LONE STAR COLLEGE

Student Success Outcomes: A Regression Analysis

TAIR

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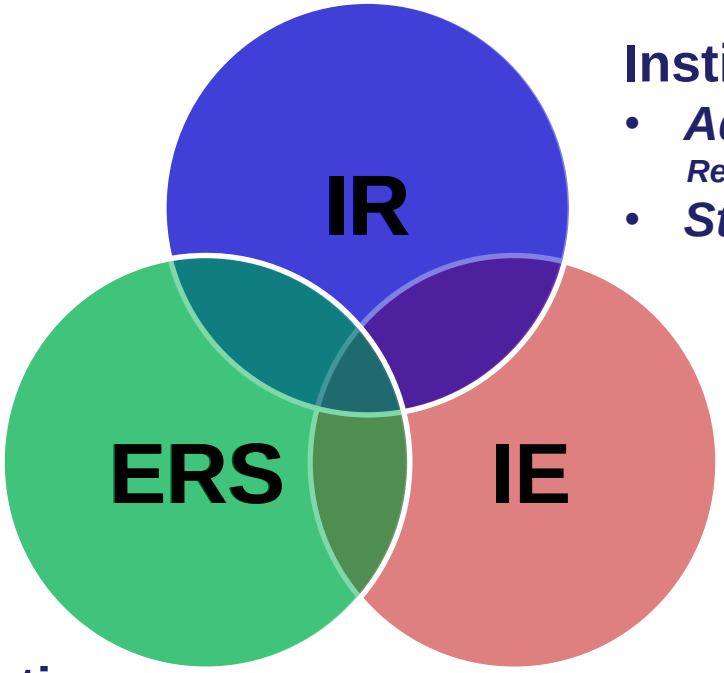
Lone Star College System
Office of Research
and Institutional Effectiveness

Anna Garland, Ph.D.
Latrice Rideout, Ph.D.
Christopher Tkach, Ph.D.

Lone Star College System

Over 76,000 credit students in Fall 2013
Six main campuses
Six centers
Two University Centers
Eleven ISDs in service area
62% Female
37% White, 19% Black, 30% Hispanic
36% between 20 and 24

ORIE Structure and Tasks



Institutional Research

- *Ad Hoc Reporting*
  Report generation & interpretation
- *Standardized Reporting*

Enterprise Reporting

- *State Reporting*
- *Dashboards*
- *Automated Reporting*

Institutional Effectiveness

- *SACS*
- *Continuous Improvement*
- *Student Learning Outcomes*

The Literature

- Student background characteristics and socioeconomic status (ASHE Higher Education Report, 2007)
- Quality of high school academic preparation (ACT Program, 2006)
- Family education background
- The availability and type of financial aid (May, 2002)
- Enrollment patterns (full time or part time, two-year or four-year institution, direct or delayed enrollment)

The Data

- LSCS Fall 2013 Headcount
- LSCS Spring 2014 Headcount

- Binary Logistic Regression: Did the student enroll in the Spring 2014 term?
  - Non-linear transformation of the linear regression, necessary with dichotomous dependent variables (0,1) (San Jose State University)
  - Results interpreted with odds ratios, the likelihood that the student enrolled

The Variables

Table 1: Operationalization of the Variables

Variable	Description
Dependent Variable	
Persistence	Enrollment in Spring 2014 term (yes=1, no=0)
Demographic Characteristics	
Age	Years of age of the student (continuous)
Age-squared	The quadratic form of age (age*age)
Gender	Gender of the student (male=1, female=0)
Race	Race/Ethnicity of the student (White is the reference category, black, Hispanic and other)
Income	Household income of the student ($0-$13,290=1, $100,000 or above=12)
Financial Need	
Scholarships	The student has a scholarship for the Fall 2013 term (yes=1, no=0)
Grants	The student has a grant for the Fall 2013 term (yes=1, no=0)
Need Based Loans	The student has a need based loan for the Fall 2013 term (yes=1, no=0)
Non-Need Based Loans	The student has a non-need based loan for the Fall 2013 term (yes=1, no=0)
Biological Influences	
Father's Education	Highest educational level of the student's father (Attended high school=1, Received bachelor's degree=4)
Mother's Education	Highest educational level of the student's mother (Attended high school=1, Received bachelor's degree=4)
Academic Characteristics	
Fall 2013 Credit Hours in Progress	The number of hours the student was enrolled in for the Fall 2013 term (continuous)
Fall 2013 Credit Hours in Progress-squared	The quadratic form of credit hours in progress (credit hours*credit hours)
FTIC	First time in college, 0 credit hours beginning the Fall 2013 term (yes=1, no=0)
Fall 2013 GPA	Grade point average at the conclusion of the Fall 2013 term (continuous)
Units Ratio	Ratio of credit hours earned by credit hours attempted in the Fall 2013 term (continuous)

