Let Icarus Fly:
The Four Cornerstones of Gateway Course Completion and Success for All our Students

West Los Angeles College
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Overview

- Standardized assessment systematically and substantially underestimates student capacity
  - Particularly for students of color, low income students, first generation college students, women
- Four evidence-based cornerstones on which to rebuild community college outcomes
  - Range of cost but exceptionally high ROI
    - to students, colleges, the state - all of us
  - Tremendous completion, equity, and real world implications
But first, I digress
A little classics, a little econ, and a little probability
First, Classics: Daedalus and Icarus

- Daedalus crafted the labyrinth of inescapable complexity for King Minos.

- To escape from Minos, Daedalus built wings of feather and wax for his son Icarus and himself.

- Don’t fly too high, lest sun melt the wax and you plummet to your doom.
  - Dangers of innovation/invention, hubris,
  - Importance of knowing your limits, listening to your wiser elders.

- But most of us forget the rest of that story...
A little macroeconomics: Great Recession in CA, BLS data

- The worst recession in any of our lifetimes took a million people out of the workforce for a year or more, causing suffering on an epic scale.
- Now - imagine if we knew it was happening and stopping it was fully in our control.
And a quick probability estimation

- Imagine you’re told that an event is **highly unlikely** to occur

- Take a moment to decide the **maximum probability** of that event’s occurrence between 1-100% that you would accept as consistent with a description of “highly unlikely”
Transition to College: Assessment and Placement

- CCCs are open enrollment institutions
  - Requires assessing and planning for educational needs of students.

- Goal: Effectively place student at most appropriate level for their skill
What are we aiming for?
The Zone of Proximal Development

Level of challenge/difficulty of task

Degree of competence/level of skill

What the learner cannot currently achieve

The Zone of Proximal Development

What the learner can achieve independently

Engage

What the learner can achieve/learn with instructional support

Improve

Succeed

Flow

Apathy

Anxiety

Mr. Worry by Roger Hargreaves

Engage

Improve

Succeed
Can you summarize that in one sentence?

• If you think you can catch the bus, you will run for it.”

• Lee Peng Yee, Singapore National Institute of Education Mathematician
What we are actually doing: Community college student transition to college

- Community colleges rely nearly entirely on standardized assessment (WestEd, 2011)
  
- Most CC students placed below college-level
  - Significant barrier (Bailey, Jeong, and Cho, 2010)

- What does this mean?
  - First interaction is to tell students they don’t belong
  - Imply that most students are not ready for college and are likely to fail
  - Convinces many, including our students
Conventional Wisdom
Explaining Assessment Results

• It is a problem with today’s students
  • Students are simply, vastly unprepared for college
  • Kids these days ….

• It is a problem with public education
  • Public education is failing to prepare students
  • Teachers these days...
What If the Conventional Wisdom is Wrong?

- Substantial, long-term increase in IQ: bit.ly/FlynnEffectIQ
- National Assessment of Educational Progress: at all-time highs in virtually every demographic category: bit.ly/NAEPIInfo
NAEP Math and Reading Assessments

NAEP Math Score Improvement, 1978-2012
By race and age

NAEP Reading Score Improvement, 1975-2012
By race and age
What If the Conventional Wisdom is Wrong?

- Research increasingly questions the effectiveness of standardized assessment for understanding student capacity.
- NAG B, 2012: Incredible variability in cut scores; 2-year colleges often use higher cut scores than 4-year. bit.ly/NAGB2012
What if?

• What if the problem is not with our students but with limitations in how we have assessed their capacity to do college-level work?

• OR

• What if one of the key barriers to our students’ successful transition to and success in college is one that we fully control?
Four transformative cornerstones
Cornerstone 1: Improving assessment through evidence-based multiple measures

Resources/references:
• http://bit.ly/RPMultipleMeasures
• http://cccassess.org
Utility of HS information to improve assessment

- 2008: Willett, Hayward, & Dahlstrom
  - 11th grade HS variables as early alert mechanism for discipline assessment
- 2011: Martinez
  - Self-reported HS variables as more powerful predictors of college completion
- 2012: Hetts, Fuenmayor, & Rothstein
  - Strong predictive utility of HS GPA and grade in discipline for course performance
- 2014: Willett & Karanjeff
  - Replication of 2012 research by 12 colleges (STEPS)
- MMAP: Multiple Measures Assessment Project
LBCC Multiple Measures Research

- Five cohorts tracking more than 7,000 HS grads who matriculate to LBCC directly

- Examined predictive utility of wide range of high school achievement data

- For predicting:
  - How students are assessed and placed
  - How students perform in those classes
  - (and alignment between them)
Alignment in English

