Predictive Analytics in Higher Education

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Introduction to Predictive Analytics

An area of statistical analysis that deals with extracting information using various Technologies to uncover relationships and patterns within large volumes of data. That can be used to predict behavior and events.
"Prediction is very difficult, especially if it's about the future." —Neils Bohr
Reasons for Adopting

- Increasing Financial or operational efficiency,
- Expanding local and Global impact,
- Establishing new funding models during a changing economic climate,
- Responding to the demands for greater accountability.
Functional Areas of Predictive Analytics

• Advancement/fundraising
• Business and finance
• Budget and planning
• Institutional research
• Human resources
• Academic affairs
Purpose:  
• To identify contemporary challenges facing institutions of higher education.  
• To explore the potential of Data/predictive analytics in addressing these challenges.

Focus:  
• To explore the use of predictive analytics in Higher Education to improve student access and success.  
• To examine how historical data can be used to identify persistence trends and inform a continuous improvement cycle.
Areas of use in Higher Education

- **Admissions**: Predict each applicant’s probability of enrolling
- **Financial Aid**: Project headcount and financial aid outlay
- **Retention**: Predict each student’s probability of attrition. Identify trends and profiles of students who transfer or drop out.
- **Forecasting**: Determine overall expected enrollment for next year based on this year’s class.
Methodology

• Analysis of persistence patterns from Civitas Learning Illume predictive analytics application
• Data analytics on historical student raw data
  – Data Validation
  – Data Mining
  – Data Exploration
Student Populations Explored

- Full-time First-Time Freshmen Variables:
  - Test Scores
  - High School Class Percentile

- Transfer Students Variables:
  - Credits Earner Prior-Term
  - Transfer Credits brought in
Is high school percentile a better indicator of student persistence over test scores at our institution?
## Awarding Policy

<table>
<thead>
<tr>
<th>Scholarship</th>
<th>ACT/SAT Scores</th>
<th>Scholarship Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presidential</td>
<td>28/1270</td>
<td>$2,500 per year/$1,250 per semester</td>
</tr>
<tr>
<td>Academic Excellence</td>
<td>25/1180</td>
<td>$1,500 per year/$750 per semester</td>
</tr>
<tr>
<td>Blue &amp; Gold</td>
<td>23/1050</td>
<td>$1,000 per year/$500 per semester</td>
</tr>
</tbody>
</table>

- Previous Scholarship Awarding policy was based on Test Scores
• **Students at or above the 80th percentile persist 7.16 percentage points above the average** for entering first-time, full-time students overall.

• **37% of all who persist in their educational journey with TAMU-C graduated high school at or above the 80th percentile of their high school class.**
• **Relying on SAT/ACT scores** to indicate college readiness and control decisions on admission and scholarships **steers qualified students away** from higher education.

• **Using high school percentiles** to make decisions on **admissions and scholarships** tracks better with the data on increasing retention at Texas A&M University–Commerce.
The hypothetical insights we found include:

- We could have awarded scholarships, on average, to **six percent more students in each first-time freshman cohort**.
- We would have awarded scholarships, on average, to **45 percent more minority students** in each first-time freshman cohort, with a particularly large boost in funds for new Hispanic students.
- Our retention of first-time freshmen would have been at **least three percentage points higher after three years**.
New Awarding Policy based on Analytics

<table>
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<tr>
<th>Scholarship</th>
<th>High School Percentile</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presidential</td>
<td>Top 10%</td>
<td>$2,750 per year/$1,375 per semester</td>
</tr>
<tr>
<td>Academic Excellence</td>
<td>11%–25%</td>
<td>$1,500 per year/$750 per semester</td>
</tr>
</tbody>
</table>

- New Scholarship Awarding policy was implemented to better serve our growing and diverse student population
Are Competency-Based Education Transfers persisting at higher rates than traditional transfer students
Transfer insights

- Historically, traditional transfer students who only take 6 or less credit hours (Part-Time) represent more than 52% of all non-persisting students.

- On average TAB students are taking 6 SCHs per term and are being retained at 87%. These students are breaking the historical negative pattern.
Transfer Insights cont.

- Historically, traditional transfer students who bring 80 or more credits represent more than 48% of all non-persisting students.

- TAB program graduates transferred in 85 SCHs on average, and graduated in less than a year. Again, these students are breaking the historical negative pattern.
Accelerated Time-to-Completion

Findings:

Fall 2015 Transfer Cohort Graduation Rates

Traditional BAAS Graduates
95 Transfer students

- Spring 2016 Graduates: 6
- Summer 2016 Graduates: 10
- Fall 2016 Graduates: 24.21%

TAB Program Graduates
131 Transfer students

- Spring 2016 Graduates: 24
- Summer 2016 Graduates: 38
- Fall 2016 Graduates: 43.51%

57% Transfer Cohort Graduation Rate difference by Fall 2016
Thank you for your time!!
Questions??

References
• Competency-Based Education and Predictive Analytics: Learning from Transfers - by Carlos Rivers and Judith Sebesta