Improving Student Placement Using Multiple Measures Assessment

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Community College Research Center

JMM Webinar
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Agenda

• Why use multiple measures for placement
• Selection of a multiple measures system
• Results of the SUNY research
• Discussion
Students needing 1+ developmental education course (NCES, 2013)
Community college 8-year graduation rates
(Attewell, Lavin, Domina, and Levey, 2006)
### Under-placement and Over-placement

<table>
<thead>
<tr>
<th>Student Ability</th>
<th>Developmental</th>
<th>College Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental</td>
<td>✅</td>
<td><strong>Over-placed</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(English – 5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Math – 6%)</td>
</tr>
<tr>
<td>College Level</td>
<td><strong>Under-placed</strong></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>(English – 29%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Math – 18%)</td>
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</tbody>
</table>
Model R-Squared Statistics
English

R-Squared Statistics – Graphical Representation

Colleges 1 to 7

- GPA
- ACCUPLACER
- GPA + ACCUPLACER
- Full Model
Model R-Squared Statistics

Math

R-Squared Statistics – Graphical Representation

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

Legend:
- GPA
- ACCUPLACER
- GPA + ACCUPLACER
- Full Model
Conclusions so far

- Students placed into developmental education are less likely to complete.
- Better assessment systems are needed.
- HS GPA is the best predictor of success in college math and English.
Multiple Measures Assessment
Why Use Multiple Measures

• Existing placement tests are not good predictors of success in college courses.

• More information improves most predictions.

• Different measures may be needed to best place specific student groups.
Percent of Colleges Using Measures Other than Standardized Tests for Assessment

Community Colleges

Public 4-Year Colleges

Math

Reading

SOURCES: 2011 data from Fields and Parsad (2012); 2016 data from the CAPR’s institutional survey.

NOTE: The Fields and Parsad (2012) reading statistics are for reading placement only, whereas the CAPR survey data are for both reading and writing.
Processes Used to Determine College Readiness in Community Colleges

- Standardized Tests: 100%
- High School Performance: 0%
- Planned Course of Study: 20%
- Other Indicators of Motivation or Commitment: 40%
- College Readiness Not Assessed: 60%

SOURCE: Data from CAPR’s institutional survey.
NOTE: Categories are not mutually exclusive.
## Multiple Measures Options

<table>
<thead>
<tr>
<th>MEASURES</th>
<th>SYSTEMS OR APPROACHES</th>
<th>PLACEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administered by college:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Traditional or alternative placement tests</td>
<td>• Waiver system</td>
<td>• Placement into traditional courses</td>
</tr>
<tr>
<td>2. Non-cognitive assessments</td>
<td>• Decision bands</td>
<td>• Placement into alternative coursework</td>
</tr>
<tr>
<td>3. Computer skills or career inventory</td>
<td>• Placement formula (algorithm)</td>
<td>• Placement into support services</td>
</tr>
<tr>
<td>4. Writing assessments</td>
<td>• Decision rules</td>
<td></td>
</tr>
<tr>
<td>5. Questionnaire items</td>
<td>• Directed self-placement</td>
<td></td>
</tr>
<tr>
<td>Obtained from elsewhere:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. High school GPA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Other HS transcript information (courses</td>
<td></td>
<td></td>
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<tr>
<td>taken, course grades)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Standardized test results (e.g., ACT, SAT,</td>
<td></td>
<td></td>
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<tr>
<td>Smarter Balanced)</td>
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</tr>
</tbody>
</table>

- **Waiver system**
- **Decision bands**
- **Placement formula** (algorithm)
- **Decision rules**
- **Directed self-placement**
- **Placement into traditional courses**
- **Placement into alternative coursework**
- **Placement into support services**
## Possible Measures

<table>
<thead>
<tr>
<th>Type</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement test</td>
<td>• Accuplacer</td>
</tr>
<tr>
<td></td>
<td>• ALEKS</td>
</tr>
<tr>
<td>High school GPA, course grades, test scores</td>
<td>• Self-report</td>
</tr>
<tr>
<td></td>
<td>• From transcript</td>
</tr>
<tr>
<td>Non-cognitive assessments</td>
<td>• GRIT Questionnaire</td>
</tr>
<tr>
<td></td>
<td>• SuccessNavigator or Engage</td>
</tr>
<tr>
<td>Career inventory, computer skills</td>
<td>• Kuder Career Assessment</td>
</tr>
<tr>
<td></td>
<td>• Home grown computer skills test</td>
</tr>
<tr>
<td>Writing examples</td>
<td>• Faculty-assessed portfolio</td>
</tr>
<tr>
<td></td>
<td>• Home-grown writing assessment</td>
</tr>
</tbody>
</table>
Sources of HS transcript data

- The students bring a transcript.
- The high school sends.
- Obtained from state data files.
- Self report.