Predicting Placement

Ordinal Regression Coefficients

CST ELA (z) | Eng Grade (12) | GPA (other)
---|---|---
1.34* | .00 | .30**

Predicting Performance

Logistic Regression Coefficients

CST ELA | Eng Grade | GPA (other)
---|---|---
.17* | .37*** | .88*

*p < .05, **p < .01, ***p < .001, x = p < 1 x 10^-10
Alignment in Math

Predicting Placement

Predicting Performance

* $p < .05$  ** $p < .01$  *** $p < .001$, $x = p < 1 \times 10^{-10}$
Key Takeaways

• Assessment should predict how students will perform at our colleges

• Instead:
  • Current standardized tests predict standardized tests
  • Classroom performance predicts classroom performance
  • More info tells us more about student capacity than less info
Implementing Multiple Measures Placement
Transfer-level Placement Rates F2012

- F2011 First time students
- F2011 LBUSD
- F2012 Promise Pathways
  - Accuplacer Only
- F2012 Promise Pathways
  - Multiple Measures
F2012 Promise Pathways vs. Fall 2011 2-year rates of achievement

- Successfully Completed Transfer Math: 23% for F2012 Promise Pathways (N=933) vs. 13% for F2011 LBUSD (N=1654)
- Successfully Completed Transfer English: 24% for F2012 Promise Pathways (N=933) vs. 20% for F2011 LBUSD (N=1654)
- Successful Completion of English 3: 3% for F2011 LBUSD (N=1654) vs. 52% for F2012 Promise Pathways (N=933)
- Behavioral Intent to Transfer: 31% for F2012 Promise Pathways (N=933) vs. 54% for F2011 LBUSD (N=1654)
Before I show you the success rates...

• What are the standards for including a prerequisite on a course?

• Prerequisites can be required if:
  • Needed for health and safety of student
  • Required by statute or rule
  • If student would be highly unlikely to successfully complete the course if the prerequisite wasn’t fulfilled first.
Success rates in transfer-level courses

First Cohort, F2012

Non-Pathways: 64% English, 55% Math
Promise Pathways: 62% English, 51% Math

Neither of these differences approach significance, p >.30

Most recent cohort, F2014

Non-Pathways: 67% English, 49% Math
Promise Pathways: 79% English, 49% Math

English difference, p < .001
Equity impact: F2011 Baseline Equity Gaps for 2-year rates of achievement

Transfer Math Successful Completion:
- F11 African Americans: 4%
- F11 Hispanic: 12%
- F11 Asian: 21%
- F11 White: 18%

Transfer English Successful Completion:
- F11 African Americans: 13%
- F11 Hispanic: 25%
- F11 Asian: 24%
- F11 White: 34%

English 3 Successful Completion:
- F11 African Americans: 2%
- F11 Hispanic: 3%
- F11 Asian: 1%
- F11 White: 6%

Behavioral Intent to Transfer:
- F11 African Americans: 15%
- F11 Hispanic: 32%
- F11 Asian: 33%
- F11 White: 41%
Equity impact: F2012 2-year rates of achievement

Transfer Math Successful Completion
- African American: 12%
- Hispanic: 26%
- Asian: 39%
- White: 51%

Transfer English Successful Completion
- African American: 21%
- Hispanic: 36%
- Asian: 51%
- White: 64%

English 3 Success
- African American: 18%
- Hispanic: 23%
- Asian: 28%
- White:

Behavioral Intent to Transfer
- African American: 42%
- Hispanic: 52%
- Asian: 59%
- White: 66%
MMAP Overview

• Statewide replication of use of high school information via CalIPASS Plus
  • Uses classification and regression trees (CART) to organize students into highly similar performance
  • Allows for very complex, non-linear effects and robust to missing variables
  • Rule set development: placement where past students with those characteristics achieved a C+ or better in course
  • All colleges welcome to join or follow along with pilot effort (23 and counting!)

• jhetts@edresults.org
• 714-380-2678
Multiple Measures Assessment Project: Potential Impact of conservative statewide Implementation

- **Math**
  - Traditional Placement: 29%
  - Multiple Measures: 41%

- **English**
  - Traditional Placement: 48%
  - Multiple Measures: 63%

The diagram illustrates the percent placed at the transfer level for traditional placement versus multiple measures assessment in Math and English.
Correlations with College Grade:
11th grade Cumulative GPA vs. Accuplacer

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

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

![Bar charts showing projected success rates for transfer-level Math and Transfer-Level English.](chart)

- **Transfer-level Math**
  - Historic success rate: 62%
  - Projected success rate: 62%

- **Transfer-Level English**
  - Historic success rate: 72%
  - Projected success rate: 71%

Successful completion of transfer-level course

- **Historic success rate**
- **Projected success rate**
MMAP: Equity Impacts

Percent placed at transfer level:

Math
- URM Traditional: 22%
- n-URM Traditional: 33%
- URM Multiple Measures: 40%
- n-URM Multiple Measures: 55%

English
- URM Traditional: 41%
- n-URM Traditional: 53%
- URM Multiple Measures: 60%
- n-URM Multiple Measures: 74%
Why is HS GPA a strong predictor?

