Using High School Achievement Information to Improve Placement Accuracy in Community Colleges

Association for the Study of Higher Education
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Slides available at: bit.ly/capr_ashe16

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Community College Research Center/Center for the Analysis of Postsecondary Readiness
Agenda for Presentation

• Background and Prior Research
• CAPR: Research on Alternative Placement Systems (RAPS)
• RAPS Initial Data
• Implementation Research Sneak Peak
Background and Prior Research
Prior CCRC Research Studies


# Under-placement and Over-placement

<table>
<thead>
<tr>
<th>Student Ability</th>
<th>Placement According to Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental</td>
<td>Developmental ✔️ Over-placed</td>
</tr>
<tr>
<td>College Level</td>
<td>Under-placed ✔️</td>
</tr>
</tbody>
</table>
Scott-Clayton (2012) – Model R² Statistics

<table>
<thead>
<tr>
<th></th>
<th>Placement Test Scores Only</th>
<th>High School GPA/Units Only</th>
<th>Placement Test Scores PLUS High School GPA/Units</th>
<th>Test Scores, HS GPA/Units, PLUS</th>
<th>Years Since HS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earned B or higher in CL</td>
<td>0.121</td>
<td>0.102</td>
<td>0.165</td>
<td>0.183</td>
<td></td>
</tr>
<tr>
<td>Earned C or higher in CL</td>
<td>0.069</td>
<td>0.077</td>
<td>0.109</td>
<td>0.121</td>
<td></td>
</tr>
<tr>
<td>Passed CL (D- or higher)</td>
<td>0.040</td>
<td>0.058</td>
<td>0.074</td>
<td>0.078</td>
<td></td>
</tr>
<tr>
<td>Grades in first CL</td>
<td>0.129</td>
<td>0.119</td>
<td>0.183</td>
<td>0.204</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earned B or higher in CL</td>
<td>0.021</td>
<td>0.043</td>
<td>0.060</td>
<td>0.093</td>
<td></td>
</tr>
<tr>
<td>Earned C or higher in CL</td>
<td>0.008</td>
<td>0.038</td>
<td>0.045</td>
<td>0.059</td>
<td></td>
</tr>
<tr>
<td>Passed CL (D- or higher)</td>
<td>0.004</td>
<td>0.034</td>
<td>0.038</td>
<td>0.047</td>
<td></td>
</tr>
<tr>
<td>Grades in first CL</td>
<td>0.017</td>
<td>0.055</td>
<td>0.069</td>
<td>0.098</td>
<td></td>
</tr>
</tbody>
</table>


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Many more students could succeed in college level courses (Belfield & Crosta, 2012)

- Many students assigned to developmental education using COMPASS could have gotten a B or better in a college-level class:
  - 1/3 of students – English
  - 1/4 of students – Math
### Error Rates

<table>
<thead>
<tr>
<th></th>
<th>LUCCS 1</th>
<th>SWCCS 1</th>
<th>SWCCS 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Math</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over-placement rate</td>
<td>5.3%</td>
<td>5.8%</td>
<td>12.3%</td>
</tr>
<tr>
<td>Under-placement rate</td>
<td>18.5%</td>
<td>28.4%</td>
<td>14.3%</td>
</tr>
<tr>
<td>Total Error Rate</td>
<td>23.9%</td>
<td>34.2%</td>
<td>26.6%</td>
</tr>
<tr>
<td><strong>English</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over-placement rate</td>
<td>4.5%</td>
<td>8.8%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Under-placement rate</td>
<td>28.9%</td>
<td>17.3%</td>
<td>27.8%</td>
</tr>
<tr>
<td>Total Error Rate</td>
<td>33.4%</td>
<td>26.2%</td>
<td>33.5%</td>
</tr>
</tbody>
</table>

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CAPR: Research on Alternative Placement Systems (RAPS)
RAPS

1. 7 SUNY Community Colleges.
2. Each works with CAPR team to develop an alternative placement method using an algorithm.
3. Students are randomly assigned to be placed using either the existing placement method or the algorithm.
4. We look for differences in student outcomes based on placement method.
5. Monitor implementation of study and transition to MM system.
RAPS – Partner Sites

A – CAPR/CCRC/MDRC
B – Cayuga CC
C – Jefferson CC
D – Niagara County CC
E – Onondaga CC
F – Rockland CC
G – Schenectady County CC
H – Westchester CC
RAPS – Study Timeline

- Years 1-2
  - Analysis of historical data
  - Create requisite systems on campuses
- Years 3-4
  - Randomly assign students to be placed using algorithm or pre-existing system.
  - 3 Semesters – Fall 2016, Spring 2017, Fall 2017
- Years 4-5
  - Collect and analyze outcomes data.
  - Final data transfer from colleges – July, 2018
How Does the Algorithm Work?

1. Use data from previous cohorts
2. Develop formula to predict student performance
3. Use formula to place entering cohort of students
Creating the algorithm

• Three cohorts of students
• Select students who:
  – Took a placement test
  – Took a college-level course first
• Use their outcome in the initial college-level course to gauge how well certain factors predict success (Passing the course with a C or better)
• Establish minimum acceptable probability for success in college-level course
Explaining variation in outcomes.

