Common Guidelines for Education Research and Development

U.S. National Science Foundation and Institute of Education Sciences, U.S. Department of Education

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1The following is based on material presented at the 2013 Annual Meetings of the American Educational Research Association; for additional information and to download the Common Guidelines, see NSF 13-126
The Joint Committee began meeting in January 2011 with representatives from both agencies.

Co-Chairs:
Janice Earle, NSF (EHR) and Rebecca Maynard, ED (Institute of Education Sciences, 2011-2012; Ruth Curran Neild, ED (Institute of Education Sciences, 2012-2013)

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- **NSF**: Jina Cai, Gavin Fulmer, Edith Gummer (EHR-DRL); Jim Hamos (EHR-DUE); Janet Kolodner (CISE and EHR-DRL); Susan Winter (SBE)
What do we mean by “Common Guidelines?”

A cross-agency framework that describes:

- Broad types of research and development
- The expected *purposes, justifications*, and *contributions* of various types of research to knowledge generation about interventions and strategies for improving learning
Knowledge Development in Education

- Is not strictly linear; three categories of educational research—core knowledge building, design & development, and studies of impact—overlap

- Requires efforts of researchers and practitioners representing a range of disciplines and methodological expertise

- May require more studies for basic exploration and design than for testing the effectiveness of a fully-developed intervention or strategy

- Requires assessment of implementation—not just estimation of impacts

- Includes attention to learning in multiple settings (formal and informal)
Who Needs Common Guidelines?

- Program Directors
- Reviewers
- Principal Investigators and perspective grantees
- Evaluators – project and program
- Congress
- General public
NSF Program Directors

- A common set of guidelines that can structure the deliberations that program directors have about the landscape of research across the different paradigms in education
  - Analyze the developmental status of awards in various portfolios
  - Identify which areas of STEM education research and development need encouragement
  - Provide technical assistance to PIs about what is needed to improve proposals
  - Encourage a focus on research in the development of new strategies and interventions
NSF Reviewers

- A common set of guidelines that can structure the deliberations that reviewers have about the quality of the research and development within individual proposals and across the proposals in a panel
  - Help provide NSF with the best information to ensure that the most robust research and development work is funded
  - Support the “critical friend” role of reviewers to provide specific and actionable feedback to PIs
NSF Principal Investigators

- A common set of guidelines that can structure the ways in which PIs conceptualize and communicate their research and development agenda
  - Beyond a single proposal – what a researcher needs to consider when planning what to do and with whom to work
  - Within a single proposal and a given type of research, what components of the work need to be included
Implications for Practitioners

- Guidelines can help practitioners develop a better understanding of what different stages of education research should address and might be expected to produce
  - Helps practitioners understand what to expect from different types of research findings
  - Supports more informed decisions based on the level of evidence
  - Provides a shared sense of what is needed as practitioners engage with researchers to improve education practices
Foundational Research

- Fundamental knowledge that may contribute to improved learning & other education outcomes

Studies of this type:
- Test, develop or refine theories of teaching or learning
- May develop innovations in methodologies and/or technologies that influence & inform research & development in different contexts
Early-Stage or Exploratory Research

- Examines relationships among important constructs in education and learning
- Goal is to establish logical connections that may form the basis for future interventions or strategies intended to improve education outcomes
- Connections are usually correlational rather than causal
Design and Development Research

- Draws on existing theory & evidence to design and iteratively develop interventions or strategies
  - Includes testing individual components to provide feedback in the development process
- Could lead to additional work to better understand the foundational theory behind the results
- Could indicate that the intervention or strategy is sufficiently promising to warrant more advanced
Studies of Impact

- Generate reliable estimates of the ability of a fully-developed intervention or strategy to achieve its intended outcomes

- **Efficacy Research** tests impact under “ideal” conditions

- **Effectiveness Research** tests impact under circumstances that would typically prevail in the target context

- **Scale-Up Research** examines effectiveness in a wide range of populations, contexts, and circumstances
## Important Features of Each Type of Research

<table>
<thead>
<tr>
<th>Purpose</th>
<th>How does this type of research contribute to the evidence base?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Justification</td>
<td>How should policy and practical significance be demonstrated? What types of theoretical and/or empirical arguments should be made for conducting this study?</td>
</tr>
</tbody>
</table>
# Important Features of Each Type of Research

