Unique Impact of Programs and Services on Fall 2016 Freshman Retention

Overview

A multivariate logistic regression analysis evaluated the unique contribution of first-year programs and services on retention outcomes after accounting for other factors that affect retention. Results provide staff, faculty, and leaders a better understanding of how freshman students benefit from their involvement in first year experiences by continuing into their sophomore year at the University of Arizona. Results indicate statistically significant support for the positive effect of participation in programs and services on freshman student retention.

Data and Methodology

The fall 2016 first-time full-time freshman domestic[1] student population was included in the analysis. Due to international students not having high school GPA, an important control when examining retention, they were excluded from the analysis. Furthermore, 14 domestic students who had missing high school GPA were also removed from the analysis. The remaining student population analyzed (N=5,525) experienced an 82.7% (n=4,569) retention rate. The analysis estimates the association between participation in programs and services and returning to sophomore year. Explanatory variables were selected based on well-documented relationships with first-year student retention in student success research and previous institutional assessments. Control variables are listed under Student Demographic Profile and independent variables categorized as Summer Transition, Academic Support, Student Engagement, and Health and Wellness (See Appendix A).

Logistic regression is considered a strong statistical technique to predict the outcomes of binary variables, such as student retention (e.g. Retained vs. Did not retain). Assumptions testing was conducted with an evaluation of minimum number of observations before building the regression model. A stepwise method was then used to evaluate added explanatory variables through the Likelihood Ratio Test and Akaike's Information Criterion (AIC) to determine if variables improved model fit. This process continued until the resulting best-fitted regression model was achieved to predict student retention. Goodness-of-fit tests were also employed and demonstrate statistics supportive of an acceptable model fit.

Results

Results are presented using odds ratios (OR) and statistical significance levels (See Figure 1). A variable's odds ratio indicates the odds or likelihood of retention occurring given a particular program or service compared to retention occurring without that experience. Odds ratios are interpreted by magnitude in three main ways:

- OR < 1 – Program or service indicates lower odds of retention occurring
- OR = 1 – Program or service does not affect the odds of retention occurring
- OR > 1 – Program or service indicates higher odds of retention occurring

Figure 1: Odds Ratios of Program or Service Participation on Student Retention
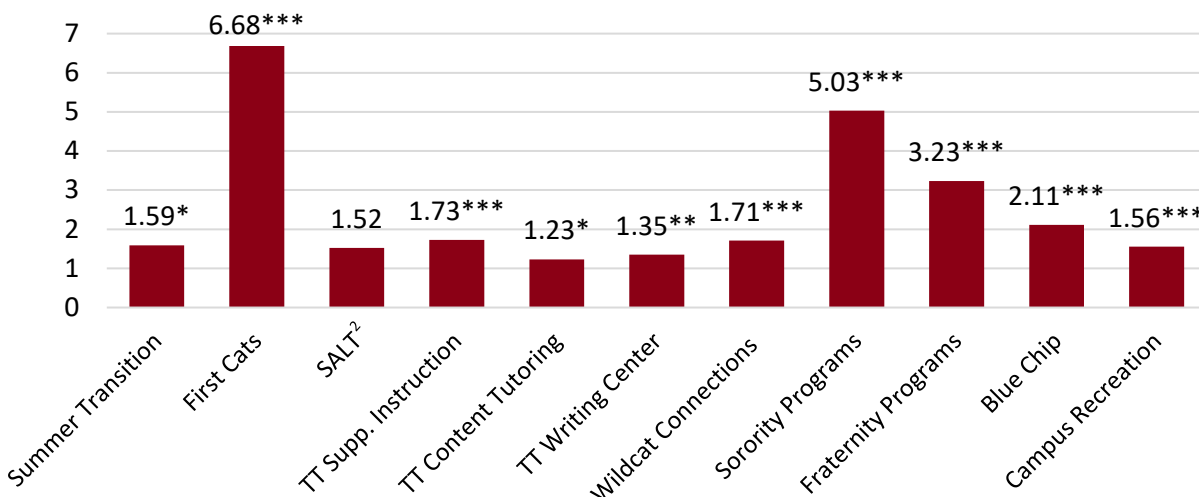
*Note: *p < 0.05; ** p < 0.01; *** p < 0 .001*

Discussion

Results indicate statistically significant support for the positive effect of participation in programs and services on freshman student retention. In other words, students who participated in Summer Transition, Academic Support, Student Engagement, and Health and Wellness programs were significantly more likely to persist to their sophomore year. For example, students who attended THINK TANK's Writing Center at least three times were 35% more likely to return to sophomore year compared to non-participants, while holding constant other variables ($p <$ .01). The First Cats program had the highest odds of retaining to sophomore year (OR 6.68, $p <$ .001). Campus Recreation active users (30 or more visits) were 1.56 times more likely to retain compared to non-active users while accounting for all other factors ($p <$ .001). A complete table of logistic regression results is included in Appendix B.

