Defining and Measuring Successful PhD Career Outcomes

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New Dimensions for Doctoral Programs in Europe: Training, Employability + the European Knowledge Agenda
Florence, July 8th, 2006

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Overview

1. Overview of existing (EU+US) national PhD recipients career and educational outcome surveys
2. Purpose, uses, and usefulness of survey information
3. Questioning traditional assumptions about doctoral program quality using career outcome measures

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Existing National Doctorate (PhD) Career Outcome Surveys

(Europe)

- UK Grad Programme: What do PhDs do?
- UNESCO/OECD/Eurostat:
  - Careers of Doctorate Holders

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Existing National Doctorate (PhD) Career Outcome Surveys

(US)

• National Science Foundation
  – Survey of Earned Doctorates (SED)
  – Survey of PhD Recipients (SRD)

• CIRGE, University of Washington
  – PhDs—Five and Ten Years out Surveys

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
UK Grad Programme: What do PhDs do? (WDPD)

Project (2004)
- Commissioned by UK Grad Programme with Graduate Prospect
- Statistics from the Higher Education Statistical Agency (Destination of Leavers from Higher Education, 1973)

Purpose
- For PhD candidates: make informed career decisions
- For supervisors: understand potential careers, transferable nature of PhDs
- For employers: what PhDs can offer them
- To illustrate the diversity of PhD population

Content:
- Employment by sector and titles, unemployment, postdoc (0-18 months after PhD) by field of study
- Demographics
- “viewpoints and messages from key organization and individuals”

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Strength + Limitations
UK What Do PhDs do? (WDPD)

Strength:
• Annual census information of UK doctoral recipients first jobs 0-18 months at degree award

Limitations:
• No career progression/path information
• No reasons for job choice
• Short application of knowledge and skills acquired
• No assessment/information for individual institutions/quality of education/program

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
UNESCO/OECD/Eurostat
(in development)

Project by
- the UNESCO institute for Statistics, OEC, Statistical Office of the European Commission

Purpose
- To collect internationally (European?) comparable statistics of PhD, annually?
- To establish and analyze trends on career paths - workforce development
- To ensure career development of highly qualified people all over the world

Content (longitudinal survey?)
- statistics on educational history including financial support
- work experience (postdoc appointments), unemployment
- Career productivity (publication & patents, )
- Job satisfaction and salary
- International and intro-sector mobility

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Strength + Limitations
UNESCO/OECD/Eurostat

(in development)

Strength:
• Well designed, comprehensive survey on employment
  Captures reasons for international mobility
• International comparison possible

Limitations:
• No assessment of doctoral education experience
• No possibilities for individual institutional adjustments
• Unclear access to data level, no tool for doctoral education
  program improvement

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
US Survey of Earned Doctorates (SED)

Project (since 1958)
• Coordinated by the National Science Foundation (NSF) on behalf of 6 federal agencies,
• administered by the Nat. Opinion Research Center (NORC)

Purpose
• To annually collect statistics of new doctoral recipients
• To establish trend analyses over time
• To Provide information for labor market planning

Content:
• Educational history
• Sources of financial support
• Immediate plans after doctorate completion
• Demographics

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Strength + Limitations
US Survey of Earned Doctorates (SED)

Strength:
• Annual census information of US doctoral recipients
• Information of indebtedness
• Parental education

Limitations:
• No assessment of doctoral education experience
• No actual employment information, only plans

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
US Survey of Doctorate Recipients (SRD)

Project (since 1973)
- NSF + NIH, administered by the Nat. Opinion Research Center (NORC)

Purpose
- To biannually collect longitudinal panel survey information, surveys people until age 76
- To provide estimates of characteristics of Science & Engineering workforce, for workforce development planning

Content:
- Selected fields & only for those remaining in the US
- Employment information
- Job satisfaction
- Publication, patents
- Further employment training

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Strength + Limitations
US Survey of Doctorate Recipients (SDR)

Strength:
Detailed employment information

Limitations

• Cannot be used for analyzing PhD career outcomes by doctoral programs, departments or individual universities

• No possibilities for individual institutional adjustments

• No tool for doctoral education program improvement

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Center for Innovation and Research in Graduate Education Surveys
CIRGE Surveys (5-10 Years Out)

Project by
- The national Center for Innovation and Research in Graduate Education at the University of Washington, Seattle, funded by Ford Foundation

Purpose
- To collect national comparable statistics of PhD career and educational outcomes by program, departments, and universities
- To provide data & analyses of career path information, assessment of doctoral program quality, and usefulness of the doctoral degree to graduate deans, department chairs, disciplinary professional associations, and students
- To improve doctoral education

Content
1. Career goals at start and end of PhD education
2. Career paths and salary
3. Job search, reasons for job selection
4. Job satisfaction
5. Family and career
6. Evaluation of PhD education
7. Usefulness of PhD education

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Strength + Limitations
CIRGE surveys

Strength:

• Detailed user-friendly information on career path and job choices
• Allows for user adjustments
• Allows for comparison of quality assessment of doctoral programs, department, or universities
• Includes professional development of doctoral students (generic skills)
• Allows for capturing career development in the context of partner/family information

Limitations:

surveys major fields of studies every 3 years

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Relevant Questions about PhD Careers and Educational Outcomes

1. Are PhDs employed? in what sectors, in which organization, in what positions?
2. What are influential factors, such as career goals, relationships, and family influences, future-oriented scholarly employment preparedness?
3. How useful is the doctoral education for the subsequent career path?
4. How satisfied are PhDs with their careers?
5. Does career outcomes information relate to doctoral program quality?
6. What kind of information is needed to provide feedback to doctoral programs to improve their quality?