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Generally speaking, what types of outcomes (theory and empirical evidence) should the project produce?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Plan</td>
<td>What are the key features of a research design for this type of study?</td>
</tr>
</tbody>
</table>
Graphic representation Entrance and Exit Guidelines

- Purpose
- Justification
- Outcomes
- Research Design

“Entrance”
“Exit”
### External Feedback Plan

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Important Features... (continued)</strong></td>
<td>Series of external, critical reviews of project design and activities</td>
</tr>
<tr>
<td></td>
<td>Review activities may entail peer review of proposed project, external review panels or advisory boards, a third party evaluator, or peer review of publications</td>
</tr>
<tr>
<td></td>
<td>External review should be sufficiently independent and rigorous to influence and improve quality</td>
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</table>
# Comparisons & Sticking Points - Purpose

<table>
<thead>
<tr>
<th>Exploratory/ Early Stage</th>
<th>Design &amp; Development</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigate approaches, develop theory of action, establish associations, identify factors, develop opportunities</td>
<td>Develop new or improved intervention or strategy</td>
<td>Impact = improvement of X under ideal conditions with potential involvement of developer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impact = improvement of X under conditions of routine practice</td>
</tr>
</tbody>
</table>

**Impact**

- **Efficacy**
- **Effectiveness**
## Comparisons & Sticking Points - Justification

<table>
<thead>
<tr>
<th>Exploratory/Early Stage</th>
<th>Design &amp; Development</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical, important problem, Different from current practice, Strong theoretical and empirical rationale, Potential to generate important knowledge</td>
<td>Practical, important problem Different from current practice Potential to improve X, Strong theoretical and empirical justification for development, Theory of action or logic model, Key components</td>
<td>Practical problem Important Different from current practice Why &amp; how intervention or strategy improves outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Efficacy</td>
</tr>
</tbody>
</table>

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## Comparisons & Sticking Points – Project Outcomes

<table>
<thead>
<tr>
<th>Exploratory/Early Stage</th>
<th>Design &amp; Development</th>
<th>Impact</th>
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</thead>
</table>
| Empirical evidence of factors and outcomes, Strong conceptual or theoretical framework, Determination of what next steps should be. | • Fully developed version  
• Theory of action  
• Description of design iterations  
• Evidence from design testing  
• Measures with technical quality  
• Pilot data on promise | What Works Clearinghouse guidelines on evidence of  
• Study goals  
• Design and implementation  
• Data collection and quality  
• Analysis and findings  
Documentation of implementation of intervention and counterfactual condition  
Findings and adjustments of theory of action  
Key features of implementation |
# Comparisons & Sticking Points – Research Design

<table>
<thead>
<tr>
<th>Early Stage / Exploratory</th>
<th>Design &amp; Development</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set of hypotheses/ research questions</td>
<td>Methods for</td>
<td>• Study design to estimate <em>causal</em> impact</td>
</tr>
<tr>
<td>Detailed research design</td>
<td>• Developing intervention or strategy – including instrumentation</td>
<td>• Key outcomes and minimum size of impact for relevance</td>
</tr>
<tr>
<td>Justification of context and sample</td>
<td>• Collecting evidence of feasibility of implementation</td>
<td>• Study settings &amp; target population(s)</td>
</tr>
<tr>
<td>Data collection procedures – instruments with evidence of reliability &amp; validity</td>
<td>• Obtaining pilot data on promise</td>
<td>• Sample with power analysis</td>
</tr>
<tr>
<td>Details of data analysis</td>
<td></td>
<td>• Data collection plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Analysis and reporting plan</td>
</tr>
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Using Guidelines to Examine “Proposals”

- Using the descriptions of research types provided, what evidence is provided for each feature?
- What additional evidence do you think the description needed given the Comparisons and Sticking Points.
- How well do these examples exemplify the Common Guidelines?
Key Questions for NSF

- How do we help the field with the development of instrumentation to reliably and validly measure important outcomes of DRK–12 Research and Development?
- What do we mean by “Promise”? How will we know that a DRK–12 resource, model or tool has promise?
- How do we structure studies to produce promising resources, models and tools?
Final Question

- How does Design Research or Implementation Research fit into these guidelines?

- How will the use of Big Data influence educational research and development guidelines?
Questions?

Common Guidelines for Education Research and Development:

FAQ’s for Common guidelines

Contact your program officer with questions