STUDENT SUPPORT INTERVENTIONS AND PREDICTIVE ANALYTICS
Regression model

→ Cohort identification

→ Validation

→ Intervention analysis

→ Proactive new interventions
• Support from research on student persistence
• Conversation from Foundations of Excellence
• Help retention
• Eventually help graduation rates
• Proactive intervention to help students succeed early
• Help students navigate transition issues
THE AT RISK MODEL
DEFINITION OF “AT RISK”

Many definitions

- Students on probation status
- Students who fail or do not complete critical courses within their major
- Students who do not have a sense of belonging
- Students who are homesick
- Financial challenges
- …..
DEFINITION OF “AT RISK”

For our analysis:

• A group of individuals who are less likely to transition successfully from a secondary institution to a post-secondary institution.

• End of first semester cumulative GPA \( \leq 2.5 \)
Data sources for input to the model

• The sample consisted of 12,507 new beginner undergraduate domestic students who entered Purdue University in Fall 2012 and Fall 2013.

Data sources for model validation and assessment

• Students’ actual cumulative GPA at the end of Fall 2012 and 2013
• Student Success program participation data for predicted at risk students for Fall 2014
• Predictors:
  o High school core GPA
  o Highest SAT verbal and math score (or converted ACT score)
  o Highest SAT writing score (or converted ACT score)
  o 21st Century Scholars indicator (Y/N)
  o First generation indicator (Y/N, self reported)
  o Underrepresented minority (URM) indicator (Y/N, self reported)
  o Indiana resident indicator (Y/N)
  o Gender (M/F, self reported)
• Response variable:
  • Cumulative GPA at the end of first semester
\[ CumeGPA = -0.2825 + 0.6734 \text{ CoreGPA} + 0.0005 \text{ SAT} + 0.0007 \text{ Writ} - 0.0925 \text{ TwentyFirst} \\
- 0.0936 \text{ FirstGen} - 0.0747 \text{ URM} + 0.0420 \text{ Resident} - 0.0918 \text{ Male} \]

### Standardized Coefficients for Cumulative GPA Model

- **CoreGPA**: 0.35
- **SAT**: 0.20
- **Writ**: 0.15
- **Resident**: 0.05
- **URM**: 0.05
- **TwentyFirst**: 0.05
- **FirstGen**: 0.05
- **Male**: 0.05

**Note:** all coefficients are statistically significant at 1% level and the overall model is statistically significant (overall F-statistics is 388.17, p-value<0.0001).
MODEL VALIDATION
MODEL VALIDATION

LIFT CHART SORTED BY PREDICTED VALUES

Lift Chart 1 - Average Actual vs. Predicted Cumulative GPA
Sorted by Predicted GPA

- Number of Students
- Actual
- Predicted

PURDUE UNIVERSITY
The logit model correctly predicts 81% of the values.

The findings of logit model hint that although our model tends to over-predict students with low GPAs and under-predict students with high GPAs, it works well to identify a student’s rank relative to their peers.
INTERVENTION ANALYSIS
### T-Test Comparison of Predicted v. Actual GPA (Fall 2014)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>N</th>
<th>Mean Predicted GPA</th>
<th>Mean Overall GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Students</td>
<td>241</td>
<td>2.36</td>
<td>2.36</td>
</tr>
<tr>
<td>Non TFCS Recipient</td>
<td>193</td>
<td>2.36</td>
<td>2.30</td>
</tr>
<tr>
<td>TFCS Recipient</td>
<td>48</td>
<td>2.35</td>
<td>2.59*</td>
</tr>
<tr>
<td>Non Purdue Promise</td>
<td>203</td>
<td>2.36</td>
<td>2.31</td>
</tr>
<tr>
<td>Purdue Promise</td>
<td>38</td>
<td>2.35</td>
<td>2.61*</td>
</tr>
<tr>
<td>Non Horizons</td>
<td>236</td>
<td>2.36</td>
<td>2.36</td>
</tr>
<tr>
<td>Horizons</td>
<td>5</td>
<td>2.40</td>
<td>2.29</td>
</tr>
<tr>
<td>Non SI Participants</td>
<td>215</td>
<td>2.36</td>
<td>2.32</td>
</tr>
<tr>
<td>SI Participants</td>
<td>26</td>
<td>2.36</td>
<td>2.67*</td>
</tr>
</tbody>
</table>

*Difference in means is significant at p<0.05
### Academic Standing (end of Sp 15)

<table>
<thead>
<tr>
<th></th>
<th>At Risk</th>
<th>At Risk Enrolled</th>
<th>Not Risk Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continued Good Standing</td>
<td>70.3%</td>
<td>82.4%*</td>
<td>81.5%++</td>
</tr>
<tr>
<td>Probation</td>
<td>9.5%</td>
<td>11.9%</td>
<td>9.1%</td>
</tr>
<tr>
<td>Dropped/Not Enrolled</td>
<td>20.2%</td>
<td>5.9%**</td>
<td>9.5%++</td>
</tr>
<tr>
<td>Total (n)</td>
<td>485</td>
<td>34</td>
<td>232</td>
</tr>
</tbody>
</table>

### Mean Cumulative GPA (Sp 15)

<table>
<thead>
<tr>
<th></th>
<th>At Risk</th>
<th>At Risk Enrolled</th>
<th>Not Risk Enrolled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg</td>
<td>2.53</td>
<td>2.52</td>
<td>2.74++</td>
</tr>
<tr>
<td>St Dev</td>
<td>.65</td>
<td>.49</td>
<td>.60</td>
</tr>
<tr>
<td>n</td>
<td>405</td>
<td>32</td>
<td>213</td>
</tr>
</tbody>
</table>

*Difference in AR and ARE percentages is significant at p<0.05
**Difference in AR and ARE percentages is significant at p<0.01
++Difference in AR and NRE percentages is significant at p<0.01
## Predicted v. Actual GPA by Total Interventions (Fall 2014)

<table>
<thead>
<tr>
<th>Grouping</th>
<th>N</th>
<th>Mean Predicted GPA</th>
<th>Mean Overall GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 interventions</td>
<td>166</td>
<td>2.36</td>
<td>2.26</td>
</tr>
<tr>
<td>1 intervention</td>
<td>31</td>
<td>2.38</td>
<td>2.52</td>
</tr>
<tr>
<td>2 interventions</td>
<td>44</td>
<td>2.35</td>
<td>2.62*</td>
</tr>
</tbody>
</table>

*Difference in means is significant at p<0.05
PROACTIVE INTERVENTIONS
COMMUNITY OF PRACTICE

• Collaborators: HHS, AG, CLA, EXPL, Student Success at Purdue
• Best practices to fit in the culture of those colleges/programs
• Proactive and inclusive
COMMUNITY OF PRACTICE

• Coordination of Advising – common advising experience for students
• Student Information Form and myCareer Plan
• Collaboration with Student Success – co-leading efforts, referrals and shared database/notes
• Consortium of 11 large public research universities
• Committed to making college degrees accessible to diverse body of students
• Sharing “best practices” and gaining a better understanding of the range of factors influencing completion
• Listening and continuous learning of efforts worth investigating
• Recipient of First in the World Grant, which involves all 11 participants- future updates
NEXT STEPS TO IMPROVE MODEL

• Try additional predictors to improve model fitting

• Try interaction terms among existing predictors and/or additional predictors (e.g. SAT x Resident)

• Models for international students and non-FTFT students
QUESTIONS?

THANK YOU!