Data and Information on Graduate Education in the U.S.

Revitalizing Graduate STEM Education for the 21st Century
Board on Higher Education and Workforce
First Committee Meeting
January 12, 2017

Dr. Nimmi Kannankutty
Deputy Division Director
Division of Graduate Education
# A View of the Future of Graduate Education in the U.S.

- Lots of policy focus on graduate education
- No new observations or recommendations, but the system has changed

<table>
<thead>
<tr>
<th>1970s</th>
<th>2000s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disciplinary focus, work as an individual</td>
<td>Greater interdisciplinary and team focus</td>
</tr>
<tr>
<td>U.S. a world leader in higher education and attracting talent</td>
<td>Growth in higher education abroad and increasing competition from other nations</td>
</tr>
<tr>
<td>Students predominantly white and majority male</td>
<td>Greater racial/ethnic diversity and higher proportion of female students</td>
</tr>
<tr>
<td>Predominantly U.S. citizen students and postdocs</td>
<td>Increase in foreign students and foreign postdocs</td>
</tr>
<tr>
<td>Public and private non-profit campus-based degree programs</td>
<td>Growth of for-profit institutions and online programs</td>
</tr>
<tr>
<td>Mobility is limited (across disciplines, sectors, economies)</td>
<td>Students move across fields, countries and institutions</td>
</tr>
</tbody>
</table>

**Directorate for Education and Human Resources**
**Division of Graduate Education**
At each stage in this continuum, we are trying to understand:

- How many people are in this stage?
- What are their demographic characteristics?
- What are the short-term and long-term trends at that stage?
- How does performance at one stage relate to other stages?
Flows and Pathways

There is no distinct pipeline that individuals follow – education and career movement is better described as flows and pathways.
**Scope of U.S. S&E Graduate Education: 2015**

**Graduate enrollments in S&E**
- 570,000
  - Full-time: 74%
  - First time: 24%

**Graduate degrees awarded in S&E**
- 300,000
  - 260,000 master’s
  - 39,000 doctorates

**Workforce**
- 55 M college graduates (bach+)
  - 21.3 M w/S&E degree
  - 9.6 M w/graduate degree
    - 4.9 M w/S&E graduate degree
    - 7.9 M w/S&E-related degree
    - 4.2 M w/graduate degree
    - 3.6 M w/S&E-R graduate degree
NCES census data
- Annual
- Student characteristics
- School characteristics
- Degrees by detailed discipline

NCES sample data on students
- Longitudinal
- Students as they matriculate, graduate and move on
- Little detail on discipline, but can aggregate to S&E as a group

Professional society data (not always representative)
- Discipline-based
- Departmental characteristics
- Student characteristics
- Financial statistics
NCSES institutional enrollment data
- Annual
- Student characteristics
- Enrollments by detailed discipline
- Not disaggregated by degree level

NCSES doctoral degree data
- Annual
- Detailed characteristics of doctoral graduates
- Graduate funding profile

NCES census data
- Master’s degrees by detailed discipline

Professional society data
- Annual
- Department-level
NCSES workforce data
- Biannual
- Educational, employment and demographic characteristics
- Aggregate data on postdocs from academic and FFRDC employers

Census Bureau workforce data
- Annual
- S&E degree holders as a part of the entire workforce

NCES workforce data
- Some longitudinal data on S&E graduate students extends here

Professional society data
- Discipline-based
- Type of graduate
- Individual characteristics

Other large-scale collections
- Private and federal program data
Scope of Human Resources Data

Undergraduate enrollments
- IPEDS Fall Enrollment
- Professional societies (e.g. ASEE, AChemS)

Undergraduate degrees
- IPEDS Completions
- Professional societies (e.g. ASEE, AChemS)

Graduate enrollments
- GSS

Graduate degrees
- SED
- IPEDS Completions
- Professional societies (e.g. CGS)

Workforce
- SESTAT
- NSCG
- NSRCG
- SDR
- OES
- GSS
- Early Career Doctorates Project
- ACS
- LEHD
- O*NET
- CGS

NCES Longitudinal Surveys (NPSAS, BPS, B&B)

Institutional
- Few Dimensions

Individual
- Many Dimensions
Other Resources

• Administrative Records and Big Data
• Institutional Data, Exit Interviews, Follow-up Surveys
• Program Participation Data
• Program Evaluation Data
• Social Media Data

LINKING ACROSS DATASETS
Data and Information Needs

Transitions – Attrition (levels, contextual factors)

Transitions – Graduate school vs. Workforce entry

Transitions – Job changes and movement, adequate academic preparation, reskilling, life-long learning

Matriculation – Programs, interventions, investments

Directorate for Education and Human Resources
Division of Graduate Education
Issues for Consideration

1. Synthesize existing research

2. Frameworks and models
   An example: science of learning, career preparation, program improvement

3. Lots of existing data – can we make better use of what is available?
   • The S&T education and workforce research community is well-developed and has increasingly better access to data and tools – they may be able to assist
   • What kinds of information do policymakers and educators need on a regular basis? Is this different than the questions that researchers are developing?

4. Is new or different data required?
   • Qualitative vs. quantitative information
   • Would information at a non-national scale be helpful? Who is best position to collect that data?
   • Is there extant data that we are not using, or that could be but is not accessible?
   • Gaps in data regarding the actual graduate school experience – how to bridge that gap?
Issues for Consideration

5. Some compelling themes

• Degrees vs. Skills/competencies
• Degree-based education versus other types of training/education
• Teaching methods and knowledge acquisition
Different Consumers Need Different Information

- More independent consumer
  - Compilation Reports
    - (S&E Indicators)
    - Academy Reports
  - Microdata
    - Online Data Tools (public data)
  - Data Repository

- Less independent consumer
  - Simple data product
    - Short Reports
      - Data Tables
  - Complex data product