- Assessment/measurement theory:
  - True score + error (systematic and random)

- Methodological gold standard
  - To minimize error, triangulate to true score through assessment across different:
    - methods
    - content/domains
    - evaluators
    - times

- But what about grade inflation?!?
MMAP: HS GPA Distribution

Histogram

Mean = 2.382
Std. Dev. = .792
N = 363,152
Comerstone 2: Acceleration

Resources/references
• http://bit.ly/RPCAP
• http://bit.ly/CAPEval
• http://bit.ly/RPAcceleration
Evaluation of 2011-2012 pilot year of California Acceleration Project

• Compare outcomes of accelerated students vs. similar students enrolled in traditional English and math basic skills sequences

• Students followed through spring 2013
• 18 accelerated pathways at 16 colleges
• 1,836 accelerated English students & 22,354 comparison students with complete data
• 653 accelerated math students & 23,607 comparison students with complete data
Summary of Findings

• Large and robust effects of acceleration that work for
  • Students of all backgrounds
  • Students at all placement levels
• Quality of implementation mattered
CAP increased odds of transfer-level course completion in two years

<table>
<thead>
<tr>
<th>Type of Pathway</th>
<th>Odds Ratio (Effect Size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All English CAP pathways</td>
<td>1.5</td>
</tr>
<tr>
<td>Low-acceleration English pathways</td>
<td>1.2</td>
</tr>
<tr>
<td>High-acceleration English pathways</td>
<td>2.3</td>
</tr>
<tr>
<td>All Math CAP pathways</td>
<td>4.5</td>
</tr>
</tbody>
</table>
Regression Adjusted Effects - English

Transfer Level Completion

- ≥4 levels below: 17% (Comparison), 22% (Acceleration)
- 3 levels below: 21% (Comparison), 27% (Acceleration)
- 2 levels below: 25% (Comparison), 32% (Acceleration)
- 1 level below: 30% (Comparison), 38% (Acceleration)

Comparison: Orange
Acceleration: Yellow
Regression Adjusted Effects - Math

Estimated Transfer Level Completion

<table>
<thead>
<tr>
<th>Category</th>
<th>Comparison</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥4 levels below</td>
<td>6%</td>
<td>21%</td>
</tr>
<tr>
<td>3 levels below</td>
<td>10%</td>
<td>30%</td>
</tr>
<tr>
<td>2 levels below</td>
<td>15%</td>
<td>41%</td>
</tr>
<tr>
<td>1 level below</td>
<td>25%</td>
<td>53%</td>
</tr>
</tbody>
</table>
Completion of transfer-level math by ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Comparison</th>
<th>Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>10%</td>
<td>41%</td>
</tr>
<tr>
<td>Asian American</td>
<td>39%</td>
<td>44%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>14%</td>
<td>35%</td>
</tr>
<tr>
<td>White</td>
<td>18%</td>
<td>44%</td>
</tr>
</tbody>
</table>
Cornerstone 3: Lower the cut scores

Resources/references:
• http://bit.ly/LetThemIn
• http://bit.ly/RPLetThemIn
Natural experiment at Butte College

- In 2011, switched from one placement test to another

- Old test/cut scores:
  - 23% of incoming students “college ready” in English

- New test/cut scores:
  - 48% of incoming students “college ready” in English
Equitability of access for first-year students enrolled for credit

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Percent assessed at transfer level</th>
<th>F2010</th>
<th>F2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>15%</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>Asian American</td>
<td>19%</td>
<td>35%</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>19%</td>
<td>41%</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>58%</td>
<td></td>
<td>36%</td>
</tr>
</tbody>
</table>
Completion of Transfer-Level English in First Year

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>F2010</th>
<th>F2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American</td>
<td>8%</td>
<td>23%</td>
</tr>
<tr>
<td>Asian American</td>
<td>17%</td>
<td>35%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>13%</td>
<td>27%</td>
</tr>
<tr>
<td>White</td>
<td>23%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Legend:
- F2010
- F2012
What about course success rates?