Source:
    Hosmer, D. W., Lemeshow, S., & Sturdivant, R. X. (2013) *Applied Logisitc Regression* (3rd Eds). John Wiley & Sons, Inc, Hoboken, NJ.

Footnote:
1. Domestic refers to students who live in the United States before enrolling into college.
2. SALT Center includes students enrolled in the program whether or not they used available programs and services.

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Appendix A

Descriptive Statistics of Variables

Variables	%	N
Student Demographic Profile		
Sex		
Male	43%	2,389
Ethnicity		
African American	4%	203
Asian American	6%	346
Hispanic	24%	1,330
Native American/American Indian	1%	58
Two or more races	6%	309
White	58%	3,229
Unknown/Other/Pacific Islander	1%	50
Living Situation		
Lives on-campus	77%	4,271
Generation Status		
First-Generation	28%	1,547
Residency (base = non-resident)		
AZ Resident	64%	3,510
Financial Aid		
Merit-based Aid Recipient	76%	4,182
Pell-grant Recipient	28%	1,542
Honor's College		
Enrolled in Honor's College	19%	1,034
Academic Preparedness		
High School GPA	3.48 (average)	
Summer Transition		
Summer Transition (Bear Down Camp, New Start, UAdvantage)	5%	285
Academic Support		
First Cats (AY 2016 - 17)	3%	141
SALT (AY 2016 - 17)[2]	2%	118
THINK TANK Supplemental Instruction (3+ sessions)	27%	1,487
THINK TANK Content Tutoring (3+ visits)	26%	1,414
THINK TANK Writing Center (3+ visits)	18%	981
Wildcat Connections Participant (10+ opens)	66%	3,638
Student Engagement		
Sorority Programs	12%	678
Fraternity Programs	5%	227
Blue Chip First-Year Experience	6%	339
Health and Wellness		
Campus Recreation		
Active User (30+ visits)	28%	1,530

Note: Percentages are rounded

Appendix B

Logistic Regression Results of FTFT Domestic Freshman Student Retention

Variable	Odds ratio
Student Demographic Profile	
Sex (base=female)	
Male	1.08
Ethnicity (base = white)	
African American	1.47*
Asian American	1.58**
Hispanic	1.09
Native American/American Indian	1.31
Two or more races	1.22
Unknown/Other/Pacific Islander	1.32
Living Situation (base = off-campus)	
Lives on-campus	0.79*
Generation Status (base = continuing-generation)	
First-Generation	0.78**
Residency (base = non-resident)	
AZ Resident	1.70***
Financial Aid (base = did not receive aid type)	
Merit-based Aid Recipient	1.12
Pell-grant Recipient	0.76*
Honor's College (base = not honor's enrolled)	
Enrolled in Honor's College	2.22***
Academic Preparedness	
High School GPA	1.54**
Summer Transition	
Summer Transition Programs (base = did not participate)	
Summer Transition	1.59*
(Bear Down Camp, New Start, UAdvantage)	
Academic Support	
Academic Support and Initiatives (base = did not participate)	
First Cats (AY 2016 - 17)	6.68***
SALT (AY 2016 - 17)[2]	1.52
THINK TANK Supplemental Instruction (3+ sessions)	1.73***
THINK TANK Content Tutoring (3+ visits)	1.23*
THINK TANK Writing Center (3+ visits)	1.35**
Wildcat Connections Participant (10+ opens)	1.71***
Student Engagement	
Student Engagement Programs (base = did not participate)	
Sorority Programs (AY 2016 - 17)	5.03***
Fraternity Programs (AY 2016 - 17)	3.23***
Blue Chip First-Year Experience (AY 2016 - 17)	2.11***
Health and Wellness	
Campus Recreation (base = 0-29 visits)	
Active User (30+ visits)	1.56***
Constant	0.33*

Note: *$p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Model Likelihood Ratio χ^2 =601.01, *df* =25, *p* < 0.0000
Diagnostic Statistics: Hosmer & Lemeshow, χ^2 = 9.57, *p* = 0.2964; Nagelkerke R^2 = 0.173; ROC Curve = 0.7428