Addressing Gaps in Research on First-Year Success

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Gauging the Influence of the Secondary School Environment, Part-Time Instructors, and Diversity on Preparation and Persistence of First-Year University Students

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1st Southern African Conference on the First-Year Experience, 8 – 10 September 2008, Stellenbosch University, Stellenbosch, South Africa

Changes in Higher Education

- *Academic:* Mounting numbers of under-prepared students graduating from secondary schools
- *Economic*: Greater reliance on part-time, non-regular adjunct instructors
- *Demographic*: Increase in the ethnic/racial diversity of students

How do they affect first-year students?

Case Study of a U.S. University

- Total enrollment of 17,000 students
- Moderately selective admission
- Public, research institution in medium-size town
- 2,800 first-year students from 55 secondary schools (93% of 2004/05 cohort) in state
- Data sources:
  - Institutional student information system (SIS)
  - State Department of Education accountability reports
- Variables tested:
  - Student demographics, academic preparation, first-year university experience, financial aid
  - Ten secondary school environment features

Analytical Approach

- Input-environment-output model by Astin to isolate variable effect
- All variables are measured on basis of objective indicators
  - % of courses taken in first year that were taught by part-time faculty
  - % of classmates by ethnic/racial identity
  - Quantitative metrics for secondary school features
- Output measures
  - Academic preparation at college entry: 100-point index comprising grades, test scores, AP credits
  - First-year cumulative academic performance (GPA)
  - Enrollment persistence into second year of study

Statistical Technique

- To estimate secondary school environment influence on academic preparation and first-year performance, *mixed-level linear regression* with cross-level interaction takes following form:

$$Yij = y_{00} + yp_0Xpij + y_{0q}Zqj + ypqZqjXpij + u_{0j} + eij$$

- To estimate probability of enrollment persistence into second year, *logistic regression* with interaction term:

$$\text{Log}_n(pi / [1- pi]) = y_0 + y_1Xi + y_2Zj + y_3\ XZij + ei$$

Findings

- Secondary school environment from which students came shows great variation:
  - Student enrollment: 101 to 3,500
  - Per student $ expenditure: $1,160 to $11,900
  - % of not highly qualified teachers: 0 to 70.4
  - Number of safety violations per 100 students: 0 to 14.2
  - % of non-Asian minority students: 6.1 to 74
  - Average class size: 5.6 to 33.1
  - % of students with limited English skills: 2.4 to 61
  - 82% of schools are located in urban areas
- But they have no significant effect on level of academic preparation at college entry

Findings

- Significant effects on first-year academic performance (cumulative GPA):
  - Average class size in secondary schools (slightly negative effect)
  - Academic preparation at college entry
  - Motivation to go to college
  - Negative effect of secondary school environment for low-income students
    - % of non-Asian minority student enrollment
    - % of students with limited English proficiency
    - Number of safety violations (guns, drugs, violence)

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Findings

- Significant effects on enrollment persistence:
  - No significant correlations associated with secondary school environment
  - Positive effect
    - Asian background, first-year GPA, number of courses taken, number of science courses
  - Negative effect
    - Non-local student, academic preparation at entry, receiving a failing/incomplete/withdrawal course grade

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Findings

- Significant interaction effects on enrollment persistence:
  - % of non-Asian minority classmates
    - Positive for non-Asian minority students
    - Negative for non-local students
  - For male students, positive effect with
    - First-year academic performance (GPA)
    - Working on campus
  - Living on campus, positive effect with
    - Academic preparation at college entry
- Enrollment persistence shows no significant link with exposure to part-time instructors

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Conclusion

- First-year students from low-income background may be negatively affected by the confluence of environmental factors in secondary schools that relate to peer culture, physical safety, and possibly immigrant student enrollment
- There is no evidence that part-time status of teaching faculty influences academic success and enrollment persistence of first-year students
- There is evidence that ethnic/racial diversity in the classroom has mixed effects on enrollment persistence of first-year students depending on their background

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Future Research

- Use of objective measures of diversity to replace or complement subjective data from student/faculty surveys
- Examine secondary-school data from individual schools in larger states to increase number of schools in the analysis
- Explore effects of part-time faculty across different disciplinary areas
- Test for higher-order effects in single multivariate model, rather than multiple tests on subsets of students

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Link to presentation:

http://www.cis.unr.edu/IA_Web/research.aspx

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