Median success rates across sections of College English:

- Old policy: 67-72%
- New policy: 63%

But high degree of variability across sections:

- 2012-13 success rates ranged from 18% to 94%
Within instructor comparisons

• 21 instructors taught before and after the policy change:
  • 8 had higher success rates
  • 3 had no change
  • 10 had lower success rates

• Mean success rate dropped just 2.8 percentage points
• Median <1 percentage point.
Developmental Math Reform – Virginia Community College System

- Introduced new instrument (VPT-MATH)
- Intentionally increased percentage assigned to college-level math

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-Reform, Fall 2010</th>
<th>Post-Reform, Fall 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any College Math</td>
<td>18%</td>
<td>43%</td>
</tr>
<tr>
<td>Liberal Arts Math</td>
<td>4%</td>
<td>10%</td>
</tr>
<tr>
<td>STEM Math</td>
<td>14%</td>
<td>33%</td>
</tr>
</tbody>
</table>
Increased Enrollment in College Math

- STEM college math enrollments increased more than liberal arts college math enrollments.

<table>
<thead>
<tr>
<th></th>
<th>Pre-Reform, Fall 2010</th>
<th>Post-Reform, Fall 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>11%</td>
<td>29%</td>
</tr>
<tr>
<td>Liberal Arts</td>
<td>3%</td>
<td>10%</td>
</tr>
<tr>
<td>STEM</td>
<td>8%</td>
<td>20%</td>
</tr>
</tbody>
</table>
Successful Completion of College Math Declined

Of those placed at college level and that enrolled, successful completion rates declined after introduction of the VPT.

- Overall: Pre-Reform, Fall 2010, 69%; Post-Reform, Fall 2012, 62%
- Liberal Arts: Pre-Reform, Fall 2010, 73%; Post-Reform, Fall 2012, 68%
- STEM: Pre-Reform, Fall 2010, 65%; Post-Reform, Fall 2012, 57%
Significantly More Students Successfully Completed College Math

- Far larger percentage of first-time students successfully completed entry-level college math in first year.
Cornerstone 4: Corequisite models

Resources/References:
- http://alp-deved.org
Replication of CCBC ALP model

• ALP model involves:
  • Enrollment directly in college-level English (mainstreamed)
  • Concurrent enrollment in just-in-time companion developmental English course taught by same instructor
• Four early implementers at or near scale
Completion of College-Level English (of those who take one-level below course)

<table>
<thead>
<tr>
<th>College</th>
<th>Baseline</th>
<th>ALP Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>College 1</td>
<td>36%</td>
<td>78%</td>
</tr>
<tr>
<td>College 2</td>
<td>34%</td>
<td>78%</td>
</tr>
<tr>
<td>College 3</td>
<td>37%</td>
<td>62%</td>
</tr>
<tr>
<td>College 4</td>
<td>50%</td>
<td>78%</td>
</tr>
</tbody>
</table>
Completion of College-Level English by ethnicity (of those who take one-level below course)

Percent successfully completing transfer level

- College 1: 70% Baseline-URM, 42% Baseline - nonURM, 80% ALP-URM, 62% ALP non-URM
- College 2: 66% Baseline-URM, 37% Baseline - nonURM, 82% ALP-URM, 58% ALP non-URM
- College 3: 50% Baseline-URM, 38% Baseline - nonURM, 62% ALP-URM, 55% ALP non-URM
- College 4: 76% Baseline-URM, 46% Baseline - nonURM, 76% ALP-URM, 55% ALP non-URM
Combining cutscore revision and corequisite expansion in English - Virginia Community College System

Pre-Reform, Fall 2010
- College English, 43%
- Co-Requisite College English, 10%
- Developmental English, 47%

Post-Reform, Fall 2013
- College English, 58%
- Co-Requisite College English, 23%
- Developmental English, 19%
More Students Enroll in College English

- Enrollment in college-level English and corequisite College English

<table>
<thead>
<tr>
<th></th>
<th>Pre-Reform, Fall 2010</th>
<th>Post-Reform, Fall 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>College English</td>
<td>34%</td>
<td>50%</td>
</tr>
<tr>
<td>Co-Requisite</td>
<td>4%</td>
<td>14%</td>
</tr>
<tr>
<td>Total</td>
<td>38%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Legend:
- Pre-Reform, Fall 2010
- Post-Reform, Fall 2013
Successful completion rates little changed

- Among the students who enrolled in a college English course within one year, success rates were relatively unchanged, though declined slightly for the Co-Requisite English.
Completion of College English

- More students successfully completed college English

![Bar chart showing completion rates for College English and Co-Requisite College English before and after reform. Pre-Reform Fall 2010 and Post-Reform Fall 2013.]

