Pathways, Potholes and Partnerships: Rethinking the Future of Graduate Education

Debra W. Stewart
President Emerita and Senior Scholar
Council of Graduate Schools
Council of Colleges of Arts and Sciences
San Antonio, Texas
November 2014
Why does Graduate School pathway matter?

• The knowledge based economy of the 21\textsuperscript{st} century increasingly requires the advanced knowledge and skills acquired in graduate school

• Graduate education trains creative thinkers able to produce cutting-edge, interdisciplinary research

• Number of jobs requiring advanced degree at entry-level to grow by 1.1 million between 2012 and 2022: master’s +18.4% and doctoral/professional +16.0%.

• Problem is that technology is growing faster than our ability to educate – resulting in more domestic inequality – and more outsourcing (Tyler Cowen, 2007)
Growth of Master’s Degree

Total Number of Master's and Doctorate Degrees Awarded, 1986-2013

Data Source: CGS/GRE Graduate Enrollment and Degree Surveys
Mean Earnings of Workers 18 Years and Over by Educational Attainment, 1975-2012 (In 2012US$)

International Trends

• **Other countries** recognize graduate education and human capital development as engine of economic competitiveness

• **International students** have increasing options
  - China and India are investing substantially in graduate programs
  - Canada, Australia, and others are more welcoming to internationals
  - For international students educated in the US increasingly find viable career options in their home countries

• Europe and China now produce **more doctorates** in the sciences and engineering than the U.S.
Median Cumulative Borrowing for Graduate Education by Graduate Degree Recipients, by Degree Types, 2011-12

Students Don’t Feel Informed About the Jobs They Might Get
When you were considering graduate school, how much information did you receive about potential careers?

- Less than needed: 49%
- As much as needed: 40%
- None: 11%

Source: ETS-CGS Pathways Project Student Survey, 2012
When you were considering graduate school, how helpful was the information you received about potential careers?

- Somewhat helpful: 60%
- Extremely helpful: 16%
- Not at all helpful: 24%

Source: ETS-CGS Pathways Project Student Survey, 2012
Graduate Deans Confirm Student Voice

• Students enter graduate school without good understanding of career options
• Many leave graduate school still lacking good knowledge of career options
• Graduate deans recognize importance of illuminating career pathways
• Graduate deans are dissatisfied with ability to track career outcomes
Pattern of PhD Placement

Employment Sector of Doctoral Recipients, 1993 and 2010

Data Source: National Science Foundation, National Center for Science and Engineering Statistics, National Survey of College Graduates 1993 and 2010
Obscure Career Pathways

Percentage of Life Sciences Doctorate Recipients with Defined Commitment for Employment or Postdoctoral Study and Number of Doctorate Recipients, 1988-2012

Data Source: National Science Foundation, Survey of Earned Doctorates
Low Completion Rates
The current state of attrition and completion in US doctoral programs wastes human and financial resources.

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Completed within 5 years</th>
<th>Completed within 7 years</th>
<th>Completed within 10 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humanities</td>
<td>12%</td>
<td>29%</td>
<td>49%</td>
</tr>
<tr>
<td>Math &amp; Physical Sciences</td>
<td>23%</td>
<td>48%</td>
<td>55%</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>21%</td>
<td>41%</td>
<td>56%</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>22%</td>
<td>54%</td>
<td>63%</td>
</tr>
<tr>
<td>Engineering</td>
<td>35%</td>
<td>57%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Source: CGS. (2008) *PhD Completion and Attrition: Analysis of Baseline Program Data from the PhD Completion Project.*
What skills do employers think students need?

Leadership
Entrepreneurship
Team Building
Negotiation
Evaluation Skills
Conflict Resolution
Complex Problem Solving
Advanced Systems Analysis
Inter-Cultural Cooperation
Career Building
Project Management
Are We Aligning Education with Skills Sets Required?

*Students Perceived Importance and Level of Preparedness Across Skills*

<table>
<thead>
<tr>
<th>Skill</th>
<th>Very important</th>
<th>Very prepared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity</td>
<td>55%</td>
<td>39%</td>
</tr>
<tr>
<td>Oral communication</td>
<td>83%</td>
<td>54%</td>
</tr>
<tr>
<td><strong>Teamwork</strong></td>
<td><strong>72%</strong></td>
<td><strong>47%</strong></td>
</tr>
<tr>
<td>Resilience</td>
<td>67%</td>
<td>47%</td>
</tr>
<tr>
<td>Planning and organization</td>
<td>78%</td>
<td>52%</td>
</tr>
<tr>
<td>Ethics and integrity</td>
<td>75%</td>
<td>54%</td>
</tr>
<tr>
<td><strong>Technological comfort and savvy</strong></td>
<td><strong>50%</strong></td>
<td><strong>39%</strong></td>
</tr>
<tr>
<td>Publications</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Research skills</td>
<td>38%</td>
<td>56%</td>
</tr>
<tr>
<td>Writing skills</td>
<td>70%</td>
<td>66%</td>
</tr>
<tr>
<td>Analysis/synthesis of data</td>
<td>65%</td>
<td>62%</td>
</tr>
<tr>
<td>Teaching and training</td>
<td>45%</td>
<td>38%</td>
</tr>
</tbody>
</table>

Doctorate Students by Type of Support

Environmental Influences

• Decreased public funding
• High accountability
• Pressure to increase enrollment
• Global competition for students
• Digital technology
State Budget Declines

State Appropriations to Four-year Institutions per Full-time Equivalent Students in 2010US$, 1987-2010

Accountability

"Mind you, I’m not responsible for the entire pipeline – just the section that flows through my office."
First time U.S. enrollment declining

% Change in First-time Graduate Enrollment of U.S. Citizens and Permanent Residents, 2002-2013

Average annual % change, 2002 to 2012
Average annual % change, 2007 to 2012
% change 2011 to 2012
% change 2012 to 2013

% change in first-time graduate enrollment of U.S. citizens and permanent residents

International Graduate Applications Uneven

% Change in International Graduate Applications from China and India, 2010-2014

Digital technology could undermine financial support for graduate education
A friendship founded on business is a good deal better than a business founded on friendship.

- John Rockefeller
Call to Action for all Deans

• Promoting financial education
• Tracking career outcomes
• Increasing faculty awareness about student outcomes
• Increasing completion rates
• Supporting professional development for graduate students
• Taking “Political Action” for graduate support
Daily Life of a Dean