STUDENT SUCCESS & RETENTION ANALYSIS

Prepared for Saint Augustine's University

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INTRODUCTION

Saint Augustine's University (SAU) has partnered with Hanover Research (Hanover) to conduct an analysis of factors that contribute to undergraduate student success, measured by first- to second-year retention and four-year graduation. The goal of this study is to provide SAU with additional markers of dropout risk and opportunities to identify students that need additional support at an early stage.

Hanover utilized both descriptive and predictive analysis methodologies in this study. The results are presented in a Tableau workbook that contains the following tabs:

- **Key Findings** and **Recommendations** tabs provide the main insights derived from this analysis.

- **Predicted Probability Calculator** tab includes an interactive tool that allows users to calculate predicted probabilities of retention and graduation for individual hypothetical students based on their characteristics.

- **Historical and Predicted Rates** tab allows users to visualize historical and predicted retention and graduation rates for custom student groups defined by two user-selected characteristics.

- **Model Overview** tab displays regression coefficients for both retention and graduation models.

- **Data Overview** and **Methodology** tabs provide additional details on Hanover's approach and the provided data.

- **Focus on additional academic support and ensure wide accessibility to services for students who are not high-achievers throughout all four years at SAU.** Regression analysis results identify a large gap in the probability of retention and graduation between students with a 2.1 GPA or below and those who earn higher first-term GPAs. However, while students with an "average" GPA (2.1-3.1) are approximately as likely as "high-achievers" (3.1 GPA or above) to persist into their second year, their likelihood of graduation falls significantly in succeeding years. Utilizing this early warning indicator in conjunction with targeted advising sessions for individual students can positively influence persistence and graduation. Other widely used forms of academic support services include peer tutoring, small discussion sections for introductory courses, and major-specific learning centers. Greater student-faculty engagement can also positively affect student persistence through designing relevant and student-centered curricula, communicating effectively with students, and engaging students in the learning process. Additionally, institutions are increasingly considering co-requisite remediation courses, as traditional remedial coursework can be a significant financial burden to students without granting credits they can apply to their degree.

- **Investigate and address potential gaps between the outcomes for various demographic subgroups.** Hanover's analysis shows that male and in-state students are significantly less likely to progress with their studies at SAU. Understanding the reasons why these subgroups tend to drop out at a higher rate may help SAU address specific challenges faced by these students and improve overall equity on its campus.

KEY FINDINGS

- **First-term GPA is a significant predictor of retention and four-year graduation.** On average, students with a 2.1-3.1 first-term GPA are 23 percentage points more likely to stay for the second year than the reference group (students with less than 2.1 GPA) and they are 7 percentage points more likely to complete their program on time. Students with a first-term GPA greater than 3.1 are 25 and 17 percentage points more likely to persist and graduate on time, compared to students with a GPA below 2.1.

- **Students in the Criminal Justice program are the most likely to complete their programs in four years.** Their 4-year graduation probabilities are, on average, 7 percentage points higher than the reference group (Business Administration students). Students in the remaining programs are not statistically significantly more or less likely to graduate on time compared to the reference group.

- **North Carolina residents are significantly less likely to stay for the second year of studies and to graduate within four years.** On average, the retention and on-time graduation probabilities of North Carolina resident students are 8 and 5 percentage points lower than out-of-state students, respectively.

- **African Americans are 26 percentage points less likely to persist to their second year of studies than other race/ethnicity groups.** Their graduation probabilities are, however, not statistically different from each other.

- **Female students are more likely to be retained and graduate in four years than male students.** They are 11 percentage points more likely to stay for the second year of studies and 6 percentage points more likely to complete their program in four years than male students.

Probability Calculator

This tab allows to calculate the probability of one-year retention and four-year graduation for a hypothetical student based on the observed characteristics. Use the filters on the left to select the outcome and student characteristics. The calculated probability will be shown in the chart on the right.

Select Input Value		Predicted Probability

Model
Retention

Gender
Male

First Term GPA
Less than 2.1
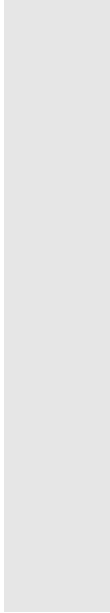
Programs (for graduation model only)
Business Administration

Residency
In State

Race/Ethnicity (for retention model only)
African American

31.56%
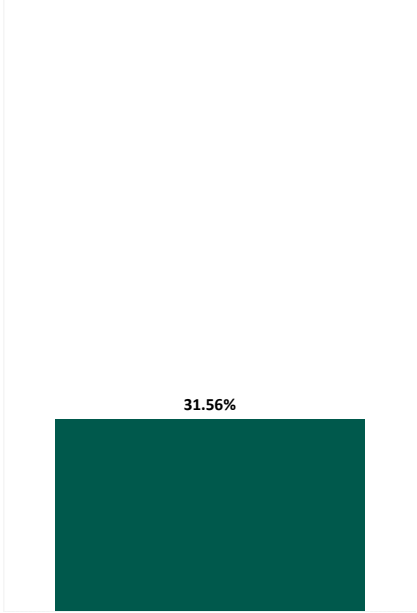
Historical and Predicted Rates

This tab allows to display historical and predicted one-year retention and four-year graduation rates for cross-sections of two selected student groups. Use the filters on the left to select the metric of interest and the breakdown measures for rows and columns. Users can filter out groups with a low student count using the "Minimum Records per Cell" filter.