- College English: Pre-Reform 25%, Post-Reform 37%
- Co-Requisite College English: Pre-Reform 3%, Post-Reform 11%
- Total: Pre-Reform 28%, Post-Reform 48%
Impact of putting one more of the four cornerstones in place
### Summary of impacts

<table>
<thead>
<tr>
<th>Pillar</th>
<th>Transfer-level success rates (if taken)</th>
<th>Developmental Success Rates</th>
<th>Transfer-level completion (by entire cohort)</th>
<th>Meaningful equity impacts</th>
<th>Upfront Development of Curriculum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple Measures</td>
<td>No change to higher</td>
<td>Lower overall (but no change for students that remain)</td>
<td><strong>Much higher</strong></td>
<td><strong>Substantial</strong></td>
<td>Low</td>
</tr>
<tr>
<td>Acceleration</td>
<td>No change to higher</td>
<td>No change to higher</td>
<td><strong>Much Higher</strong></td>
<td><strong>Substantial</strong></td>
<td>High</td>
</tr>
<tr>
<td>Cutscore revision</td>
<td>Slightly lower</td>
<td>No change to slightly lower</td>
<td><strong>Much Higher</strong></td>
<td><strong>Substantial</strong></td>
<td>Low</td>
</tr>
<tr>
<td>Corequisite models</td>
<td>Higher</td>
<td>Higher</td>
<td><strong>Much Higher</strong></td>
<td><strong>Moderate to substantial</strong></td>
<td>High</td>
</tr>
</tbody>
</table>
Potential Needs for Professional Development and Other Support to Optimize Outcomes

- Transfer level courses
  - E.g., first-year students in first year English again
- Developmental courses
  - E.g., best students will no longer be present
- Faculty re-training support
- Student Support Services
  - E.g., how to interpret and incorporate additional evidence of student capacity
- Unlearning of previous narrative
  - Counselors
  - Assessment and Matriculation staff
  - Foundational skills faculty
  - Administrators

- Enrollment management
- Curriculum development and redesign
- Rebuilding relationship/trust of students and K-12 partners
- Institutional research skills and capacity
  - Understanding modeling and analytics
What might this mean for our institutions?

• Improved outcomes for our students
  • And taking less time to achieve them
• Improved behavior from our students
• Better prepared students
• Higher quality data to better understand student performance and interventions
• Improved targeting of interventions
• *New May 2015 Budget Revise developments
2015 May Budget Revision Notes

- **Basic Skills and Student Outcomes Transformation Program**
  - An increase of $60 million Proposition 98 General Fund to assist community colleges in improving delivery of basic skills instruction by adopting or expanding the use of evidence-based models of placement, remediation, and student support that accelerate the progress of underprepared students toward achieving postsecondary educational and career goals.

- **Basic Skills Partnership Pilot Program**
  - An increase of $2 million Proposition 98 General Fund for a pilot program to provide incentives to community college districts and the CSU to coordinate their efforts to provide instruction in basic skills to incoming CSU students in an efficient and effective way.

- **Investing in Student Success**
  - An increase of $15 million Proposition 98 General Fund to further close achievement gaps in access and achievement in underrepresented student groups, as identified in local Student Equity Plans.
What might this mean for our students?

- LBC C saved students >10,000 semesters (5000 years) of unneeded remediation in first three years.
  - $250 per course for student (plus books!)
  - $750 per course for state
- Dramatic opportunity costs of college reduced
  - Median salary of "some college" is $30,000/year
  - Don’t lose their first year or median salary though, they lose their last year.
What might this mean for all of us?

- On average, these thoughtful, evidence-based changes save students 1-2 semesters of developmental education that the evidence clearly demonstrates they did not need.

- There are two million community college students in California who have been taken out of the productive workforce for an additional year or more.

- The worst recession in any of our lifetimes only took one million people in California out of the workforce.
Multiple Measures Assessment Project: Potential Impact of conservative statewide Implementation

- **Math**
  - Traditional Placement: 29%
  - Multiple Measures: 41%

- **English**
  - Traditional Placement: 48%
  - Multiple Measures: 63%

The chart shows the percent of students placed at a transfer level in Math and English under traditional placement and multiple measures assessment.
Additional first time transfer-level students each year in CA

Math: AT&T Park (~40,000)  .  English: Dodger Stadium (~60,000)
What we gain through knowing our students better

• The ability to go back to each of our colleges and transform student outcomes by adding one more of these cornerstones by Fall 2016.

• A clarion call to reassess our understanding of student capacity and preparation as far greater than we’ve given them credit for for a generation.

• An opportunity to stop meeting students at the front door to work to convince them that they’re not actually college material.

• A critical reminder of Daedalus’ second instruction to Icarus.

• It’s just as important not to fly too low.
Thank you!

