Let Icarus Fly
Multiple Measures in Assessment and Other Cornerstones of the Re-imagination of Student Capacity

Modesto Junior College
January 6, 2016

John J. Hetts, Ph.D.
Senior Director of Data Science
Educational Results Partnership
jhetts@edresults.org
@jjhetts LetIcarusFly
Recognize contributions of hundreds of people

Long Beach City College

- Andrew Fuenmayor
- Karen Rothstein
- Eva Bagg
- Mark Taylor
- English Department
- Math Department
- Counseling Department
- Assessment and Matriculation
- Promise Pathways Committee
- Student Success Committee
- Executive Leadership
- And many more

Multiple Measures Assessment Project

- Mallory Newell
- Craig Hayward
- Terrence Willett
- Loris Fagioli
- Peter Bahr
- Ken Sorey
- Rachel Baker
- Nathan Pellegrin
- Alyssa Nguyen
- Danielle Duran

- Common Assessment Initiative
- Multiple Measures Work Group
- California Community Colleges Chancellor’s Office
- Faculty, staff, and leadership at more than 60 pilot colleges
- And many more
Reality of assessment and placement

- Majority of students placed below transfer-level in ≥1 discipline
  - 68% nationally (Scott-Clayton & Belfield, 2015) [bit.ly/CCRCPlacementAccuracy](bit.ly/CCRCPlacementAccuracy)
- Cohort completion rates of transfer-level course drop by a third to half for every additional level placed below transfer (CCCCCO Basic Skills Cohort Tracker: [http://bit.ly/BSCohort](http://bit.ly/BSCohort))
Remedial!
Remedial, I say!!
All of you!!!

Looks like the standardized sorting hat is in a cranky mood again...

Oh dear...
Evidence that conventional assessment is flawed

- Research increasingly questions effectiveness of standardized assessment for understanding student capacity
  - Little relation to college course outcomes
  - Incredible variability in cutscores and 2-year colleges often use HIGHER cutscores than 4-year
  - Underestimates capability of students of color, women, first generation college students, low SES
Multiple measures can dramatically improve placement accuracy

- Increasing evidence of far stronger predictive utility of high school achievement for predicting performance in transfer-level courses

- Nationally:

- California alone
  - Willett, Hayward, & Dahlstrom, 2008; Martinez, 2011; Hetts, Fuenmayor, & Rothstein, 2012; Willett & Karanjef, 2014; Ngo & Kwan, 2015
  - Multiple Measures Assessment Project
Emerging consensus as a clear best practice in assessment

- REL Southeast and IES Guide to assessing college readiness
- WWC Educator’s Practice Guide: Strategies for Postsecondary Students in Developmental Education
Also required by law

  - “Assessment is a holistic process through which each college collects information about students to facilitate their success by ensuring their appropriate placement into math, English, and ESL curricula. Student assessments should reflect a variety of informational sources that create a profile of a student’s academic strengths and weaknesses.” p. 2.3

- Colleges must adhere to the following regulations and guidelines when implementing and managing any assessment instrument used for course placement:
  - ...
  - Course placement recommendations must be based on multiple measures (sections 55502(i) and 55522(a)). Additional indicators of student readiness for math, English, and ESL course content must be used together with placement test results. p. 2.4
Title 5, esp. Division 6 (CCCs), Subchapter 6 (Matriculation programs): [http://bit.ly/Title5Matriculation](http://bit.ly/Title5Matriculation)

- 55502. (i) “Multiple measures” are a **required component** of a district's assessment system and refer to the use of more than one assessment measure in order to assess the student. Other measures that may comprise multiple measures include, but are not limited to, interviews, holistic scoring processes, attitude surveys, vocational or career aptitude and interest inventories, high school or college transcripts, specialized certificates or licenses, education and employment histories, and military training and experience. (See also 55522(a))

- 55502 (e) “Disproportionate impact” in broad terms is a condition where access to key resources and supports or academic success may be hampered by inequitable practices, policies, and approaches to student support or instructional practices affecting a specific group. For the purpose of assessment, **disproportionate impact is when the percentage of persons from a particular racial, ethnic, gender, age, or disability group**, who are directed to a particular service or course placement based on an assessment test or other measure **is significantly different from the representation of that group** in the population of persons being assessed, and **that discrepancy is not justified by empirical evidence** demonstrating that the assessment test or other measure is a **valid and reliable predictor of performance** in the relevant educational setting.

