

**Education Research:
Cognition, Content, Practice, Systemic Change.**

What constitutes an appropriate research balance?

**Nora H. Sabelli
National Science Foundation**

(to be taken as thinking aloud!)

• **Education Research and Education *Practice*:**

- @ unit of analysis;
- @ questions posed.

• **Education Research and Education *Policy*:**

- @ public discourse;
- @ goals served;

• **Education Research and Education *Reform***

- @ unit of analysis
- @ $d(\mathbf{Dx})/d(\text{time})$

•Education Research for Education Practice:

@ must be *systemic*

•Education Research for Education Policy:

@ must be *credible*

•Education Research for Long-term Reform

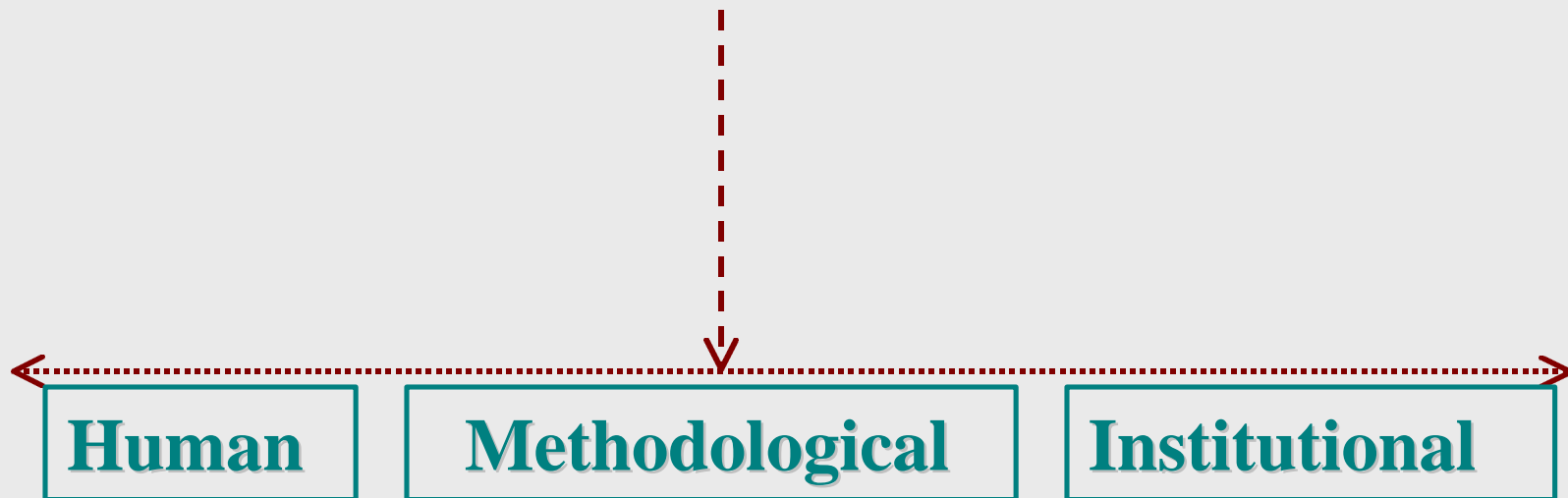
@ must be *achievable*

@ must be *fundable*

@ must lead to *demonstrable, sustainable*
and *scalable* outcomes

Achievable:

Multiple Capacities Needed



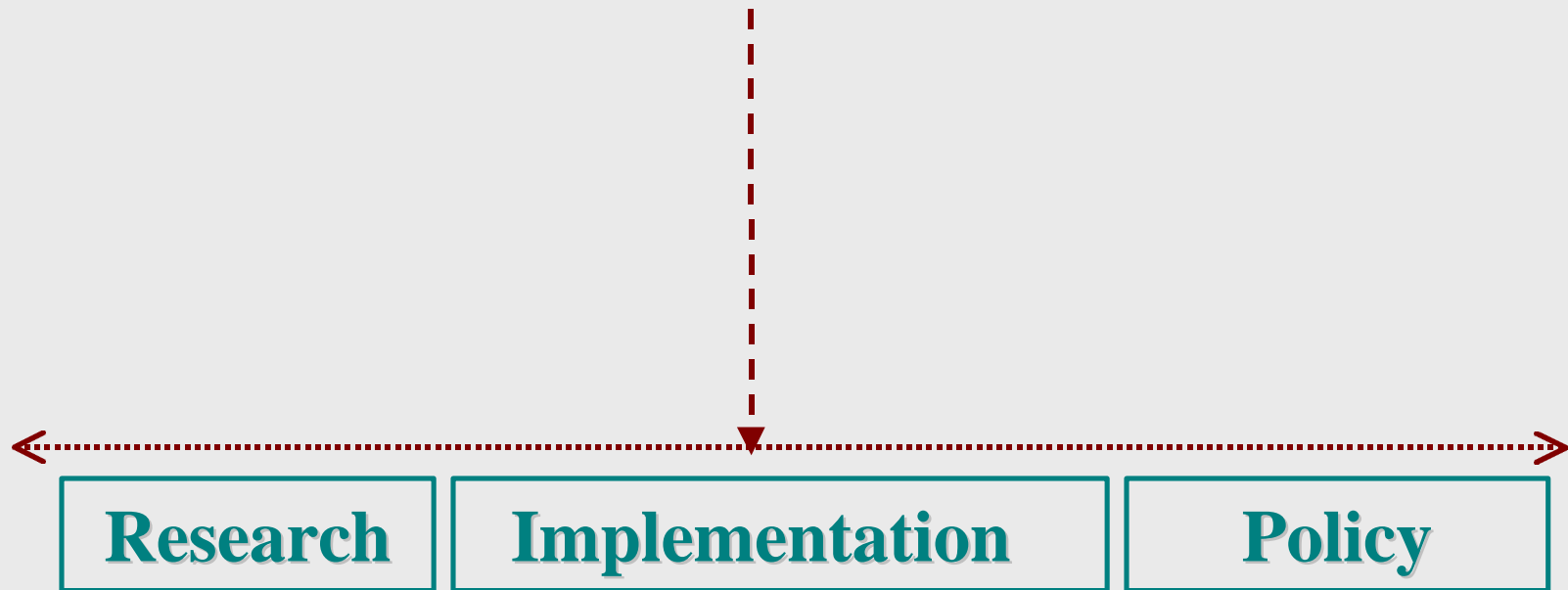
Human

Methodological

Institutional

Credible

Multiple Audiences Involved



Research

Implementation

Policy

Fundable:

Multiple Goals Addressed

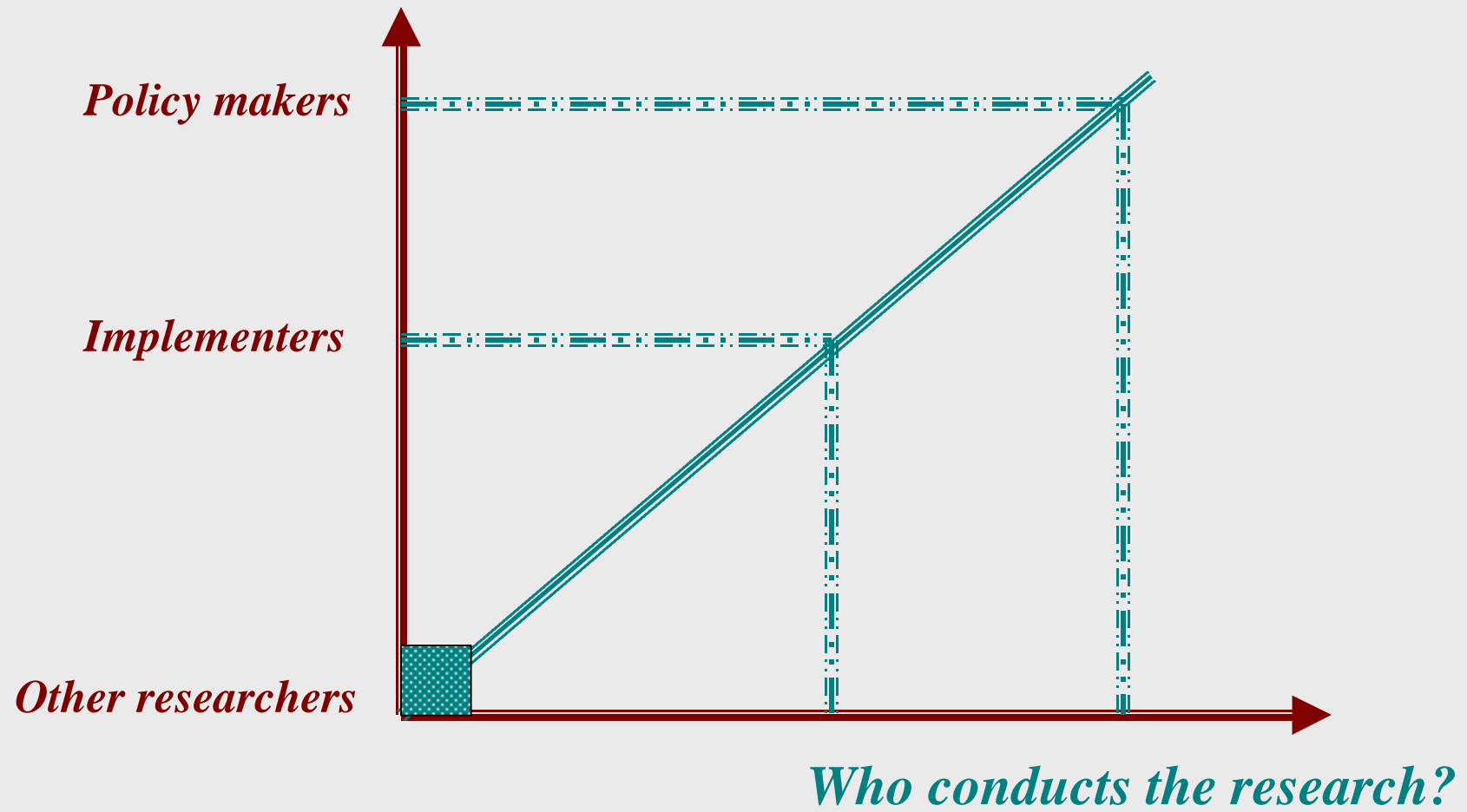


**Credibility
of research
as discovery**

**Balance between
vision and
outcome measures**

**Impact of
research on
practice**

Who uses the knowledge generated?



