Analysis of Test-Optional Admissions at Saint Vincent College

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DS-400 Data Science and Analytics Capstone

SAINT VINCENT COLLEGE

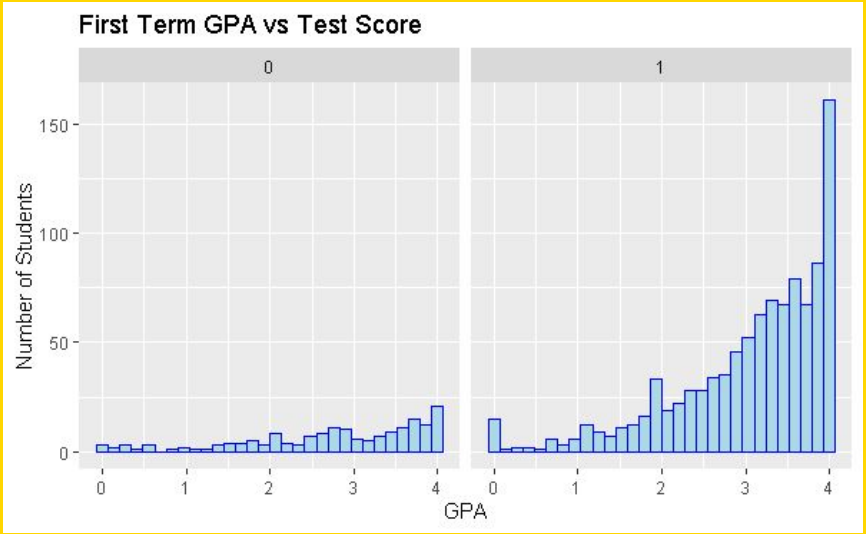
Goals & Problems

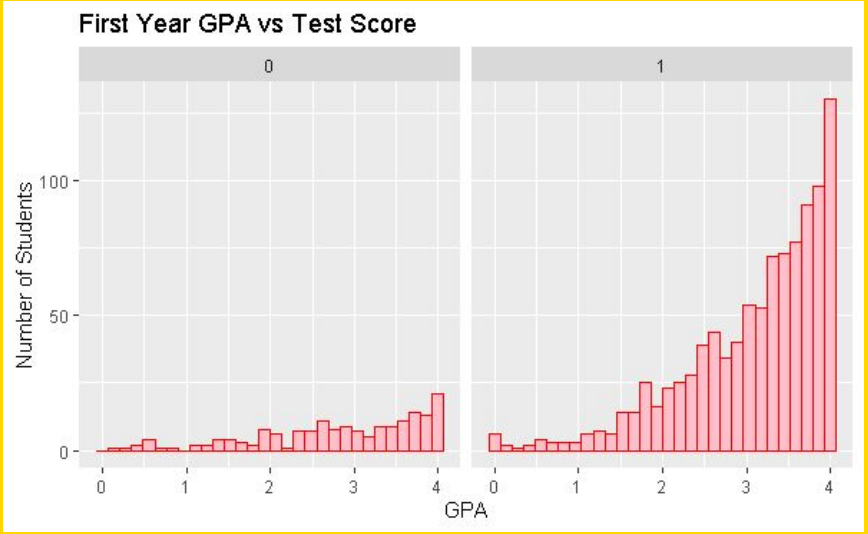
- Study the implications of the change in SVC's admission policy to test-optional applications.
  - This makes admitting an individual difficult since SAT/ ACT scores used to be the primary variable
- Find an alternative variable to aid final admittance decision
  - Use the alternative variable to appropriately award financial aid to each accepted student

The Process

- Three different cohorts (2019-2021) were analyzed
  - Find relationships between academic outcomes and whether or not a test score was submitted
- Study patterns to identify alternative criteria to test scores for admission and scholarship decisions
- Performed logistic regression, correlation analysis, and other classification methods