- (also 55003 (d)(2): Prerequisites or corequisites may be established only for any of the following purposes:
  - (2) the prerequisite will assure, consistent with section 55002, that a student has the skills, concepts, and/or information that is presupposed in terms of the course or program for which it is being established, **such that a student who has not met the prerequisite is highly unlikely to receive a satisfactory grade** in the course (or at least one course within the program) for which the prerequisite is being established)
Also supported by Statewide Academic Senate

- The ASCCC supports and encourages the use of multiple measures, provided local control is maintained
Multiple Measures Assessment Project

- Collaborative effort of CCCC0, Common Assessment Initiative (CAI), Cal-PASS Plus (Educational Results Partnership & San Joaquin Delta College), RP Group and now >60 CCC pilot colleges
  - Replications and extension of Student Transcript Enhanced Placement Study
- Identify, analyze, & validate multiple measures data (including HS transcript data, non-cognitive variable data, & self-report HS transcript data
  - For English, Mathematics, ESL and Reading
  - Focus on predictive validity (success in course) using categorization and regression tree models (robust to missing data, non-linear effects, and interactions)
- Engage pilot colleges to conduct local replications, test models and pilot use in placement, and provide feedback

[bit.ly/MMAP2017]
Data Set for Models

- CCC students from all colleges in the system enrolled in an English, Math, Reading or ESL course past census with matching high school data in CalPASS
- >1 million cases for Math & English; >200,000 for Reading & ESL from 2008-2014
- Data files include:
  - High school courses in discipline and grades, unweighted HSGPA, course level/type
  - Assessment data, wherever avail. (ACCUPLACER, CST, EAP)
  - CCC data (course grades, course level)
  - Other derived info. (e.g., delay, CCC math class type)
  - Rules developed with subset of students with 4 years of HS data (about 25% of total sample)
## Transfer-Level Rule Sets

<table>
<thead>
<tr>
<th>Transfer Level Course</th>
<th>Direct Matriculant</th>
<th>Non-Direct Matriculant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College Algebra</strong></td>
<td>HS 11 GPA &gt;=3.2 OR</td>
<td>HS 12 GPA &gt;=3.2 OR</td>
</tr>
<tr>
<td>Passed Algebra II (or better)</td>
<td>HS 11 GPA &gt;=2.9 AND Pre-Calculus C (or better)</td>
<td>HS 12 GPA &gt;=3.0 AND Pre-Calculus or Statistics (C or better)</td>
</tr>
<tr>
<td><strong>Statistics</strong></td>
<td>HS 11 GPA &gt;=3.0 OR</td>
<td>HS 12 GPA &gt;=3.0 OR</td>
</tr>
<tr>
<td>Passed Algebra I (or better)</td>
<td>HS 11 GPA &gt;=2.3 AND Pre-Calculus C (or better)</td>
<td>HS 12 GPA &gt;=2.6 AND Pre-Calculus (C or better)</td>
</tr>
<tr>
<td><strong>English</strong></td>
<td>HS 11 GPA &gt;=2.6</td>
<td>HS 12 GPA &gt;=2.6</td>
</tr>
<tr>
<td>N=347,332</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

N=216,420
# One-Level Below Rule Sets

<table>
<thead>
<tr>
<th>One Level Below Course</th>
<th>Direct Matriculant</th>
<th>Non-Direct Matriculant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>HS 11 GPA &gt;= 2.2</td>
<td>HS 12 GPA &gt;= 2.4 AND 12th Grade English C (or better)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HS 12 GPA &gt;= 2.4 AND CST English &gt;= 322</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HS 12 Grade GPA &gt;= 1.7 AND 12th Grade English C+ (or better)</td>
</tr>
<tr>
<td>ESL</td>
<td>HS 11 GPA &gt;= 2.7</td>
<td>HS 12 GPA &gt;= 2.6</td>
</tr>
</tbody>
</table>

- The vast majority of ELL/ELD HS students (~85%) who enter CC begin directly in mainstream English coursework.
- Other major populations of ESL students (e.g., international students, migrants, older immigrants) will not have US high school transcripts and so other multiple measures, such as essays, must be used with those groups.
Projected impact on placement and success

Placement into transfer-level

- English: Historic (Placement) 28%, Historic (Course-Taking) 37%, Projected 59%
- Math: Historic (Placement) 15%, Historic (Course-Taking) 26%, Projected 37%

Projected success rates

- Transfer-level Math: Historic success rate 62%, Projected success rate 72%
- Transfer-Level English: Historic success rate 71%, Projected success rate 71%

Legend:
- Historic (Placement)
- Historic (Course-Taking)
- Projected
Common Concerns/Multiple Measures Myths

