PhD Completion and Attrition Data at NC State: What the Graduate School can do for you

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Have we got a problem here?

MALLARD FILLMORE

I've got my future all mapped out...

STAY IN GRADUATE SCHOOL UNTIL I'M ELIGIBLE FOR SOCIAL SECURITY...

TINSLEY 6-30
Preamble

• Improvement of doctoral completion does **not** represent a lowering of academic standards
• Attrition – good or bad?
• Data should be used constructively
• How can we improve?
New Challenges

• New career opportunities for Ph.D.’s outside academia
• Interdisciplinarity
• Shrinking public investment
• Increased accountability (scientific misconduct)
New Paradigm

- From solitary scholarship towards collaboration
- Integration of research/teaching/service
- In-depth specialization with breadth of preparation (transferable skills needed)
- Connect academic work with larger social context
- Ethics, respect, responsibility
Participating Programs

Botany
Microbiology
Genetics
Civil Engineering
Computer Sci.
Chemical Eng.

Chemistry
Physics
Mathematics
Economics
Psychology
Sociology

Data from 1992-93 through 1997-98 cohorts
Average ten-year cumulative Ph.D. completion rates (%) for NC State vs national rates, by broad field (1992-93 through 1997-98 cohorts)

National 10 year completion and attrition rates were obtained from the Council of Graduate School data from the 1992-93 through 1994-95 cohorts; National data for Physical & Mathematical Sciences includes Computer Science.

Broad field contains data from the 12 participating programs in the National Ph.D. Completion Project.
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Cumulative ten-year Ph.D. attrition Rates (%) for NC State vs national rates, by broad field (1992-93 through 1997-98 cohorts)

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Broad field contains data from the 12 participating programs in the National Ph.D. Completion Project.
Average cumulative ten-year Ph.D. completion rates (%) for all programs at NC State University by college (1992-93 through 1997-98 cohorts)

 Completion Rate (%)

<table>
<thead>
<tr>
<th>Colleges</th>
<th>Agriculture &amp; Life Sciences</th>
<th>Education</th>
<th>Engineering</th>
<th>Humanities &amp; Social Sciences</th>
<th>Management*</th>
<th>Natural Resources</th>
<th>Physical &amp; Mathematical Sciences</th>
<th>Textiles</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70.3</td>
<td>55.9</td>
<td>61.5</td>
<td>49.0</td>
<td>48.1</td>
<td>53.1</td>
<td>61.5</td>
<td>62.5</td>
<td>56.1</td>
</tr>
</tbody>
</table>

*College of Management completion rates are based on the doctoral program in Economics.

National 10 year completion and attrition rates were obtained from the Council of Graduate School data from the 1992-93 through 1994-95 cohorts; National data for Physical & Mathematical Sciences includes Computer Science and the Broad Field of Humanities.

Broad field contains data from the 12 participating programs in the National Ph.D. Completion Project.
Average cumulative ten-year Ph.D. attrition rates (%) for NC State University by college (all Ph.D. programs) (1992-93 through 1997-98 cohorts)

<table>
<thead>
<tr>
<th>College</th>
<th>Attrition Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture &amp; Life Sciences</td>
<td>26.7</td>
</tr>
<tr>
<td>Education</td>
<td>34.5</td>
</tr>
<tr>
<td>Engineering</td>
<td>37.1</td>
</tr>
<tr>
<td>Humanities &amp; Social Sciences</td>
<td>39.0</td>
</tr>
<tr>
<td>Management*</td>
<td>50.0</td>
</tr>
<tr>
<td>Natural Resources</td>
<td>44.8</td>
</tr>
<tr>
<td>Physical &amp; Mathematical Sciences</td>
<td>37.1</td>
</tr>
<tr>
<td>Textiles</td>
<td>36.4</td>
</tr>
<tr>
<td>National</td>
<td>29.7</td>
</tr>
</tbody>
</table>

* College of Management attrition rates are based on the doctoral program in Economics.
Average ten-year Ph.D. completion rates (%) for female students at NC State University vs. national Rates, by broad field (1992-93 through 1997-98 cohorts)

- **Engineering**
  - NC State: 66%
  - National: 56%

- **Agriculture & Life Sciences**
  - NC State: 62%
  - National: 56%

- **Physical & Mathematical Sciences**
  - NC State: 58%
  - National: 52%

- **Social Sciences**
  - NC State: 51%
  - National: 55%

Broad field data includes all Ph.D. programs compared to national rates.
Average ten-year Ph.D. completion rates (%) for male students at NC State University vs. national rates, by broad field (1992-93 through 1997-98 cohorts)

<table>
<thead>
<tr>
<th>Broad Field</th>
<th>NC State</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>61</td>
<td>65</td>
</tr>
<tr>
<td>Agriculture &amp; Life Sciences</td>
<td>75</td>
<td>64</td>
</tr>
<tr>
<td>Physical &amp; Mathematical Sciences</td>
<td>58</td>
<td>59</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>45</td>
<td>57</td>
</tr>
</tbody>
</table>

Broad field data includes all Ph.D. programs compared to national rates.
Cumulative ten-year Ph.D. completion rates (%) by student ethnicity at NC State University vs. national rates by broad field (1992-93 through 1997-98 cohorts)

**Engineering**
- African American: 50%
- Hispanic: 55%
- White: 60%

**Agriculture & Life Sciences**
- African American: 59%
- Hispanic: 54%
- White: 63%

Broad field data includes all Ph.D. programs compared to national rates.
Cumulative ten-year Ph.D. completion rates (%) by student ethnicity at NC State University vs. national rates by broad field (1992-93 through 1997-98 cohorts)