Contact information
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  jhetts@edresults.org
- 916-498-8980 ext. 208
- 714-380-2678 cell
- Twitter: @jjhetts
Additional Resources

• Background research
  • Achieving the Dream/Jobs for the Future summary of alternative assessment
    • bit.ly/AlternativeAssessment
  • CCRC research on Assessment, Placement, and Progression in Developmental Education
• RP Group’s Student Transcript-Enhanced Placement (STEPS) Project
  • bit.ly/RPSTEPS
  • Step by Step process for replication: bit.ly/RPSTEPS2
• More information about our research
  • bit.ly/PathwaysResearch
• Similar CCC research and implementation:
  • Peralta CCD: bit.ly/LaneySTEPS2, bit.ly/PeraltaSTEPS
  • Grossmont-Cuyamaca: bit.ly/Grossmont
Extra slides
# English models - placed as assessed unless...

<table>
<thead>
<tr>
<th>Level</th>
<th>11&lt;sup&gt;th&lt;/sup&gt; grade models</th>
<th>12&lt;sup&gt;th&lt;/sup&gt; grade models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer-level</td>
<td>• Cumulative GPA &gt;= 2.7&lt;br&gt;• AP English w/grade of C+ or better</td>
<td>• Cumulative GPA &gt;= 2.7&lt;br&gt;• AP English with grade of C or better&lt;br&gt;• Cumulative GPA &gt;= 2.3 &amp; 12th Course GP &gt;= B-</td>
</tr>
<tr>
<td>One level below</td>
<td>• Cumulative GPA &gt;= 2.4</td>
<td>• Cumulative GPA &gt;= 2.4 &amp; 12th Course GP &gt;= C+</td>
</tr>
<tr>
<td>Two levels below</td>
<td>(rules superseded)</td>
<td>• Cumulative GPA &gt;= 2.5&lt;br&gt;• 12th Course GP &gt;= C +&lt;br&gt;• GPA &gt;= 2.4 &amp; CST &gt;= 334</td>
</tr>
<tr>
<td>Three levels below</td>
<td>(rules superseded)</td>
<td>• Cumulative GPA &gt;= 2.0 &amp; 12th Course GP &gt;= C+</td>
</tr>
</tbody>
</table>
Math models - flagged as eligible...

<table>
<thead>
<tr>
<th>Transfer level</th>
<th>11th grade models</th>
<th>12th grade models</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Algebra</td>
<td>• Cumulative GPA $\geq 3.4$ &amp; Algebra II B or better</td>
<td>• Cumulative GPA $\geq 3.4$</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.9$ &amp; CST $\geq 310$</td>
<td>• Cumulative GPA $\geq 2.9$ &amp; Calculus C or better</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.9$ &amp; Pre-Calculus B- or better</td>
<td>• Trigonometry B- or better</td>
</tr>
<tr>
<td></td>
<td>• Trigonometry B- or better</td>
<td>• Cumulative GPA $\geq 3.0$ &amp; Geometry B or better</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.9$ &amp; DID NOT take Algebra I &amp; Geometry B or better</td>
<td></td>
</tr>
<tr>
<td>GE Math/Liberal Arts</td>
<td>• Cumulative GPA $\geq 3.2$</td>
<td>• Cumulative GPA $\geq 2.8$</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.5$ &amp; CST $\geq 288$ &amp; Algebra II C or better</td>
<td>• CST $\geq 284$ &amp; Took Trigonometry</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Trigonometry B or better</td>
</tr>
</tbody>
</table>
Math models - flagged as eligible...

<table>
<thead>
<tr>
<th>Transfer level</th>
<th>11\textsuperscript{th} grade models</th>
<th>12\textsuperscript{th} grade models</th>
</tr>
</thead>
</table>
| Statistics     | • Cumulative GPA $\geq$ 3.2  
• Cumulative GPA $\geq$ 2.7 & CST $\geq$ 310 & Pre-Calculus C or better  
• Cumulative GPA $\geq$ 2.7 & CST $\geq$ 310 & Algebra II B or better  
• Trigonometry B or better | • Cumulative GPA $\geq$ 3.1  
• Cumulative GPA $\geq$ 2.7 & Statistics C or better  
• Cumulative GPA $\geq$ 2.7 & CST $\geq$ 308 & AP math with C+ or better  
• Cumulative GPA $\geq$ 2.7 & Pre-Calculus C or better  
• Enrolled in Calculus |
Math models - place as assessed unless:

<table>
<thead>
<tr>
<th>Level</th>
<th>11th grade models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate algebra</td>
<td>• Cumulative GPA $\geq 2.9$ &amp; C + or better in Algebra II</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.9$ &amp; Enrolled in Pre-calculus</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.9$ &amp; CST $\geq 310$ &amp; higher level CST</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 3.2$</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.8$ &amp; CST $\geq 284$ &amp; Higher level CST</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.7$ &amp; Pre-Calculus B- or better</td>
</tr>
<tr>
<td></td>
<td>• Precalculus C or better &amp; Algebra II C or better</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level</th>
<th>12th grade models</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 3.2$</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.8$ &amp; CST $\geq 284$ &amp; Higher level CST</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA $\geq 2.7$ &amp; Pre-Calculus B- or better</td>
</tr>
<tr>
<td></td>
<td>• Precalculus C or better &amp; Algebra II C or better</td>
</tr>
</tbody>
</table>
Math models - placed as assessed unless...

<table>
<thead>
<tr>
<th>Level</th>
<th>11th grade models</th>
<th>12th grade models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two levels below</td>
<td>• Cumulative GPA &gt;= 2.9</td>
<td>• Cumulative GPA &gt;= 2.9</td>
</tr>
<tr>
<td></td>
<td>• Cumulative GPA &gt;= 2.3 &amp; CST &gt;= 284 &amp; higher level CST</td>
<td>• Cumulative GPA &gt;= 2.7 &amp; CST &gt;= 274 &amp; higher level CST</td>
</tr>
<tr>
<td>Three levels below</td>
<td>(rules superseded*)</td>
<td>• Cumulative GPA &gt;= 2.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cumulative GPA &gt;= 2.4 &amp; CST &gt;= 278</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Delay &gt;6 years</td>
</tr>
</tbody>
</table>
Math specific impacts (And were our success rates in developmental math as high as we thought they were?)
Placements for F2012 Promise Pathways Students (n=933)

- **Transfer Level Intermediate Algebra (Math 130)**
  - Traditional Placement: 9%
  - Pathways Placements: 31%

- **Algebra (Math 110)**
  - Traditional Placement: 27%
  - Pathways Placements: 30%

- **Pre-Algebra (Math 815)**
  - Traditional Placement: 23%
  - Pathways Placements: 20%

- **Arithmetic (Math 805)**
  - Traditional Placement: 2%
  - Pathways Placements: 1%
Pathways students enrolled in transfer-level Math in Fall 2012 (by Accuplacer Placement)

- MATH 60 Calculus: 5%
- MATH 50 Pre-Calculus: 4%
- MATH 40 Trigonometry: 15%
- MATH 37/45/STAT 1: 11%
- MATH 130: 37%
- MATH 110: 27%
- No Accuplacer Placement Available: 1%
Broader Context: F2012 Non-Pathways Students in Transfer Math: Semesters to Reach Transfer Level (by Accuplacer)

Semesters to Attempt Transfer Level

- Transfer Level placement (n=330): 2
- Math 130 placement (n=382): 4
- Math 110 placement (n=478): 6
- Math 815 placement (n=68): 7.3
- Math 805 placement (n=33): 20
Cohort completion rates for Transfer-Level Math: F2008 First time students vs. Promise Pathways (by Accuplacer Placement)

- Transfer Level placement: 63% F2008, 68% Promise Pathways
- Math 130 placement: 57% F2008, 27% Promise Pathways
- Math 110 placement: 41% F2008, 13% Promise Pathways

- F2008 (Cohort completion rate over 4 years)
- Promise Pathways (First-term completion rate among students placed)
But …

- Changed understanding of success rates (C or better) in remedial courses
  - 40-50% in Math, 65% in English
  - This included MANY students who had successfully completed material in HS and who could and have successfully completed higher level courses
Success rates in F2012 Math courses below transfer level

- Math 130 (n=764/28, p<0.0001) Non-Pathways: 51% Promise Pathways: 19%
- Math 110 (n=753/83, p=0.078) Non-Pathways: 42% Promise Pathways: 35%
- Math 815 (n=375/35, p=0.18) Non-Pathways: 50% Promise Pathways: 42%
What happened in Math 130? (and Math 110)

- Full Five LBUSD Cohorts from Cal-PASS data set: Math 110 36%, Math 130 40%
- Full Five LBUSD Cohorts Excluding Students Advanced by Model: Math 110 31%, Math 130 29%
- F2012 Pathways Cohort Excluding Catalog Rights Qualifiers: Math 110 35%, Math 130 29%
- F2012 Pathways Cohort Qualification by Catalog Rights Only: Math 110 6%

Math 110 and Math 130
Spurred Curricular Innovation in Mathematics

- Emporium model delivery of mathematics
  - Nearly doubled course success rates
- Compressed acceleration
  - Dramatically increased sequence completion
- Curriculum redesign acceleration
- Statistics pathway
Improved understanding of institutional effectiveness