- Students placed via multiple measures will not be successful
- *Our* assessment test/system is different/better/more awesome
  - It won’t work at my school/type of institution
- High school GPA is only predictive for recent graduates
- It’s too hard to get or use transcripts/it’s not worth it
- Will threaten my college’s enrollment/FTES
Students placed by multiple measures are as or more successful
Maintains or improves success rates in transfer-level courses

Fall 2014 LBCC

F2014 Sierra College: English

Fall 2015: Cañada College

Cañada College Transfer-level Placements

Cañada College Transfer-level Success Rates

Fall 2015: SDCCD Pilot

Transfer-level Success Rates by Method of Entry

- Math:
  - Accuplacer: 60%
  - MMAP: 58%
  - Other: 61%
  - Sequence: 59%

- English:
  - Accuplacer: 68%
  - MMAP: 69%
  - Other: 70%
  - Sequence: 79%

New Spring 2016 English Pilot – Mira Costa

Placement into Transfer-Level English

Overall: 71% Previous, 83% MMAP
African American: 57% Previous, 44% MMAP
Hispanic: 62% Previous, 66% MMAP
Asian: 76% Previous, 47% MMAP
PI: 63% Previous, 69% MMAP
White: 83% Previous, 83% MMAP
Mira Costa Transfer-Level English Success rate by year/placement type

- S2013: 63%
- S2014: 64%
- S2015: 66%
- S2016 - Old: 66%
- S2016 - MMAP: 69%

### Davidson County CC 2013-2015

<table>
<thead>
<tr>
<th>Subject</th>
<th>Comparison</th>
<th>HS Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>59%</td>
<td>76%</td>
</tr>
<tr>
<td>Math</td>
<td>48%</td>
<td>65%</td>
</tr>
</tbody>
</table>

### Ivy Tech 2014-2015

<table>
<thead>
<tr>
<th>Subject</th>
<th>Accuplacer</th>
<th>HS Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>57%</td>
<td>64%</td>
</tr>
<tr>
<td>Math</td>
<td>59%</td>
<td>68%</td>
</tr>
<tr>
<td>Reading</td>
<td>57%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Rules used for English and Math: HSGPA >=2.6 and completion of four years of mathematics including one year beyond Algebra 2

Rules used for English and Math: HSGPA >=2.6
Powerful consequences for sequence completion/throughput and equity
Potential equity & completion impact: LBCC F2011
Baseline Equity Gaps for 2-year rates of achievement

Transfer Math Successful Completion: 4% F11 African Americans, 12% F11 Hispanic, 21% F11 Asian, 18% F11 White
Transfer English Successful Completion: 13% F11 African Americans, 13% F11 Hispanic, 25% F11 Asian, 24% F11 White
Behavioral Intent to Transfer: 15% F11 African Americans, 32% F11 Hispanic, 33% F11 Asian, 41% F11 White
LBCC: F2012 2-year rates of achievement
Nationwide pattern of multiple measures being more predictive regardless of test compared
Their test wasn’t different - Compass

<table>
<thead>
<tr>
<th>Course</th>
<th>Compass Test</th>
<th>Compass</th>
<th>HSGPA</th>
<th>HSGPA + Compass</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1</td>
<td>Writing Skills</td>
<td>.31</td>
<td>.57</td>
<td>.62</td>
</tr>
<tr>
<td>Arithmetic</td>
<td>Pre-Algebra</td>
<td>.57</td>
<td>.34</td>
<td>.66</td>
</tr>
<tr>
<td>Algebra</td>
<td>Pre-Algebra</td>
<td>.36</td>
<td>.65</td>
<td>.80</td>
</tr>
<tr>
<td>Intermediate Algebra</td>
<td>Algebra</td>
<td>.47</td>
<td>.66</td>
<td>.84</td>
</tr>
<tr>
<td>College Algebra</td>
<td>Algebra</td>
<td>.41</td>
<td>.76</td>
<td>.88</td>
</tr>
<tr>
<td>College Algebra</td>
<td>College Algebra</td>
<td>.51</td>
<td>.76</td>
<td>.94</td>
</tr>
</tbody>
</table>

http://bit.ly/COMPASSValidation  (Table 4 - Median Logistic R)
Their test wasn’t different - Accuplacer