The Population

Table 2: Descriptive Statistics

Variable	Mean	Range	N
Dependent Variable			
Persistence	0.72	0 to 1	64,652
Demographic Characteristics			
Age	24.45	12 to 82	64,652
Male	0.40	0 to 1	64,622
Black	0.18	0 to 1	61,871
Hispanic	0.35	0 to 1	61,871
Other	0.10	0 to 1	61,871
Income	6.19 ($31,771-$36,390)	1 to 12	35,728
Financial Need			
Scholarships	0.03	0 to 1	64,652
Grants	0.37	0 to 1	64,652
Need Based Loans	0.17	0 to 1	64,652
Non-Need Based Loans	0.15	0 to 1	64,652
Biological Influences			
Father's Education	2.54 (Attended college)	1 to 4	29,915
Mother's Education	2.55 (Attended college)	1 to 4	32,993
Academic Characteristics			
Fall 2013 Credit Hours in Progress	8.58	0 to 24	64,123
FTIC	0.16	0 to 1	64,652
Fall 2013 GPA	2.37	0 to 4	64,122
Units Ratio	0.76	0 to 1	64,523

The Relationships

Table 3: Correlation of Persistence

Variable	Correlation
Demographic Characteristics	
Age	-0.097*
Male	-0.024*
Black	-0.042*
Hispanic	0.019*
Other	0.025*
Income	0.042*
Financial Need	
Scholarships	0.048*
Grants	0.096*
Need Based Loans	0.035*
Non-Need Based Loans	0.030*
Biological Influences	
Father's Education	0.024*
Mother's Education	0.018*
Academic Characteristics	
Fall 2013 Credit Hours in Progress	0.182*
FTIC	0.065*
Fall 2013 GPA	0.350*
Units Ratio	0.283*

*p<.001

The Regression

Table 4: Binary Logistic Regression of Persistence

Variable	Coefficient	Standard Error	Odds Ratio
Demographic Characteristics			
Age	-0.016	0.001	0.985*
Male	-0.201	0.025	0.818*
Black	-0.106	0.034	0.899*
Hispanic	0.060	0.030	1.062
Other	0.194	0.046	1.214*
Income	0.018	0.003	1.019*
Constant	1.359	0.049	3.891*
N	35,162		
Nagelkerke R-square	0.013		

*p<.01

The Regression

Table 5: Binary Logistic Regression of Persistence

Variable	Coefficient	Standard Error	Odds Ratio
Demographic Characteristics			
Age	-0.079	0.007	0.924*
Age-squared	0.001	0.000	1.001*
Male	-0.207	0.025	0.813*
Black	-0.087	0.035	0.917
Hispanic	0.055	0.030	1.057
Other	0.194	0.046	1.214*
Income	0.014	0.003	1.014*
Constant	2.300	0.049	9.970*
N	35,162		
Nagelkerke R-square	0.017		

*p<.001

The Regression

Table 6: Binary Logistic Regression of Persistence

Variable	Coefficient	Standard Error	Odds Ratio
Demographic Characteristics			
Age	-0.106	0.008	0.900*
Age-squared	0.001	0.000	1.001*
Male	-0.141	0.025	0.868*
Black	-0.276	0.036	0.758*
Hispanic	0.064	0.031	1.066
Other	0.202	0.046	1.224*
Income	0.051	0.003	1.053*
Financial Need			
Scholarships	0.734	0.095	2.083*
Grants	0.709	0.033	2.031*
Need Based Loans	0.222	0.039	1.248*
Constant	2.135	0.121	8.455*
N	35,162		
Nagelkerke R-square	0.052		

