Advancing the "Ethos of Science"* in Education Research—Cumulative Knowledge, Capacity Building, and Looking Ahead

Felice J. Levine

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*Robert K. Merton (1942)

Building Research Infrastructure—
.....The Vantage of A REESE PI

- Impressive Cohorts—Quality Science Funded under REESE "Imprimatur"
- ARC—A Research Infrastructure Initiative
  - Advancing research and communication (ARC) more than a slogan
  - ARC as a framework and facilitator
- Our "Fiduciary" Challenge & Opportunity
  - To build and leverage research infrastructure
  - To prepare for the next generation of science and scientists in our field

Enhancing Data and Human Resources—Goals and Framework

- Goals
  - Cultivate interest in building the knowledge base beyond our own studies
  - Focus attention on advancing research capacity and field development
- Framework—Two REESE Projects
  - Data sharing and utilization initiative
  - Assessment of education research doctorate programs

Data Sharing and Knowledge Utilization in Historical Perspective

- 1962, ICPSR founded as Inter-university Consortium for Political Research (ICPR); "Social" added to title in 1975
- Prior to 1975, sharing emphasized replication of instruments and measures
- 1985, National Research Council (NRC), *Sharing Research Data*
- 1986, NSF Division of Social and Economic Science, established data archiving policy
- 1989, NSF agency-wide data sharing requirement
- 2003, NIH data sharing for major data projects
- 2005, NRC, *Advancing Scientific Research in Education* calls for data sharing

Gains from Data Sharing and Data Archiving Include

- Promote open inquiry and cumulative knowledge
- Permit verification of results, rival hypotheses
- Stimulate new research
- Provide resources for education, training
- Improve documentation and data preparation
- Enhance value of quality data collection for PI
- Data sharing fosters collective responsibility
  - Appropriate acknowledgement of PIs as data producers
  - Responsibility for use consonant with confidentiality provisions, data protection plans

Data Sharing and Utilization Initiative Component of DRL 0941014

- Newly funded part of AERA Grants Program led by PI and active Governing Board
- Collaboration of AERA with ICPSR
- Promote secondary analysis through archiving of primary data collection from NSF-funded education and learning projects
- NSF, AERA-ICPSR currently identifying NSF awards completed or very near completion
- Invitational PI meetings for projects that are potential exemplars
- 8 projects to be archived over two-years
- Year 3, small-grants competition to support secondary analysis of archived project data
- Data user and producer PI meeting as capstone to model initiative

General Selection Criteria
Projects for Secondary Analysis

- **Important Questions Include**
  - How significant are the data for subsequent research?
  - How significant is the source and context of the data?
  - How useful and usable are the data?
  - What is the density and timeframe of the data?
- **Important Considerations Include**
  - **Scope of Study:** Breadth or extensiveness of issues
  - **Sample or Study Population(s):** Type of sample (e.g., random, area, cluster, quota); scope of sample (e.g., local, national, regional; non-US, international); representativeness of sample (oversampling) and appropriateness of sample for subsequent study
  - **Time Span and Periodicity of Data Collection:** Cross-sectional, repeated cross-sectional, longitudinal (including density of time sampling)
  - **Scope of Data Collection or Data Sets:** Sufficient to support secondary analyses that could yield substantive or methodological contributions
  - **Data Quality:** Based on instruments, measures, data completeness; type and number of variables

Assessment of Education Research Doctorate Programs DRL 0836856

- Collaboration of AERA and National Academy of Education (AERA-NAEd DocStudy)
- Mathematica Undertaking Web-based Data Collection
- Study Goals and Objectives
  - Advance knowledge of education research doctorate programs in US universities
  - Build on and extend National Research Council (NRC) assessment of research doctorate programs in the arts and sciences; permit cross field comparisons
  - Establish benchmarks and quality criteria to advance and improve doctorate programs nationally
  - Special focus on science and mathematics education
  - Make accessible information and data for a range of users, including participating institutions, researchers, analysts, prospective students, advisors/mentors
  - Public use and restricted access files planned

Scope of DocStudy

- 116 universities, including 5 institutions with only mathematics or science education programs
- 85% of universities with eligible research doctorate programs participating
- Only research doctorate programs under study, no practice doctorate programs included
- Empirically defined taxonomy of education fields
- Research programs in 20 fields, totaling over 700 programs
- 20% of institutions with 10 or more programs; 6—median number of programs
- 6,000-7,000 faculty; 3,500 students, 9 fields(*)

Taxonomy of Education Research Fields

- Curriculum and Instruction*
- Science Education*
- Mathematics Education*
- Social Studies/Multicultural Education
- Language and Literacy/Reading*
- Bilingual Education/ESL-TESOL
- Teaching and Teacher Education
- Educational Psychology*
- Education Measurement and Statistics*
- Special Education
- School Psychology
- Counseling and Counseling Psychology
- Instructional Technology
- Social/Philosophical Foundations of Education*
- Educational Policy
- Educational Leadership, Administration & Policy*
- Higher Education*
- Child/Human Development
- Education Research Doctorate (single integrated program)
- Workforce/Adult Education

Nature and Type of Data Collection

- **Program survey.** Information on enrollment and completion rates, time to degree, requirements for admission to program and candidacy, program and institutional financial support, student research and teaching activities, post-doctoral scholars, curriculum and methodological training.

- **Faculty survey.** Information on faculty's activity with doctoral students; employment experience; educational background; publication activity; research activity; research funding; perceived importance of faculty, student, and program characteristics for program quality; demographics.

- **Student survey**. Information on educational background, research activities, mentoring, receipt of funding, postgraduation plans, availability and perceived quality of program support and facilities, demographics.

- **Program rating survey.** The program quality survey collects information necessary to arrive at weights for the quality of the program in the taxonomic fields, based on program and faculty characteristics.

- Thomson Scientific (aka ISI) regarding faculty publication, citation; Scopus, etc.

DocStudy Relevance to REESE PIs

- 2,000-2,500 education research doctorates produced yearly; more than any other social-behavioral science and 5% of the doctorates produced in the US each year
- Compositionally constitute the dominate pathway into scientific research on STEM education and beyond
- Substantial proportion of REESE PIs are faculty in the 700 programs and 20 fields
- Others are collaborators or employers of talent pool prepared in these doctorate programs
- All of us have a stake in the advanced preparation of researchers in REESE-related fields and in improving and strengthening research capacity
- Scientific careers, capacity building, development, and training are understudied issues
- The DocStudy and NRC Study are important to our understanding of the research workforce and to planning for the next generation

Concluding Thoughts

- Cumulative knowledge and strong data and human resources go hand in hand
- If you have an interest in data archiving of a past or ongoing NSF study, e-mail flevine@aera.net
- Whether you are a subject in the DocStudy or not, e-mail flevine@aera.net if your interests and commitments relate to strengthening research doctorate education and training
- Looking ahead, we all need to leverage quality data and be more adroit users of diverse forms of data resources—preparing ourselves and our next generation of researchers for this challenge is a common good