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Questioning traditional assumptions about doctoral program quality using career outcome measures

Source: CIRGE, University of Washington: AGS, "Defining Successful Careers," Florence 7-8-2005
Empirical Findings from Three US PhDs –10+ and 5 Years Later Studies

1. PhDs—Ten Years Later *(surveyed 1997)* MELLON FOUNDATION AND NSF FUNDED
   61 US universities, 6 disciplines
   
   Survey population: 5,864  response rate: 66%
   - Biochemistry  - Computer Science
   - Electrical Engin.  - English
   - Mathematics  - Political Science

2. PhDs in Art History – Over a Decade Later *(surveyed in 2002)* GETTY GRANT FOUNDATION FUNDED
   54 US universities, all art history PhD programs
   
   survey population: 725  response rate: 70%

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
3. Social Science PhDs – 6+ Years Out
(surveyed 2005/2006) FORD FOUNDATION FUNDED

64 universities, 6 disciplines, 50% response rate (3,332)
- Anthropology
- Geography
- Political Science
- Communications
- History
- Sociology

Survey instrument:
• Career goals at start and end of PhD education
• Career paths and salary
• Job search and job satisfaction
• Evaluation of doctoral education
• Usefulness of doctoral education
• Family and Career

Source: CIRCE, University of Washington, AESS, "Defining Successful Careers," Florence, 7-8, 2005
Common *(incorrect)* US Assumptions about US PhDs

1. All PhD students want to become professors.
2. The “best” PhD students do become professors.
3. PhD recipients’ career paths are linear and smooth.
4. Everybody can take the best job offered.
5. Academic staff enjoy the highest job satisfaction

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Common Assumption 1

All students who you pursue a PhD want to become professors.

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
## Career Goal at PhD Completion and Tenured 10-14 Years Later

<table>
<thead>
<tr>
<th>Discipline</th>
<th>% Wanted to Be Professor</th>
<th>% Tenured of (1)</th>
<th>% Tenured of All PhDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio-Chemistry</td>
<td>32</td>
<td>34</td>
<td>19 (605)</td>
</tr>
<tr>
<td>Computer Sc.</td>
<td>46</td>
<td>61</td>
<td>34 (282)</td>
</tr>
<tr>
<td>Electrical Engin.</td>
<td>19</td>
<td>67</td>
<td>22 (328)</td>
</tr>
<tr>
<td>English</td>
<td>81</td>
<td>64</td>
<td>55 (767)</td>
</tr>
<tr>
<td>Mathematics</td>
<td>54</td>
<td>73</td>
<td>54 (522)</td>
</tr>
<tr>
<td>Political Sc.</td>
<td>72</td>
<td>66</td>
<td>53 (455)</td>
</tr>
</tbody>
</table>

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Employment at Survey, 1996/97 10+ Years after PhD

## Career Goal at PhD Completion and % Tenured or Tenure-Track 6+ Years Later

<table>
<thead>
<tr>
<th>Major Field</th>
<th>(1) % Want to be Professor</th>
<th>(2) % Tenure + TT of (1)</th>
<th>(3) % Tenure+ TT of All PhDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anthropology</td>
<td>72</td>
<td>60</td>
<td>48</td>
</tr>
<tr>
<td>Communication</td>
<td>75</td>
<td>77</td>
<td>63</td>
</tr>
<tr>
<td>Geography</td>
<td>64</td>
<td>70</td>
<td>48</td>
</tr>
<tr>
<td>History</td>
<td>84</td>
<td>71</td>
<td>60</td>
</tr>
<tr>
<td>Political Sc.</td>
<td>77</td>
<td>77</td>
<td>63</td>
</tr>
<tr>
<td>Sociology</td>
<td>75</td>
<td>77</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: CIRGE, University of Washington. AGS, “Defining Successful Careers,” Florence 7-8-2005
Employment at Time of Survey
(2005/2006) 5+ Years after PhD (SS5)

Source: CIRGE, University of Washington: AGS, "Defining Successful Careers," Florence 7-8-2005
Selected Employer at Time of Survey (2005/2006) Social Science

Excluded: Not in the Workforce (55)

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Common Assumption 2

The “best” PhD students do become professors

measures: short time-to-degree, many publications
Common Assumption 2
The “best” become professors

Short time-to-doctoral degree and number of publications only mattered significantly for English and political science PhDs. These factors did NOT matter for biochemists, electrical engineerings, and mathematicians. Time-to-degree mattered for computer scientists (logistic regression analysis).