<table>
<thead>
<tr>
<th>English</th>
<th>Accuplacer</th>
<th>11th Grade GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>.10</td>
<td>.27</td>
</tr>
<tr>
<td>1 level below</td>
<td>.12</td>
<td>.24</td>
</tr>
<tr>
<td>2 levels below</td>
<td>.12</td>
<td>.25</td>
</tr>
<tr>
<td>3 levels below</td>
<td>.12</td>
<td>.18</td>
</tr>
<tr>
<td>4 levels below</td>
<td>.07</td>
<td>.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Math</th>
<th>Accuplacer</th>
<th>11th Grade GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer - STEM</td>
<td>.19</td>
<td>.24</td>
</tr>
<tr>
<td>Transfer – Stats</td>
<td>.16</td>
<td>.31</td>
</tr>
<tr>
<td>Transfer – GEM</td>
<td>.09</td>
<td>.26</td>
</tr>
<tr>
<td>1 level below</td>
<td>.21</td>
<td>.28</td>
</tr>
<tr>
<td>2 levels below</td>
<td>.11</td>
<td>.26</td>
</tr>
<tr>
<td>3 levels below</td>
<td>.11</td>
<td>.23</td>
</tr>
<tr>
<td>4 levels below</td>
<td>.05</td>
<td>.19</td>
</tr>
</tbody>
</table>

MMAP (in preparation): Correlation with success (C or better) in course in CCC
Their tests weren’t different - NC

From Bostian (2016), North Carolina Waves GPA Wand, Students Magically College Ready adapted from research of Belfield & Crosta, 2012 – see also Table 1)
Their tests weren’t different - AK

Their tests weren’t different - AK

Their tests weren’t different – University of California

Figure 10
Relative Weight of High School GPA and SAT Scores, Before and After Controlling for SES, in Predicting 5-Year Graduation: All UC Freshmen vs. Underrepresented Minorities, 1994 to 2005

High School GPA is as or more predictive than tests for far longer than people think
Predicting Transfer-Level English

MMAP (in preparation): correlations b/w predictor and success (C or better) in transfer-level course by # of semesters since HS
Predicting Transfer-Level math

MMAP (in preparation): correlations b/w predictor and success (C or better) in transfer-level course by # of semesters since HS
It doesn’t have to be hard or expensive
Self-reported HSGPA potential alternative

- UC admissions uses self-report but verifies after admission


- ACT research often uses self-reported GPA, generally find it to be a highly powerful predictor and highly correlated with students actual GPA: ACT, 2013: r(1978) = .84 http://bit.ly/ACTSRGPA
# GPA vs. Self-reported HSGPA

<table>
<thead>
<tr>
<th>HSGPA Level</th>
<th>N</th>
<th>Actual</th>
<th>Self-reported</th>
<th>Mean diff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.50–4.00</td>
<td>599</td>
<td>3.79</td>
<td>3.75</td>
<td>−0.04</td>
</tr>
<tr>
<td>3.00–3.49</td>
<td>451</td>
<td>3.24</td>
<td>3.23</td>
<td>−0.01</td>
</tr>
<tr>
<td>2.50–2.99</td>
<td>408</td>
<td>2.81</td>
<td>2.76</td>
<td>−0.05</td>
</tr>
<tr>
<td>2.00–2.49</td>
<td>265</td>
<td>2.24</td>
<td>2.35</td>
<td>0.11</td>
</tr>
<tr>
<td>1.50–1.99</td>
<td>172</td>
<td>1.77</td>
<td>2.04</td>
<td>0.27</td>
</tr>
<tr>
<td>0.00–1.49</td>
<td>85</td>
<td>1.03</td>
<td>1.85</td>
<td>0.82</td>
</tr>
<tr>
<td>Total</td>
<td>1,980</td>
<td>2.95</td>
<td>3.02</td>
<td>0.07</td>
</tr>
</tbody>
</table>

### GPA vs. Self-reported HSGPA

**Self-Reported HSGPA**

<table>
<thead>
<tr>
<th>School-Reported HSGPA</th>
<th>A</th>
<th>A−</th>
<th>B+</th>
<th>B</th>
<th>B−</th>
<th>C+</th>
<th>C</th>
<th>C−</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 14,825)</td>
<td>(n = 10,547)</td>
<td>(n = 7,795)</td>
<td>(n = 4,796)</td>
<td>(n = 1,649)</td>
<td>(n = 550)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>78%</td>
<td>32%</td>
<td>8%</td>
<td>3%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
<td>2%</td>
</tr>
<tr>
<td>A−</td>
<td>17%</td>
<td>45%</td>
<td>34%</td>
<td>14%</td>
<td>4%</td>
<td>2%</td>
<td>3%</td>
<td>4%</td>
</tr>
<tr>
<td>B+</td>
<td>4%</td>
<td>17%</td>
<td>39%</td>
<td>35%</td>
<td>16%</td>
<td>7%</td>
<td>4%</td>
<td>8%</td>
</tr>
<tr>
<td>B</td>
<td>1%</td>
<td>4%</td>
<td>17%</td>
<td>35%</td>
<td>40%</td>
<td>29%</td>
<td>18%</td>
<td>17%</td>
</tr>
<tr>
<td>B−</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
<td>10%</td>
<td>28%</td>
<td>36%</td>
<td>32%</td>
<td>15%</td>
</tr>
<tr>
<td>C+</td>
<td>0%</td>
<td>0%</td>
<td>1%</td>
<td>2%</td>
<td>9%</td>
<td>19%</td>
<td>28%</td>
<td>29%</td>
</tr>
</tbody>
</table>