*p<.001

The Regression

Table 7: Binary Logistic Regression of Persistence

Variable	Coefficient	Standard Error	Odds Ratio
Demographic Characteristics			
Age	-0.116	0.010	0.890*
Age-squared	0.001	0.000	1.001*
Male	-0.142	0.030	0.868*
Black	-0.295	0.042	0.745*
Hispanic	0.088	0.038	1.092
Other	0.161	0.054	1.174
Income	0.042	0.004	1.043*
Financial Need			
Scholarships	0.836	0.114	2.307*
Grants	0.646	0.041	1.909*
Need Based Loans	0.272	0.048	1.313*
Biological Influences			
Father's Education	0.064	0.016	1.066*
Mother's Education	-0.009	0.017	0.991
Constant	2.253	0.157	9.520*
N	35,162		
Nagelkerke R-square	0.051		

*p<.001

The Regression

Table 8: Binary Logistic Regression of Persistence

Variable	Coefficient	Standard Error	Odds Ratio
Demographic Characteristics			
Age	-0.134	0.011	0.890*
Age-squared	0.002	0.000	1.001*
Male	-0.039	0.034	0.868*
Black	0.159	0.048	0.745*
Hispanic	0.203	0.043	1.092
Other	0.046	0.061	1.174
Income	0.016	0.005	1.043*
Financial Need			
Scholarships	0.251	0.122	2.307*
Grants	0.370	0.047	1.909*
Need Based Loans	0.447	0.055	1.313*
Biological Influences			
Father's Education	0.001	0.018	1.066*
Mother's Education	-0.028	0.019	0.991
Academic Characteristics			
Fall 2013 Credit Hours in Progress	0.101	0.005	1.107*
FTIC	0.415	0.046	1.515*
Fall 2013 GPA	0.501	0.015	1.651*
Units Ratio	0.809	0.809	2.247*
Constant	2.253	0.157	9.520*
N	24,601		
Nagelkerke R-square	0.275		

*p<.001

The Regression

Table 9: Binary Logistic Regression of Persistence

Variable	Coefficient	Standard Error	Odds Ratio
Demographic Characteristics			
Age	-0.140	0.011	0.870*
Age-squared	0.002	0.000	1.002*
Male	-0.035	0.034	0.965
Black	0.158	0.048	1.171
Hispanic	0.198	0.043	1.219*
Other	0.049	0.061	1.050
Income	0.016	0.005	1.016
Financial Need			
Scholarships	0.259	0.122	1.295
Grants	0.336	0.047	1.399*
Need Based Loans	0.428	0.055	1.534*
Biological Influences			
Father's Education	0.005	0.018	1.005
Mother's Education	-0.024	0.019	0.977
Academic Characteristics			
Fall 2013 Credit Hours in Progress	0.286	0.021	1.331*
Fall 2013 Credit Hours in Progress-squared	-0.010	0.001	0.990*
FTIC	0.391	0.046	1.478*
Fall 2013 GPA	0.502	0.015	1.651*
Units Ratio	0.834	0.044	2.302*
Constant	-0.231	0.193	0.793
N	24,601		
Nagelkerke R-square	0.279		

*p<.001

The Summary

- Quadratic relationship between age and persistence
- Hispanics more likely to persist than whites
- Students with grants and need based loans are more likely to persist than those without
- Quadratic relationship between credit hours in progress and persistence
- FTIC students more likely to persist
- GPA matters
- Units ratio matters

The Next Step

- Identify the At-Risk students
  - Low GPA
  - Number of credit hours in progress
  - From correlation: males and blacks
- Early Alert Programs
- High Impact Practices

- Further Research
  - Delivery Method (Online vs. Face-to-Face)
  - Breakdown by ISDs (Identify At-Risk ISDs)

Thank you!

Questions?

Anna Garland, Ph.D.
Anna.N.Garland@lonestar.edu
281.312.1777

Latrice Rideout, Ph.D.
Latrice.Rideout@lonestar.edu
281.290.2650