- The basic four models
  - GPA only
  - ACCUPLACER test scores only
  - GPA + ACCUPLACER
  - GPA + ACCUPLACER + other HS information

- Additional complexity
  - Interaction terms
  - Higher order terms
Missing Data

- Include dummy indicators for missing data element.
- Test interaction terms between missing HS GPA and test scores.
Model R-Squared Statistics
English

R-Squared Statistics – Graphical Representation

College 1  College 2  College 3  College 4  College 5  College 6  College 7

- GPA
- ACCUPLACER
- GPA + ACCUPLACER
- Full Model

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Model R-Squared Statistics
Math

R-Squared Statistics – Graphical Representation

College 1 | College 2 | College 3 | College 4 | College 5 | College 6 | College 7
---|---|---|---|---|---|---
GPA | ACCUPLACER | GPA + ACCUPLACER | Full Model

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# Data Elements

<table>
<thead>
<tr>
<th>Data Element</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School GPA</td>
<td>+</td>
</tr>
<tr>
<td>Time since high school completion</td>
<td>+</td>
</tr>
<tr>
<td>Diploma type (standard diploma vs. GED)</td>
<td>+</td>
</tr>
<tr>
<td>High School of Record</td>
<td></td>
</tr>
<tr>
<td>Other Test Data (e.g. Regents, SAT/ACT, etc.)</td>
<td>(+)</td>
</tr>
<tr>
<td>Placement test scores</td>
<td></td>
</tr>
<tr>
<td>Indicators for missing data</td>
<td>+/-</td>
</tr>
</tbody>
</table>

**Key:**
- + significant positive predictor
- (+) somewhat positive predictor
- +/- can be positive or negative predictor
# Severe Error Rates

**Math**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Over-placed</strong></td>
<td>24%</td>
<td>6%</td>
<td>12%</td>
<td>20%</td>
<td>11%</td>
<td>16%</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Under-placed</strong></td>
<td>8%</td>
<td>45%</td>
<td>29%</td>
<td>22%</td>
<td>36%</td>
<td>19%</td>
<td>35%</td>
</tr>
<tr>
<td><strong>Severe Error Rate</strong></td>
<td>32%</td>
<td>50%</td>
<td>41%</td>
<td>42%</td>
<td>47%</td>
<td>34%</td>
<td>47%</td>
</tr>
</tbody>
</table>
## Severe Error Rates

### English

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Over-placed</strong></td>
<td>12%</td>
<td>15%</td>
<td>14%</td>
<td>17%</td>
<td>8%</td>
<td>11%</td>
<td>17%</td>
</tr>
<tr>
<td><strong>Under-placed</strong></td>
<td>31%</td>
<td>30%</td>
<td>34%</td>
<td>25%</td>
<td>44%</td>
<td>40%</td>
<td>29%</td>
</tr>
<tr>
<td><strong>Severe Error Rate</strong></td>
<td>43%</td>
<td>45%</td>
<td>47%</td>
<td>42%</td>
<td>52%</td>
<td>51%</td>
<td>46%</td>
</tr>
</tbody>
</table>
RAPS – Initial Data
Outcomes of Interest

- Placement levels
- Outcomes in introductory college-level course
- Persistence/retention
- Credits earned

- Subgroup Analyses
  - Demographics
  - Differentially placed
# English

<table>
<thead>
<tr>
<th>College</th>
<th>Prior Share in C.L. English</th>
<th>Projected placed into C.L. English using MM</th>
<th>Control Group</th>
<th>Program Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>College 1</td>
<td>47%</td>
<td>48%</td>
<td>25%</td>
<td>32%</td>
</tr>
<tr>
<td>College 2</td>
<td>60%</td>
<td>68%</td>
<td>56%</td>
<td>50%</td>
</tr>
<tr>
<td>College 3</td>
<td>28%</td>
<td>95%</td>
<td>35%</td>
<td>93%</td>
</tr>
<tr>
<td>College 4</td>
<td>50%</td>
<td>100%</td>
<td>26%</td>
<td>100%</td>
</tr>
<tr>
<td>College 5</td>
<td>38%</td>
<td>50%</td>
<td>57%</td>
<td>85%</td>
</tr>
</tbody>
</table>
## Math

<table>
<thead>
<tr>
<th></th>
<th>Projections</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prior Share in C.L. Math</td>
<td>Projected placed into C.L. Math using MM</td>
</tr>
<tr>
<td>College 1</td>
<td>53%</td>
<td>52%</td>
</tr>
<tr>
<td>College 2</td>
<td>29%</td>
<td>39%</td>
</tr>
<tr>
<td>College 3</td>
<td>27%</td>
<td>43%</td>
</tr>
<tr>
<td>College 4</td>
<td>50%</td>
<td>74%</td>
</tr>
<tr>
<td>College 5</td>
<td>44%</td>
<td>40%</td>
</tr>
</tbody>
</table>
Implementation research findings
Implementation Study

• Visited sites in the late spring/early summer 2016
  – Interviews/Focus Groups
    • Members of Research Teams
    • Senior Administrators
    • Admissions
    • Testing
    • Counsellors/Advisors
    • IT
    • IR
• Site visits Round 2 in Spring 2017
  – Interviews and Focus Groups with same set of people plus faculty
Implementation Research: Emerging Findings

- Many Stakeholders and parts of campus involved
  - Requires lots of coordination.
  - Venue to tackle more than just Multiple Measures

- Obstacles
  - Complexity of Systems
  - Skepticism and Buy-In
Multiple Measures Reform Context

- Placement Reforms
  - Exemption policies
  - Changes to scoring procedures
- Curricular reforms
  - Co-requisite courses
  - Flipped classrooms
Contact Us

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