Note: Consider using the 11th grade GPA.

Self-report research

- UC admissions uses self-report but verifies after admission. In 2008, at 9 campuses, 60,000 students. No campus had >5 discrepancies b/w reported grades and student transcripts (Hetts, 2016)
- College Board: Shawn & Matten, 2009: “Students are quite accurate in reporting their HSGPA”, $r = .73$.
- ACT research often uses self-reported GPA and generally find it to highly correlated with students actual GPA: ACT, 2013: $r = .84$. 

Non-cognitive assessments

Development of non-cognitive skills promotes students’ ability to think cogently about information, manage their time, get along with peers and instructors, persist through difficulties, and navigate the landscape of college...(Conley, 2010).

Non-cognitive assessments may be of particular value for:

- Nontraditional (older) students.
- Students without a high school record.
- Students close to the cut-off on a test.
NC 1: Success Navigator

Domains:
• Academic discipline, commitment, self-management, support, social supports

*Academic Success Index*, includes:
• Projected 1st year GPA
• Probability of returning next semester

Also, *Course Acceleration Indicator*
• Recommendation for math or English acceleration

NC 2: Engage

Domains:
• Motivation and skills, social engagement, self-regulation

Advisor report also has:
• Academic Success Index
• Retention Index

Correlation with GPA and retention, especially Motivation scale.
NC 3: Grit Scale

Domains:

• Grit and self-control.

Provides score 1-5 on level of grit, with 5 as maximum (extremely gritty) and 1 as lowest (not all gritty).

Correlation with GPA and conscientiousness

NC 4: Learning and Study Strategies Inventory (LASSI)

Domains

• Anxiety, attitude, concentration, information processing, motivation, selecting main ideas, self-testing, test strategies, time management, using academic resources.

Correlation with GPA and retention.
Concerns about the HS GPA
(with thanks to John Hetts, 2016)

- *Our* test is different/better/more awesome.
- Students really need developmental education.
- High school GPA is only predictive for recent graduates.
- Different high schools grade differently.
From Bostian (2016), North Carolina Waves GPA Wand, Students Magically College Ready adapted from research of Belfield & Crosta, 2012 – see also Table 1)
Students would be better off going through developmental education.

**Developmental education student outcomes**
(Results from 8 studies, CCRC analysis 2015)
HS GPA is a better predictor than test results for long time (from Hetts, 2016)

Decay function for the predictive utility of HSGPA on
English grades

Decay function for the predictive utility of HSGPA on
Math grades

MMAP (in preparation): correlations b/w predictor and success (C or better) in transfer-level course by # of semesters since HS
For the most part, college grades stay parallel with feeder high school grades. (Bostian, 2016)
Ways to Combine Measures

• Algorithms:
  – Placement determined by predictive model

• Decision Rules:
  – New exemptions, cutoffs

• Decision Bands:
  – “Bumping up” those in a test score range

• Directed Self-placement:
  – Provide students with information; let them decide where they fit.
Algorithm Example

Student Applies

Exemptions? Yes

HS Record, Accuplacer, Non-Cog data fed into Algorithm

Resulting Probability of Success

College Level Placement

Remedial Level Placement
Decision-Rule Example

- **Student Applies**
  - Exemptions? (Yes or No)
    - Yes: HS Record and/or Non-Cog Performance?
      - High: College Level Placement
      - Low: Accuplacer Test
    - No: Remedial Level Placement
Decision-Band Example

Student Applies

Exemptions? Yes

Above Band

Decision Band

HS Record and/or Non-Cog Performance?

Yes

College Level Placement

No

Accuplacer Test

High

Low

Remedial Level Placement

Below Band
The CAPR Assessment Study
Organization of CAPR

MDRC

- Descriptive Study of Developmental Education

CCRC

- Evaluation of The New Mathways Project (RCT in TX)
- Evaluation of New Assessment Practices (RCT in NY)

Supplemental Studies
Research on Alternative Placement Systems (RAPS)

• 5 year project; 7 SUNY community colleges
• Evaluation of the use of predictive analytics in student placement decisions.
• Random assignment/implementation/cost study
• Current status: beginning to look at impact
Research Questions (Summary)

1. Do student outcomes improve when they are placed using predictive analytics?

2. How does each college adopt/adapt and implement such a system?
SUNY 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
How Does the Predictive Analytics Placement Work?