Exploratory Data Analysis – EDA



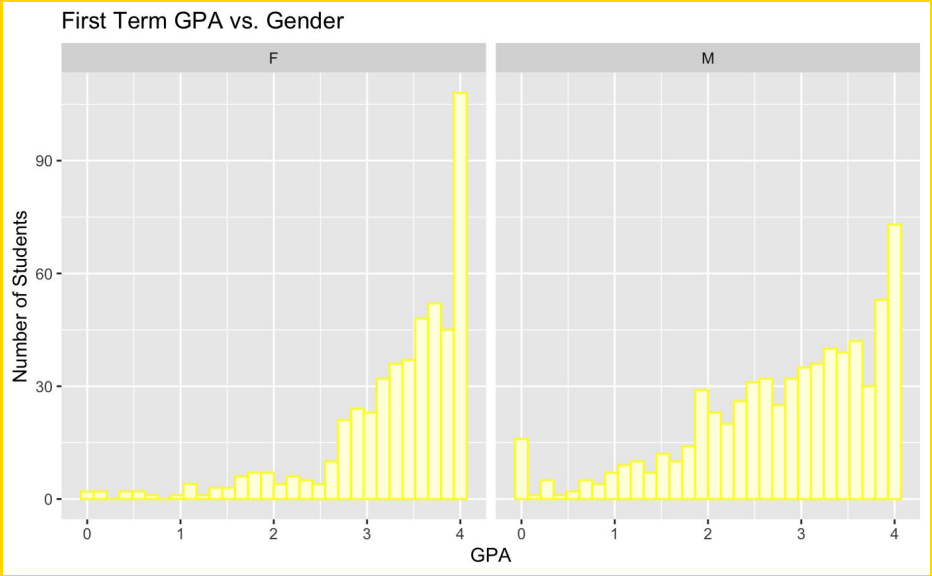


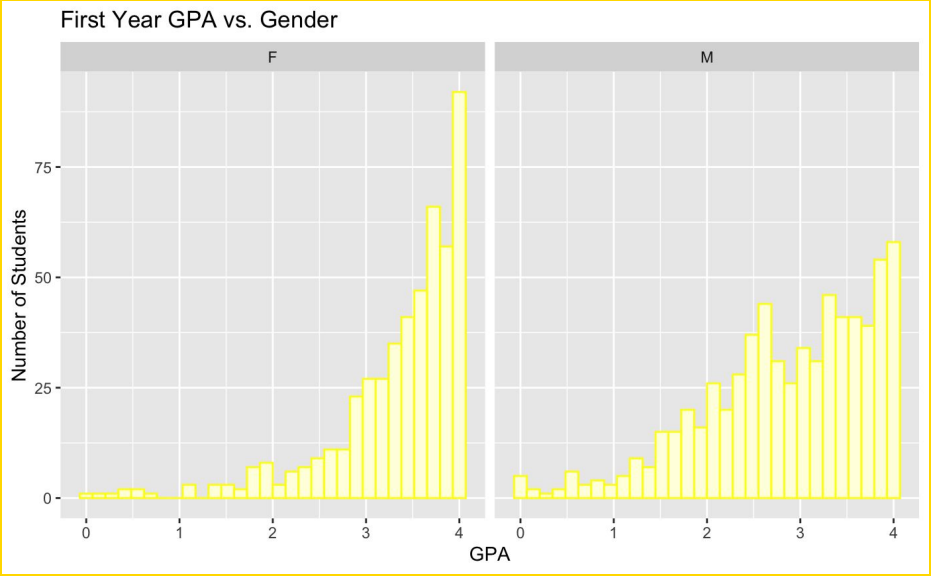
Exploratory Data Analysis – EDA

Percent	No Score	Score
0 D's Midterm	76.9%	76.2%
1-2 D's Midterm	16.2%	21.5%
1-3 D's Midterm	20.8%	23%
1-4 D's Midterm	21.4%	23.5%
1-5 D's Midterm	21.4%	23.7%
1-6 D's Midterm	22%	23.7%
1-7 D's Midterm	23.2%	23.7%

Percent	No Score	Score
0 F's Midterm	75.1%	83.5%
1-2 F Midterm	17.4%	13.6%
1-3 F's Midterm	21.4%	15%
1-4 F's Midterm	22.6%	15.9%
1-5 F's Midterm	23.2%	16.8%
1-6 F's Midterm	23.8%	17.4%
1-7 F's Midterm	25%	17.4%

