implications

Commitment of Education R&D Funding



Key Message: Model 1

I. Research & Development (R&D)

- A. Iteratively improve the innovation's design (Development)
- B. Advance collective understandings (Research)

II. Program Evaluation (External)

- A. Assess implementation of R&D activities
- B. Assess results of R&D activities

Key Message: Model 2

I. **Research & Development (R&D)**

A. Design the innovation

B. Study the design

A. Inform improvement of the design
(Development)

B. Advance understandings of learning
(Research)

II. **Program Evaluation (External)**

A. Assess implementation of R&D activities

B. Assess results of R&D activities

Implications

Unresolved Issues

- Not everyone is up to speed regarding the R&D orientation
- Dual research imperatives of **improving design** and **advancing understandings** might require separate staff (so two models)
- *What else?*

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Cite this Source

Knestis, K. (2015, November). *An Integrated R&D and Evaluation Approach for Grant-Funded STEM Education Projects*. Presentation at the American Evaluation Association conference, Chicago, IL.



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