1. Use data from previous cohorts
2. Develop formula to predict student performance
3. Set cut scores
4. Use formula to place entering cohort of students
Early Findings

Fall 2017
First Cohort - First Semester (Fall 2016)

Sample = 4,729 first year students across 5 colleges

- 48% students assigned to business-as-usual (n=2,274)
- 52% students assigned to treatment group (n=2,455)
- 82% enrolled into at least one course in 2016 (n=3,865)
Treatment Effects: Math

- College Level Course Placement:
  - Control Group: 43.7%
  - Program Group: 48.7%
- College Level Course Enrollment:
  - Control Group: 25.3%
  - Program Group: 30.0%
- College Level Course Enrollment and Completion:
  - Control Group: 14.1%
  - Program Group: 17.2%
Treatment Effects: English

- College Level Course Placement:
  - Control Group: 52.4%
  - Program Group: 82.8%

- College Level Course Enrollment:
  - Control Group: 40.8%
  - Program Group: 60.1%

- College Level Course Enrollment and Completion:
  - Control Group: 27.2%
  - Program Group: 39.7%
Treatment Effects: Any College Level Course

- Any College Level Course Enrollment:
  - Control Group: 80.7%
  - Program Group: 81.6%

- Any College Level Course Enrollment and Completion:
  - Control Group: 61.6%
  - Program Group: 65.8%
Treatment Effects: Total College Level Credits Earned

Control Group: 5.17
Program Group: 5.77
Early Findings – Subgroup Analysis

Fall 2016
Treatment Effects: College Level Math Placement

<table>
<thead>
<tr>
<th>Category</th>
<th>Control Group</th>
<th>Program Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>36%</td>
<td>43%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>48%</td>
<td>49%</td>
</tr>
<tr>
<td>White</td>
<td>58%</td>
<td>59%</td>
</tr>
<tr>
<td>Pell</td>
<td>39%</td>
<td>46%</td>
</tr>
<tr>
<td>Non-Pell</td>
<td>54%</td>
<td>58%</td>
</tr>
<tr>
<td>Female</td>
<td>41%</td>
<td>51%</td>
</tr>
<tr>
<td>Male</td>
<td>50%</td>
<td>52%</td>
</tr>
</tbody>
</table>

Legend:
- **Control Group**
- **Program Group**
Treatment Effects: College Level Math Completion

<table>
<thead>
<tr>
<th>Group</th>
<th>Control Group</th>
<th>Program Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>15%</td>
<td>18%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>18%</td>
<td>24%</td>
</tr>
<tr>
<td>White</td>
<td>18%</td>
<td>25%</td>
</tr>
<tr>
<td>Pell</td>
<td>13%</td>
<td>18%</td>
</tr>
<tr>
<td>Non-Pell</td>
<td>22%</td>
<td>25%</td>
</tr>
<tr>
<td>Female</td>
<td>15%</td>
<td>21%</td>
</tr>
<tr>
<td>Male</td>
<td>20%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Legend:
- Control Group
- Program Group
Treatment Effects: College Level English Placement

- Black: 41% (Control), 80% (Program)
- Hispanic: 54% (Control), 87% (Program)
- White: 60% (Control), 81% (Program)
- Pell: 49% (Control), 78% (Program)
- Non-Pell: 61% (Control), 88% (Program)
- Female: 54% (Control), 84% (Program)
- Male: 55% (Control), 83% (Program)

The chart above illustrates the treatment effects on college level English placement for different demographics (Black, Hispanic, White, Pell, Non-Pell) and genders (Female, Male) between control and program groups.
Treatment Effects: College Level English Completion
Costs

• First fall-term costs were roughly $110 per student above status quo (Range: $70-$320)

• Subsequent fall-term costs were roughly $40 per student above status quo (Range: $10-$170)
Implementation Challenges
Challenge 1

- Lack of data for algorithm due to multiple reforms
  - Placement tests used
  - Course changes
  - Missing HS GPA

“The seventh college in our sample had been using the COMPASS exam, which was discontinued by ACT shortly after this study began.” (report)
Challenge 2

- Concerns about the HS GPA
  - Availability
  - Mistrust of it as a valid predictor of college readiness

*Also, just one other thing is I'm wondering if the GPAs at the various schools can be really seen as being, quote, equal... (interviewee)*
Challenge 3

- Communications within colleges

Make sure you're involving the right parties. Make sure the decision makers are sitting around the table and make sure they understand the decisions they're making. (interviewee)

I think that's one of the key things that probably came out of all of this for all of us -- to know any kind of changes that we were planning to do with placement testing in general, you'd have to be planning so much further out. (interviewee)
Challenge 4

- Changes requiring forethought
  - IT time was needed
  - Classroom assignments might change
  - Needs for faculty might change

“Department chairs reported that they had to make changes based on different numbers of college developmental and college level sections needed.” (report)
Challenge 5

- Delays in getting placement information to students

*These students were used to getting the result, and they want the results right away, and we have to tell them, “You have to wait until the next business day.”* (interviewee)
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