EDA- Gender



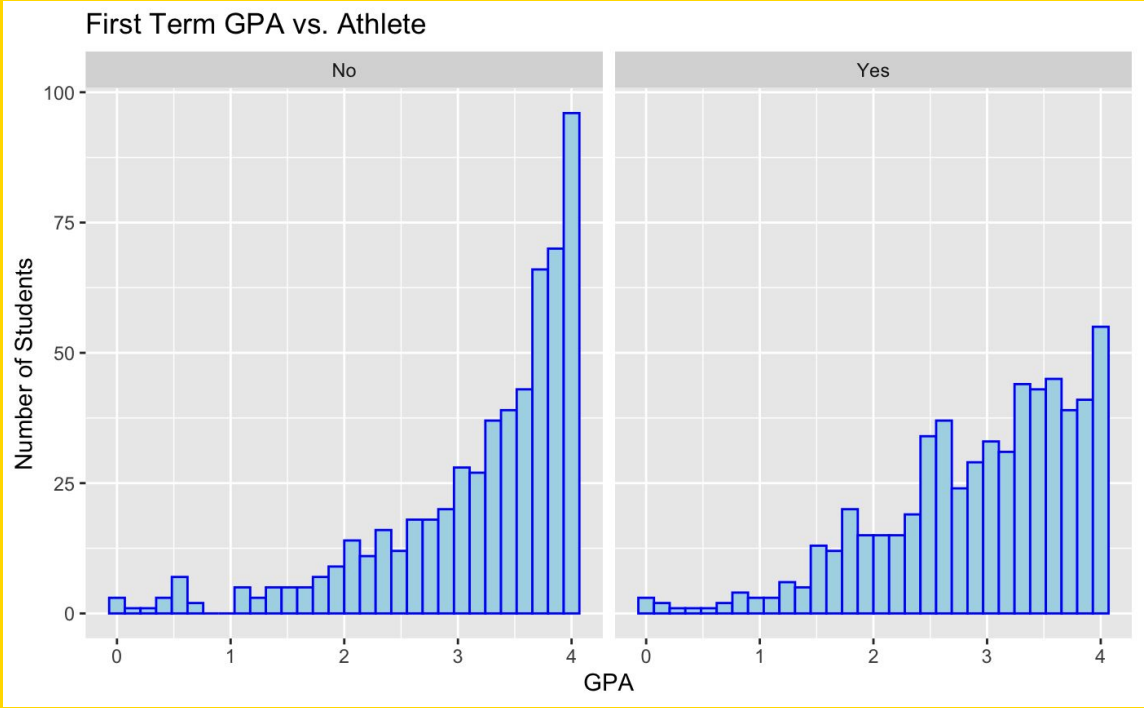


	No Score	Score
Female	68	428
Male	104	565

EDA- Athletes

- Evenly split between athletes and non-athletes (595 vs. 571 respectively)

	No Score	Score
Non-Athlete	78	493
Athlete	95	500



EDA – Retention

Enrollment Status	No score (0)	Score (1)
Dismissed	2.9%	1.16%
Enrolled	86.6%	86.6%
No spring schedule	0.58%	0
Withdrew	9.4%	12.1%
Withdrew (returned later)	0.58%	0.17%

Data Modeling – Logistic Regression

- Using **before** college variables to predict submitting SAT/ACT score
  - Using High School GPA, Class Rank, and Class Size to predict whether students will submit an SAT or ACT score

Prediction	No Test Score (0)	Test Score (1)
No Test Score (0)	0	0
Test Score (1)	43	228

- Accuracy = 0.8413
- Sensitivity = 0
- Specificity = 1

	Estimate	Odds Ratio	Std. Error	P-Value
Intercept	1.078	2.939	0.779	0.166
HSGPA	0.128	1.137	0.214	0.549
Class Rank	-0.002	0.998	0.003	0.562
Class Size	0.003	1.003	0.001	0.0229

Data Modeling – Correlations

- Correlation Matrix

	has_test_score
has_test_score	1.00
HSGPA	0.07
first_term_GPA	0.11
first_year_GPA	0.11
D's at Midterm	-0.06
F's at Midterm	-0.10

- Chi-Square
  - Interest1
  - Significant with p-value = 0.032
- T-Test

	No Score	Score	95% C.I.
D's Midterm	0.468	0.334	(-0.312 - 0.044)
F's Midterm	0.520	0.281	(-0.428 - (-0.05))
First Year GPA	2.856	3.102	(0.09 - 0.402)
First Term GPA	2.794	3.066	(0.103 - 0.441)

Data Modeling – Linear Regression

	Estimate	Std. Error	P-Value	Partial-R
has_test_score	0.205	0.077	0.008	0.0076
HSGPA	1.015	0.053	<2e-16	0.2041
Class_size	0.0009	0.0003	0.001	0.0139
Class_rank	-0.003	0.0009	0.002	0.0173
Class_size*Class_rank	0.0000008	0.000001	0.553	0.0004

First Term GPA
R-Squared: 0.3350549

Data Modeling – Linear Regression

	Estimate	Std. Error	P-Value	Partial-R
has_test_score	0.183	0.069	0.008	0.0076
HSGPA	0.948	0.047	<2e-16	0.2177
Class_size	0.0009	0.0003	0.001	0.0135
Class_rank	-0.002	0.0008	0.003	0.0193
Class_size*Class_rank	0.0000003	0.000001	0.827	0.0006

First Year GPA
R-Squared: 0.3543834

Results & Takeaways

- Our model had a high enough accuracy that we can confidently conclude:
  - HSGPA variable was best predictor for admission
  - First term GPA and first year GPA also support this finding
- Students who reported an SAT/ ACT score have better academic performance than those who did not report an SAT/ ACT score
- Scholarship money and financial aid should continue to be awarded based on high school GPA
- Our recommendation: once again require test scores on application

★ Note: other high school variables were discriminatory and could not be used for data modeling

Discriminatory Variables

- Most financial, award amounts, Pell eligible, school ranking, etc. variables can be discriminatory
  - There is a way to potentially use them in future studies
- For example for school rank, hold constant for:
  - School’s median financial income (parents)
  - School’s race / ethnicity
  - School district’s crime rate

References

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