

Factors that Influence Graduation Rates at Northwestern College

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Abstract

This project examines factors that influence graduation rates regarding behaviors and choices made in college as opposed to exogenous factors such as family income, race, etc. These factors also included responses from first-year students who took the Cooperative Institutional Research Program (CIRP) survey. Using data from 2013 - 2016 freshman admissions and combining this with CIRP responses from 2014 and 2016, there were found to be five factors related to behavior at college that influenced graduation rates.

Completion of registered hours, campus involvement, and high tuition discount rates had strong, positive correlations with whether the student graduated. Student participation in remedial reading programs and having grades below a C- in their first year were strongly, negatively correlated with whether they graduated. It was found that factors such as Expected Family Contribution (EFC), Conditional Admission status, and ACT score did not have a statistically significant impact on whether someone graduated. Based on these findings, it is advisable that colleges closely monitor students who have had previous remedial work in reading, encourage campus involvement, and advise students to avoid dropping classes.

Data and Methodology

- First-year student data was collected from Northwestern College, while CIRP responses were obtained from the Northwestern College Department of Institutional Research.
- The data contains information on prospective students who ultimately enrolled at Northwestern from the years 2013 to 2016, as well as CIRP data from the 2014 and 2016 cohorts.
- The data represents 1,152 student observations over four years, including whether the student graduated after they'd enrolled at Northwestern College.
- Various fields were created to answer appropriate research questions, such as whether a student completed the hours they registered for, how many times they changed dorm buildings, and the number of grades they received below a C-.
- Means and frequency values were used appropriately when handling NA values, and certain fields were disregarded if they contained a significant amount of missing data.

Data and Methodology

- Logistic regressions were created to evaluate the impact of various fields on graduation rates. Numerous models were tested and Bayesian Information Criteria (BIC) was used to determine the best-fitting model.
- The data was split into 70% training and 30% testing sets and accuracy scores were used to determine model precision

Descriptive Statistics

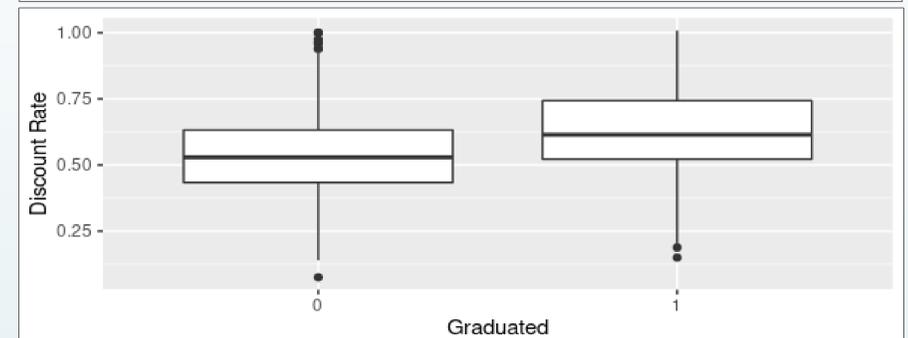
Cohort Year	n (1,152)	Sex	n (1,152)	Variable	Mean	sd
2013	286	Male	641	High School GPA	3.57	0.43
2014	318	Female	511	Class Rank (note: 1/100 = 0.01)	0.30	0.21
2015	261	Graduated	n (1,152)	ACT Composite	24.5	3.86
2016	287	Yes	763 (66%)	First-year College GPA	2.92	0.98
		No	389 (34%)			

Results

- 13 research questions were tested using logistic regression, with 5 of the models producing statistically significant results.
- RQ2 asked if completing the amount of registered credit hours was significant in determining whether a student graduated. The variable indicating that the student completed registered hours was found to be statistically significant at $p < 0.001$ and $\beta = 1.53$. The model accuracy score was 0.69.
- RQ3 asked if being involved in Campus Ministry or Residence Life had a statistically significant impact on graduation rates. Both boolean fields were found to be statistically significant with $\beta_{CMT} = 2.00$, $p_{CMT} < 0.001$ and $\beta_{RL} = 1.99$, $p_{RL} = 0.007$. The model accuracy score was 0.67.
- RQ5 asked if a student receiving more than one C- in their first year at Northwestern had a statistically significant impact on their graduation rate. Receiving more than one C- was found to have a statistically negative impact on graduation, with $\beta = -2.45$ and $p < 0.001$. The model accuracy score was 0.72.
- RQ6 asked whether having had remedial help or needing remedial math or reading help in college had a statistically significant impact on graduation. Having had and needing remedial reading were found to be statistically significant with $\beta_{Had} = -0.99$, $p_{Had} = 0.003$ and $\beta_{Need} = 0.85$, $p_{Need} = 0.02$. The model accuracy score was 0.68.

Results

- RQ9 asked whether the discount rate a student receives on their tuition impacts graduation rates. Higher graduation rates were strongly associated with higher discount rates with $\beta = 3.44$ and $p < 0.001$. The model accuracy score was 0.69.



Conclusion and Recommendations

- Initial hypotheses regarding EFC, Conditional Admission Status, and ACT were disproven since they were statistically insignificant contributors to graduation rates.
- Hypotheses regarding completion of credit hours, campus involvement, low grades, remedial work, and discount rates were supported in having statistically significant impacts on graduation rates.
- From these findings, it is advisable that students be encouraged to complete their registered credit hours and not drop courses, as well as get involved in student organizations such as Campus Ministry or Residence Life.
- Students who have had remedial reading help in the past or have received more than one C- in their first year should be closely monitored and given appropriate support.
- Colleges should look to improve their overall discount rate for students in order to encourage graduating after enrollment.
- Future studies are needed to better disentangle relationships between socioeconomic status and activities engaged in at college. While this study aimed at focusing on decision made by only the student, it is reasonable to think that factors outside of the collegiate environment influence choices made on campus.
- Additional studies will be needed in the future to look more closely at academic variables as standardized tests (ACT, SAT) are increasingly becoming irrelevant in admissions decisions.