Student Assessment and Placement Systems Using Multiple Measures

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SUNY CAO Meeting
October 2018
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>Placement According to Exam</th>
<th>Developmental</th>
<th>College Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developmental</td>
<td></td>
<td>✅</td>
<td>Over-placed</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(English – 5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(Math – 6%)</td>
</tr>
<tr>
<td>College Level</td>
<td>Under-placed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(English – 29%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Math – 18%)</td>
<td></td>
<td>✅</td>
</tr>
</tbody>
</table>
COLLEGE 2: ENGLISH

- GPA only: 3.8%
- Test only: 1.0%
- GPA and test: 4.8%
- Full model: 7.5%

COLLEGE 2: MATH

- GPA only: 9.9%
- Test only: 2.7%
- GPA and test: 12.0%
- Full model: 14.5%
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
Model R-Squared Statistics
Math

R-Squared Statistics – Graphical Representation
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.
## Multiple Measures Options

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

Which would you want to use? Why or why not?

<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)

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

Yes

Exemptions?

No

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

Resulting Probability of Success

High

Low

College Level Placement

Remedial Level Placement
Decision-Rule Example

Student Applies

Yes

Exemptions?

No

HS Record and/or Non-Cog Performance?

High

Low

Accuplacer Test

College Level Placement

High

Low

Remedial Level Placement
Decision-Band Example

Student Applies

Exemptions? Yes

Accuplacer Test Above Band

HS Record and/or Non-Cog Performance?

College Level Placement

No Below Band Remedial Level Placement

High

Low
The CAPR Assessment Study
Organization of CAPR

MDRC

Descriptive Study of Developmental Education

Evaluation of The New Mathways Project (RCT in TX)

Evaluation of New Assessment Practices (RCT in NY)

CCRC

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

Slides available at: bit.ly/capr_ashe16
How Does the Predictive Analytics Placement Work?

- Use data from *previous* cohorts
- Develop formula to predict student performance
- Set cut scores
- 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

Legend:
- Control Group
- Program Group
Early Findings – Subgroup Analysis

Fall 2016
Treatment Effects: College Level Math Placement

- Black: 36% Control, 43% Program
- Hispanic: 48% Control, 58% Program
- White: 49% Control, 59% Program
- Pell: 39% Control, 46% Program
- Non-Pell: 54% Control, 58% Program
- Female: 41% Control, 51% Program
- Male: 50% Control, 52% Program
Treatment Effects: College Level Math Completion

- Black: Control Group 18%, Program Group 18%
- Hispanic: Control Group 24%, Program Group 21%
- White: Control Group 25%, Program Group 18%
- Pell: Control Group 13%, Program Group 22%
- Non-Pell: Control Group 25%, Program Group 25%
- Female: Control Group 15%, Program Group 21%
- Male: Control Group 21%, Program Group 20%
Treatment Effects: College Level English Placement

- Black: 41% Control, 80% Program
- Hispanic: 54% Control, 87% Program
- White: 49% Control, 81% Program
- Pell: 49% Control, 78% Program
- Non-Pell: 61% Control, 88% Program
- Female: 54% Control, 84% Program
- Male: 55% Control, 83% Program
Treatment Effects: College Level English Completion

- Black: Control Group 24%, Program Group 42%
- Hispanic: Control Group 34%, Program Group 50%
- White: Control Group 39%, Program Group 52%
- Pell: Control Group 29%, Program Group 45%
- Non-Pell: Control Group 40%, Program Group 52%
- Female: Control Group 34%, Program Group 51%
- Male: Control Group 33%, Program Group 47%

Legend:
- Control Group
- Program Group
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)
Reactions? Questions?
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)
College Placement Plans Going Forward
Follow-up Interviews Protocol

- Objectives:
  - Find out colleges plans for placement in the future
  - Identify barriers to continuing to use multiple measures
- Format: ~20 minute phone call
- Respondents: College administrator(s) involved in the study
- Timeline: April/May, 2018
Summary of College Plans for Placement

• A few colleges plan to keep the multiple measures algorithm
  – Additional measures e.g. non-cognitive measure, specific grades
• A few colleges are incorporating multiple measures in other ways
  – Waiver/exemption system
  – Decision tree
• One college using single placement test
• One college replacing single test with transcript data
• Several colleges have separate placement plans for English and Math
Decision Factors

- Colleges that did not keep the algorithm:
  - Need more evidence of impact
  - Found other ways to accelerate college completion
  - Aware of ACCUPLACER Next Gen changes
  - Recognize resource limitations
  - Defer to faculty preferences
Other Key Takeaways

- Strong interest across colleges to move away from testing
- Agreement that GPA/high school transcript data can be used to improve placement
- Faculty buy-in key/faculty preferences determine placement plans
- English faculty favored algorithm over math faculty
- Research helped but need final results
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