LA-STEM Student Outcome Report

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Executive Summary

The analysis examined if LA-STEM students experience beneficial outcomes related to graduation, GPA and attaining STEM degrees when compared to sA

Introduction

This analysis examined if LA-STEM students experienced beneficial outcomes related to graduation, GPA and attaining STEM degrees when compared to students from the general LSU population entering the university with an intended STEM major.

Using quantitative variables, participating students were matched with non-participating students using propensity score logistic regression. Student characteristics such as high school grade GPA, ACT scores, and parental income were used to predict group membership (LA-STEM, or non-LA-STEM). The values for predicted group membership were then incorporated in statistical models to hold preexisting differences constant between groups, and thus make a fairer comparison of outcome variables such as graduation rates and university level GPA.

Data Preparation and Considerations

The data consisted of 20,148 records from 3,488 students; each student had an individual record for each semester enrolled. Some variables were constant across semesters, while others (such as GPA) varied across semesters. Variables were aggregated to give each student only one record representing all semesters enrolled. To aggregate constant variables, the first record in the series was used. Variables that changed across semesters were aggregated using the series average. For the graduation variable, the last record (indicating graduation) was used in the aggregate data file.

Some variables needed to be recoded so that they could be used in statistical procedures. The racial/ethnic variable was recoded into a series of dichotomous variables such that African-American (and each other group) were represented by a 1, and all other groups represented by a 0. Some textual variables (e.g. *Gender*) were also converted into numerical values so that they could be used in quantitative analysis.

Group variables

LA-STEM students were classified as entering the program (based on *lastemi* = student in LA-STEM program in entry term (y/n)), and as either staying in the program through the last semester of data collected, or withdrawing from the program (based on *lastem* = LA-Stem (y/n) by semester).

The first LA-STEM Group (called *LA-STEM COHORT GROUP* in this analysis), consisted of 133 students in the LA-STEM group. The second group (called *LA-STEM PARTICIPATION GROUP*) split the first group, with 53 students classified as withdrawing from LA-STEM, and 80 students staying in the program.

Propensity Analysis and Summary Data

Propensity analysis used

Data considerations for propensity analysis

Because of the very large disparity in the size of the groups (causing restricted variability in the dependent measure), a "bootstrap" procedure was conducted comparing 25 smaller (n =1000) random samples of the larger group (Non-LA-STEM) with the LA-STEM group. No large differences in the composition or numerical values of beta weights were found between the smaller samples and the sample as a whole, moreover, using group probability weights derived from the smaller samples did not substantially change how the propensity variable worked as a matching covariate in outcome comparisons. Therefore, the original formula from the whole sample was retained.

Some variables also entered the formula but were not used because their amount of missing data limited the number of cases allowed in outcome analyses. For instance, *Family Income*, while predictive of group membership, could not be used in the logistic regression procedure because of the amount of missing data.

Outcome variables

Several outcome variables were used to compare LA-STEM and non-LA-STEM groups. These variables included *Graduation Rate, Cumulative GPA, Average Credit Hours per Semester*, *Average Number of Withdraws* and match between intended major and actual degree for STEM majors.

Graduation rate was calculated only for those students who had stayed in school for four years or more (e.g., starting before Spring 2006) and thus had the time to graduate; all students who graduated were counted, while only those who had been in school long enough to potentially graduate were counted as not receiving a degree. Forty-six LA-STEM students received degrees.

The Cumulative Grade Point Average is the average of all semesters' grades for each student. *Average Credit Hours per Semester* was calculated from non-zero records of credits taken each semester, and *Average Number of Withdraws* is the average number of courses with a "w" (withdrawal) grade over all semesters enrolled. Mean, SD and N for each group are presented in table 4 for all outcome variables for the cohort group, and table 5 for the participation group.

	LASTEM COHORT GROUP					
	NON-LA STEM			LA STEM		
	Mean	Standard Deviation	Valid N	Mean	Standard Deviation	Valid N
GRADUATION RATE	.54	.50	1271	.77	.43	

Dependent Variable: DEGREEGRANTED

Source	Type III Sum of

			DEGREE GRANTED		
			No	Yes	Total
LA STEM PARTICIPATION GROUP	NON-LASTEM	Count	586	685	1271
		Expected Count	573.0		

The analysis shows that students in the LA-STEM who started in either 2004 or 2005 cohorts graduated in higher rates than their peers in the general population.

Students withdrawing from LA-STEM had a graduation rate statistically equivalent to students in the general population. Both of these groups graduated at lower rates than the LA-STEM group.

2. *Do LA-STEM program participants have higher cumulative grade point average?*

Students' university cumulative grade point average was compared between LA-STEM and non-LA-STEM students. The ANCOVA for the LA-STEM COHORT comparison showed a significant effect favoring the LA-STEM group with $F = 22.78$, $df = 1, 3269$, $p < .0001$.

The same comparison for the LA-STEM PARTICIPATION group showed a similar main effect with $F = 15.2$, $df = 2, 3269$, $p < .0001$. The pattern of post

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Table 10 ANCOVA table for CUMULATIVE GPA comparison, LA-STEM COHORT Group

Dependent Variable: CUMULATIVE GPA

Source

3. *Did LA-STEM students take the same number of credits per semester on the average than the general population?*

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Dependent Variable: AVERAGE SEMESTER HOURS

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	64.124[a]	3	21.375	6.854	.000
Intercept	41037.214	1	41037.214	13159.410	.000
MATCHING	.021	1	.021		

Dependent Variable:AVERAGE NUMBER OF WITHDRAWS

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	2.955[a]	2	1.477	4.838	.008
Intercept	30.426	1	30.426	99.630	.000
MATCHING	2.062	1	2.062	6.751	.009

The LA-STEM COHORT group withdrew from courses significantly less than students in both the general population, and students withdrawing from LA-STEM.

5. *Did LA-STEM students change more or less out of STEM majors than students in the general population?*

All LA-STEM students graduated with STEM degrees. Only one student from the WITHDREW LA-STEM group graduated with a non-STEM degree, while 26% of students in the general population switched from their intended major out of STEM.