Under-reporting was 2-4X as common as over-reporting.
It might actually help outcomes AND FTES
Testing & underplacement pushes students away

- Failure to enroll in the first course in the sequence often single biggest loss point in the developmental course.
  - (Bailey, Jeong, & Cho, 2010)
  
  [Diagram: Student Progression Through the Developmental Math Sequence]


http://bit.ly/CCRCWhatWeKnow
Validating student effort/performance attracts students to college

- “Students were profoundly grateful not to have to take the assessment test.” – Canada College Multiple Measures Presentation at RP Group Conference April 8, 2016

Enrollments in transfer-level course by students placed in transfer-level by method of placement – Cañada College F2015

- English: 52% (Compass Placement) vs 79% (MM Placement)
- Math: 41% (Compass Placement) vs 72% (MM Placement)

Does this solve everything for every student?

- No

- This method can’t be used (yet?) for:
  - international students
  - students who didn’t attend high school
  - students who are returning to education decades after high school

- Not every student placed this way will will succeed
  - just as every student placed via the test hasn’t succeeded
However...

- None of these reflect legitimate reasons for a college not to engage in this work.
- They represent reasons to get motivated to find additional solutions for those students as well such as:
  - Noncognitive and other variables in assessment
  - Better aligned and concurrent rather than sequential support
    - Redesigned developmental education: California Acceleration Project (e.g., Hayward & Willett, 2014) [bit.ly/CAPEval]
  - Adjusting cut scores
    - Henson & Hern, 2014 [bit.ly/LetThemIn]
Reality - it’s ultimately not really about any single one of these concerns.

- We can make it as complicated as we want but…
- It’s about institutional structure, choices, and leadership
  - Cañada College went from zero to implementation in 3 months, including full local replication of statewide MMAP research
- A large proportion of the benefit for students and institutions could be accomplished at every institution in this room by adding a handful of questions at application or assessment and writing at most a couple hundred lines of code
  - By next week.
  - Mira Costa College went from sign-up as a MMAP pilot college to implementation of new multiple measures placement rules for students in English (using self-report) in the last 4 business days before Thanksgiving F2015
Summary

- Concerns don’t hold water - reveal stereotypes about community college students that just aren’t true

- On average, evidence-based multiple measures
  - improves success rates in transfer-level courses
  - dramatically increases transfer-level placement & completion of sequence
  - saves students 1-2 semesters of developmental education

- Coupled with work on acceleration, corequisite developmental education, and cutscore reform, demonstrates that higher education generally and community colleges specifically have been systematically and substantially underestimating our students’ capacity

- Building new guided pathways without re-examining student capacity likely to fail
Support for getting started

• Multiple Measures Assessment Project Support (free)
  •  [bit.ly/MMAP2017]
  •  [bit.ly/ImplementMMAP]

• MMAP Project Team Support
  • Webinars
    • Including implementation:  [bit.ly/ImplementMMAP]
  • In person convenings
    • Connection to peers and tips, tricks, and pitfalls they’ve experienced
  • Tools and support for research methodology and data analysis:  [bit.ly/ToolsMMAP]
    • (note – links at archive page may not work but should work if you add “archive.” before the rpgroup.org
      (i.e.,http://archive.rpgroup.org/…)
  • Provision of statewide model placement recommendations and/or data for local, evidence-based model:
    [bit.ly/MMAPRecs]

• Arnold Foundation grant support for implementation of rigorous RCT implementation and evaluation
Contact Information

- John Hetts
- Educational Results Partnership
- jhetts@edresults.org
- 714-380-2678 cell
- Twitter: @jjhetts #LetIcarusFly

The Fierce Urgency of Now

- ~Two million new community college students per year
- “We are now faced with the fact that tomorrow is today. We are confronted with the fierce urgency of now. In this unfolding conundrum of life and history, there "is" such a thing as being too late. This is no time for apathy or complacency. This is a time for vigorous and positive action.”
  – Dr. Martin Luther King, Jr.