**Institution's
role is:**

Incubator costs are:

Research: active
Practice: passive
(dissemination)

Lower

Higher

**Demos,
Models**

**Start-up costs,
seed funds**

Research: active
Practice: active
*(adaptation,
replication)*

**Adoption
Experiments**

**Sustainable
Change**

Looking at Diversity from a systemic research viewpoint

(From Louis Gomez, LETUS project)

- ✦ **Diversity is more than money, ethnicity, and location**
- ✦ **Better characterized as an issue of**
 - **local culture**
 - **goals and purposes**
 - **resources**
 - **administrative infrastructures**
 - **readiness for innovation**

Goals of Education Research

Optimize pedagogy

Impact practice

Guide the development of system-level solutions

Analyze and inform policy

Evaluate options

See to the next generation of education researchers and practitioners

Adopt, refine, and create new research methodologies

Differential role of Education *researchers*

expand the audience for learning at all levels;

reconsider general education needs in the light of content and cognition advances

bring other research to bear on education and education research goals

bring the education and education research communities' input to bear on other research.

Aims of Education Research at NSF

Support systemic change and innovation (rather than enhancement)

Understand how to help *all* learners reach higher levels of competency in science and mathematics.

Explore and test the potential of developments in science, mathematics and technology for their impact on teaching and learning.

Focus the strengths and talents of research scientists, educational researchers, faculty members, classroom teachers and others on strategies for sustainable change

Lets take as an example the statement:

“all kids can learn science”

what are the implications of this statement in terms of required rigor and excellence?

what is the science they need to learn?

under what circumstances can they learn it?

how do we convince people that their current expectations are too low?

How do we convince people that this is doable in their own community?

Overarching Goals for all research activities

Build human research capacity

Advance research methodologies

Join education and technology R&D

Develop productive multidisciplinary collaborations

Unique niche that REPP (NSF's core education research program) must fill in addition:

***be the home of last resort for testing
high risk, high gain,
hypothesis, theories, innovations.***

A possible taxonomy of education research studies

- *basic research and small, focused laboratory-type experiments;*
- *design experiments and applied research;*
- *data gathering and analysis studies on prior and existing practice and on intervention experiments;*
- *systemic research on reform consortia and on large-scale intervention experiments.*

<i>Programs:</i>	Inter-agency Education Research Initiative	Research in Education, Policy, and Practice	Knowledge and Distributed Intelligence
<i>Project Drivers:</i>	IERI	REPP	KDI
<i>Impact on practice</i>	★★	★	★
<i>Build the knowledge base</i>	★	★★	★
<i>Impact on Theory</i>	★	★	★★
Other Characteristics	Inter-agency; Targeted; NSF-wide	Currently in reformulation	NSF-wide; ending (includes LIS, KN & NCC)
Related programs (existing started, planned)	CLD; Systemic Reform RFP	Systemic Reform RFP CRLT; LIS	LIS, CLD CRLT

New Interagency Education Research Initiative:

***Goal: Research that leads to
 large-scale evaluations***

***IERI emphasizes the integration of research with practice
that can lead to validation and comparisons of models
of the impact technology on practice
(based on the March, 1997 PCAST report)***

IERI: First pass at “lessons learned”

- While affirming and deepening the knowledge base in separate areas, ERI has to promote investigations (cross-disciplinary and cross-methodological) that more closely approximate the larger educational context that students face, and where we face our most daunting challenges.
- Lack of appropriate language for analyzing teaching effectiveness and individual learning trajectories.

KDI and
LEARNING AND INTELLIGENT SYSTEMS
(LIS)

Goal: Learning about Learning

*LIS emphasizes the integration of theory with experiments
that ground, test, and advance
basic understanding of learning and intelligent behavior*

Take Home Message:

Strategic dichotomies:

- Teaching vs. *Learning*
- Disseminating vs. *Adopting*
- Replicating vs. *Adapting*

Questions derived from concepts in the

- left hand focus on what *what is provided;*
- right hand focus on what are *the conditions for success*

URLs:

<http://www.nsf.gov/kdi>

<http://www.nsf.gov/kdi/lis>

<http://www.nsf.gov/ieri>

<http://www.ehr.nsf.gov/ehr/rec/nsf96138.htm>