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Common Assumptions

the “best” and mentoring

What mattered most is the RANK of PhD-granting program. However in fields with an attractive job market outside academia, computer science and electrical engineering, RANK did NOT matter significantly.

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Common Assumption 3

PhD recipients’ career paths are linear and smooth

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
### Three Major Trajectories: Political Science

<table>
<thead>
<tr>
<th>Trajectory</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Faculty</td>
<td></td>
</tr>
<tr>
<td>TT to Ten. (219)</td>
<td>42%</td>
</tr>
<tr>
<td>2. BGN Employees</td>
<td></td>
</tr>
<tr>
<td>Business (29)</td>
<td>6%</td>
</tr>
<tr>
<td>Government (21)</td>
<td>4%</td>
</tr>
<tr>
<td>Non-Profit (15)</td>
<td>3%</td>
</tr>
<tr>
<td>Acad. to BGN (22)</td>
<td>4%</td>
</tr>
<tr>
<td>BGN to Acad. (10)</td>
<td>2%</td>
</tr>
<tr>
<td>Back and Forth (30)</td>
<td>6%</td>
</tr>
<tr>
<td>3. Crossovers</td>
<td></td>
</tr>
</tbody>
</table>

- **Trajectory 1:** Under 2yrs. BGN.
- **Trajectory 2:** Under 1yr. Acad.
- **Trajectory 3:** Over 2yrs. BGN and over 1yr. Acad.

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Common Assumption 4

Everybody can take the best job offered

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Educational Level of Partner of PhDs by Gender (all fields)

Women in the Survey

Partnered with PhD/Lawyer or Medical Doctor: 61%

Men in the Survey

Partnered with PhD/Lawyer or Medical Doctor: 27%

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Educational Level of Spouse by Gender and Field

AT PhD completion married women/ men BIOCHEMISTS had spouses with PhD/JD/MD (1997): 75% / 24%

AT PhD completion married women/ men MATHEMATICIANS had spouses with PhD/JD/MD (1997): 84% / 25%

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
“Good Opportunities for My Partner” Very Important in First Job Choice

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Who Influenced the Career Path?

**Art History**

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partner</td>
<td>44%</td>
<td>26%</td>
</tr>
<tr>
<td>Children</td>
<td>38%</td>
<td>13%</td>
</tr>
<tr>
<td>Taking Care of Relatives</td>
<td>13%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Common Assumption 5

Faculty enjoy the highest job satisfaction

Source: CIRGE, University of Washington: AGS, "Defining Successful Careers," Florence 7-8-2005
## % Very Satisfied in Job at Time of Survey (All Fields)

<table>
<thead>
<tr>
<th>Rank</th>
<th>%</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40%</td>
<td>243</td>
</tr>
<tr>
<td>2</td>
<td>39%</td>
<td>54</td>
</tr>
<tr>
<td>3</td>
<td>28%</td>
<td>54</td>
</tr>
<tr>
<td>4</td>
<td>26%</td>
<td>851</td>
</tr>
<tr>
<td>5</td>
<td>24%</td>
<td>430</td>
</tr>
<tr>
<td>6</td>
<td>22%</td>
<td>54</td>
</tr>
<tr>
<td>7</td>
<td>18%</td>
<td>131</td>
</tr>
</tbody>
</table>

**BNG manager/executive**

**Academic administrator**

**Acad. researcher**

**Tenured Professors**

**BNG researcher**

**Administrators**

**Temporary academic staff, lecturer,**

Source: CIRGE, University of Washington: AGS, "Defining Successful Careers," Florence 7-8-2005
Overall Current Job Satisfaction* by Sector

*Satisfaction=“Very Satisfied” + “Fairly Satisfied”

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Would You Do the PhD Again in Same Field or Different Field?

![Bar Chart]

- **AN**: Yes, Same Field (80%)  
  Yes, Different Field (20%)
- **CO**: Yes, Same Field (80%)  
  Yes, Different Field (20%)
- **GE**: Yes, Same Field (80%)  
  Yes, Different Field (20%)
- **HI**: Yes, Same Field (80%)  
  Yes, Different Field (20%)
- **PS**: Yes, Same Field (80%)  
  Yes, Different Field (20%)
- **SO**: Yes, Same Field (80%)  
  Yes, Different Field (20%)

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
What are criteria for measuring program effectiveness?

**Traditional Criteria**

1. % national fellowship holders
2. Recruitment of diverse student body
3. Reasonable Time to degree
4. Low attrition rate
5. Student satisfaction
6. Placement

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005
Further Measurement criteria

1. Job search experience
2. Current job satisfaction
3. Retrospective analyses of the quality of the doctoral education
4. PhD recipients’ opinions of the usefulness of their doctoral education
5. Recommendations for current students and current programs.
Thank you!

CIRGE website
www.cirge.washington.edu

Source: CIRGE, University of Washington: AGS, “Defining Successful Careers,” Florence 7-8-2005