Broad field data includes all Ph.D. programs compared to national rates.
Factors affecting a student’s ability to complete the Ph.D. degree at NC State (completers vs. non-completers)

- Financial support: Non-Completers 71.9, Completers 71.9
- Mentoring/advising: Non-Completers 66.6, Completers 70.5
- Personal circumstances: Non-Completers 32.5, Completers 32.5
- Professional/Career guidance: Non-Completers 39.5, Completers 39.5
- Program quality: Non-Completers 36.3, Completers 36.3
- Program requirements: Non-Completers 31.3, Completers 31.3
- Social environment/peer group support: Non-Completers 18.8, Completers 18.8
- Family (non-financial) support: Non-Completers 60.8, Completers 60.8
- Other: Non-Completers 10, Completers 10

Other: Non-Completers 8.6, Completers 8.6
What the Graduate School can do for you

- Teach transferable skills (PFL)
- Aid programs in defining and monitoring expectations (explicit vs implicit)
- Providing data
- Assist programs by providing mentoring skills to graduate faculty
- Dissertation fellowships
What programs can do:

- Create vibrant intellectual community (open exchange of ideas)
- Encourage creativity and entrepreneurship
- Develop stewards of academic discipline
- Create participatory governance
- Model respect and ethical behavior
- Create set of best practices
What programs can do:

- Move from apprenticeship model towards a more interactive and participatory model
- Make connections between research, teaching and service
- Encourage social interactions
- If students are ill suited for PhD, intervene and if need be, terminate early
SUMMARY

• NC State’s average PhD completion rate is very close to national mean
• We need to improve completion in some programs
• Most important factors affecting completion are funding, mentoring and socialization of students
• We want to partner with you
REFERENCES


Re-envisioning the Ph.D. Carnegie Initiative on the Doctorate
www.carnegiefoundation.org/CID

The PhD Completion Project – Council of Graduate Schools
THE END
• Improvement of doctoral completion does not represent a lowering of academic standards.

• Our intellectual capital needs to be fostered in an environment of respect and highest level of integrity.

• It’s too expensive and abhorrent not to do so.
Best Practices

- Truth in advertising
- Selective admissions
- Assign mentors to students immediately upon matriculation
- Study patterns of completion in individual program – data driven
- Discuss effective mentoring practices with graduate faculty
Best Practices

- Encourage social interaction among students and faculty
- Provide opportunities for students to acquire professional or transferable skills
- Preparing Future Leaders (PFL)
- Integrate students into discipline
- Explicit vs implicit expectations
- Track progress of students’ milestones
Best Practices

• Enforce annual progress reports
• Prepare students for myriad of careers
• Act early– if student is failing, consider intervention and even termination
• Dissertation support groups
• Partner with Graduate School in acquisition of data, assessment practices, etc.
# Average Cumulative Ten-Year Ph.D. Completion Rates (%) for Students Entering NC State University (1992-93 through 1997-98 cohorts) vs. National Rates, by Broad Field

<table>
<thead>
<tr>
<th>Broad Field</th>
<th>NC State</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>64.5</td>
<td>61.1</td>
</tr>
<tr>
<td>Life Sciences</td>
<td>64.6</td>
<td>65.4</td>
</tr>
<tr>
<td>Physical &amp; Mathematical Sciences</td>
<td>47.4</td>
<td>57.2</td>
</tr>
<tr>
<td>Social Sciences</td>
<td>47.8</td>
<td>53.3</td>
</tr>
</tbody>
</table>

X (mean) | 56.1 | 59.3 |

National 10 year completion and attrition rates were obtained from the Council of Graduate School data from the 1992-93 through 1994-95 cohorts. Broad field contains data from the 12 participating programs in the National Ph.D. Completion Project.
### Average Cumulative Ten-Year Ph.D. Attrition Rates (%) for Students Entering NC State University (1992-93 through 1997-98 cohorts) vs. National Rates, by Broad Field

<table>
<thead>
<tr>
<th>Broad Field</th>
<th>NC State</th>
<th>National</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering</td>
<td>31.5</td>
<td>30.8</td>
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<tr>
<td>Life Sciences</td>
<td>29.2</td>
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<td>Social Sciences</td>
<td>37.2</td>
<td>27.5</td>
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</table>

\( \bar{X} \) (mean) 35.1 29.0

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Cumulative Ten-Year Ph.D. Completion Rates (%) by Gender for Students Entering NC State University (1992-93 through 1997-98 cohorts) vs. National Rates, by Broad Field

<table>
<thead>
<tr>
<th>Broad Field</th>
<th>Female</th>
<th>Male</th>
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<tbody>
<tr>
<td></td>
<td>NC State</td>
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<tr>
<td>Engineering</td>
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<td>56.0</td>
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<tr>
<td>Agriculture &amp; Life Sciences</td>
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<td>Physical &amp; Mathematical Sciences</td>
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<tr>
<td>Social Sciences</td>
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<tr>
<td>( \bar{x} ) (mean)</td>
<td>59.3</td>
<td>54.3</td>
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Cumulative Ten-Year Ph.D. Completion Rates (%) by Ethnicity of Students Entering NC State University (1992-93 through 1997-98 cohorts) vs. National Rates, by Broad Field

<table>
<thead>
<tr>
<th>Broad Field</th>
<th>Ethnicity</th>
<th>NCSU</th>
<th>National</th>
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<tbody>
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<td>55.8</td>
<td>57.3</td>
<td>68.0</td>
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</tr>
</tbody>
</table>

* Cumulative cohort was <5.