Select Outcome
Historical Retention Rates

Select Columns
Term GPA

Select Rows
Programs

Minimum Records per Cell
From 1

Historical Retention Rates by Programs and Term GPA				
	Less than 2.1	**2.1-3.1**	**More than 3.1**	**Unknown**
Biology	42.86%	70.59%	70.59%	36.00%
Business Administration	30.43%	48.57%	45.83%	48.44%
Criminal Justice	28.81%	55.00%	65.71%	44.74%
Psychology	32.35%	50.00%	68.00%	35.29%
Sport Management	24.68%	50.94%	41.67%	58.70%
Public Health Science	22.22%	54.55%	73.53%	54.55%
Other/Undecided	32.72%	53.38%	58.19%	44.83%

22.22% ■■■■■■■■■■■■■■■■■■ 73.53%
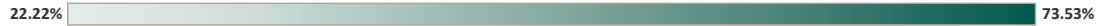
MODEL OVERVIEW

Variable	Retention	Graduation
Gender (Ref.: Male)		
Female	0.1127***	0.0622***
Unknown	-0.0885	-0.0191
Race/Ethnicity (Ref.: African American)		
Other	0.2551***	
Unknown	-0.0465	
Residency (Ref.: In State)		
Out of State/Unknown	0.0821***	0.0532***
Term GPA (Ref.: Under 2.1)		
2.1 - 3.1	0.2343***	0.0693***
More than 3.1	0.2534***	0.1659***
Unknown (Zero GPA Hours)	0.1478***	0.0440***
Programs (Ref.: Business Administration)		
Sport Management		0.0000
Criminal Justice		0.0717*
Biology		-0.0180
Public Health Science		-0.0215
Psychology		0.0310
Other/Undecided		-0.0165
Entry Academic Year (Ref.: 2016)		
2017	-0.0136	-0.0104
2018	0.0030	0.0027
2019	0.0034	
2020	0.0933**	
Observations	2,011	1,366

DATA OVERVIEW

SAU has provided Hanover with its enrolled student data from the 1930s to Fall 2021. The data includes student demographics, academic performance, financial aid, and course records. The following assumptions were made during the data setup procedure:

- Hanover focused on students whose first enrollment term at SAU is Fall 2015 and onwards. Fall 2015 – Spring 2020 student cohorts were analyzed for the retention outcome and Fall 2015 – Fall 2017* student cohorts were analyzed for the graduation outcome.

- Hanover assumed the spring term begins in January, the summer term is from May to July, and the fall term begins in August.

- Hanover defined the first-to-second year retention outcome as follows: Fall student cohorts were treated as retained if they appear in the "Hanover_StudentDemographics_CAMS_Updated" file for the fall term of the next academic year following their enrollment. The same approach was applied to the spring student cohorts. For summer student cohorts, they were treated as retained if they appear in the file for the summer term of the next academic year (entry academic year + 1) or the fall term of the academic year after (entry academic year + 2).

- Students were treated as graduated on time if they appear in the "Hanover_GraduatedStudents_CAMS" file and graduated within four years.

- Due to incomplete data and low merge rates with the demographic file, Hanover excluded the course and financial aid data files from the analysis.

- 46 students have more than one state record in their first term at SAU. For students who have one value as "NC" and other value(s) as other states, we treated them as in-state students.

- Hanover treated the first-term GPA as unknown for 393 students whose GPA hours are zero and term GPA is zero in the term.

- Hanover combined small race/ethnicity groups such as "American Indian," "Asian or Pacific Islander," and "White" as "Other" and categorized race/ethnicity into "African American," "Other," and "Unknown" groups.

- Hanover excluded students whose first-term program is "Leadership Academy."

* Hanover assumed the graduation data is incomplete for Fall 2021 as there is only one student graduated in that term compared to 13-30 students in the earlier fall terms.

Hanover employed both descriptive analysis and regression analysis in this study. In the descriptive part of the analysis, Hanover compared the historical rates and predicted probabilities of one-year retention and four-year graduation across different student subgroups segmented by entry year and term, first-term GPA, program, gender, residency, and race/ethnicity.

In the regression part of the analysis, Hanover used the logistic (logit) regression methodology to model the binary retention and graduation outcomes. From the pool of all available predictors, Hanover checked pairwise correlations between predictors and kept only one variable from each group of highly correlated predictors. The final models only include variables that are significantly predictive of the outcomes of interest. The coefficients from logit models are used in the "Predicted Probability Calculator" tab to calculate the probability of one-year retention and four-year graduation for hypothetical students based on their observed characteristics. Additionally, the fitted values from the models are shown in the "Historical and Predicted Rates" tab as the average predicted retention and graduation rates.

Finally, Hanover converted the raw logistic results (log odds ratios) to marginal effects at the means (MEMs) for easier interpretation. The MEMs methodology calculates the percentage-point change in the probability of a binary outcome per one-unit change in the continuous predictor while the latter is fixed at the sample mean value. In the case of categorical explanatory variables, MEMs estimate the change in a student's predicted probability of retention/graduation for a given classification (e.g., Female), compared to a reference category (e.g., Male), while all predictors are held constant at their average values. The MEM output is presented in the "Model Overview" tab.

Limitation:

Due to data limitations, Hanover was unable to identify students' transfer status. The first-to-second year retention and four-year on-time graduation might not be accurately defined for transfer students.