• Richer understanding of existing student characteristics/preparation led to:
  • More rigorous testing of interventions for effectiveness
  • More efficient targeting of most effective interventions to those students who need them
Are our success rates as high as we think they are?
P2 Math Placement Pilot
Fall 2012

• Students given access to highest of three placement methods:
  1. Accuplacer (same as previous)
  2. Established prerequisites:
     • A or B in the second semester of a high school equivalent to prerequisite
     • E.g., A or B in second semester of elementary algebra substitutes for completion of Math 110 as prerequisite for Math 130.
3. Alternative Assessment Pilot

- Developed with Math Department Alternative Placement workgroup
  - Bruce Chafee, Pablo Bert, Tom Killian, and Ratanamumy Ngo

- Based on longitudinal research using five cohorts of LBUSD students
  - Standardized tests → standardized tests
  - Classroom performance → classroom performance
P2 Math Placement Pilot
Fall 2012 (continued)

• 3. Alternative Assessment Pilot (cont)
  • Logistic regression to establish best predictors of performance in math
    • Last HS Math course, grade in last course, last Math California Standards Test, score on Math CST, overall Non-math GPA

  • Generate $p(\text{success})$ for each new LBUSD student in every LBCCC Math course

  • Students placed in highest course where $p(\text{success}) \geq \text{course success rate}$.
    • But no higher than one level above last course completed
Broader Context: F2012 Non-Pathways Students in Transfer Math: Semesters to Reach Transfer Level (by Accuplacer)

<table>
<thead>
<tr>
<th>Placement</th>
<th>Semesters to Attempt Transfer Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 placement</td>
<td>2</td>
</tr>
<tr>
<td>Math 110 placement</td>
<td>4</td>
</tr>
<tr>
<td>Math 815 placement</td>
<td>6</td>
</tr>
<tr>
<td>Math 805 placement</td>
<td>7.3</td>
</tr>
<tr>
<td>Math 805 placement</td>
<td>20</td>
</tr>
</tbody>
</table>

(n=330), (n=382), (n=478), (n=68), (n=33)
Broader context: F2008 First-Time Student Cohort Attempt and Successful Completion Rates of Transfer-Level Math (by Accuplacer)
Broader Context: F2012 Non-Pathways Students in Transfer Math: Semesters to Reach Transfer Level (by Accuplacer)

<table>
<thead>
<tr>
<th>Math Course Placement</th>
<th>Semesters to Attempt Transfer Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 130 placement</td>
<td>2 (n=382)</td>
</tr>
<tr>
<td>Math 110 placement</td>
<td>4 (n=478)</td>
</tr>
<tr>
<td>Math 815 placement</td>
<td>6 (n=68)</td>
</tr>
<tr>
<td>Math 805 placement</td>
<td>7.3 (n=33)</td>
</tr>
<tr>
<td>Math 805 placement</td>
<td>20 (n=33)</td>
</tr>
</tbody>
</table>
Broader context: F2008 First-Time Student Cohort Attempt and Successful Completion Rates of Transfer-Level Math (by Accuplacer)

- Transfer Level Placement (n=547) - 83%
- Math 130 Placement (n=654) - 63%
- Math 110 Placement (n=1975) - 27%
- Math 815 Placement (n=530) - 13%
- Math 805 Placement (n=516) - 4%

- Attempt Transfer Math
- Complete Transfer Math
Cohort completion rates for Transfer-Level Math: F2008 First time students vs. Promise Pathways (by Accuplacer Placement)

- Transfer Level placement: 63% (F2008) vs. 68% (Promise Pathways)
- Math 130 placement: 27% (F2008) vs. 57% (Promise Pathways)
- Math 110 placement: 13% (F2008) vs. 41% (Promise Pathways)

Legend:
- Red: F2008 (Cohort completion rate over 4 years)
- Gray: Promise Pathways (First-term completion rate among students placed)
Placements for F2012 Promise Pathways Students (n=933)

- Traditional Placement
- Pathways Placements

Transfer Level: 9% (Traditional), 31% (Pathways)
Intermediate Algebra (Math 130): 27% (Traditional), 30% (Pathways)
Algebra (Math 110): 42% (Traditional), 23% (Pathways)
Pre-Algebra (Math 815): 20% (Traditional), 16% (Pathways)
Arithmetic (Math 805): 2% (Traditional), 1% (Pathways)
Pathways students enrolled in transfer-level Math in Fall 2012 (by Accuplacer Placement)

- MATH 60 Calculus: 5%
- MATH 50 Pre-Calculus: 4%
- MATH 40 Trigonometry: 15%
- MATH 37/45/STAT 1: 11%
- MATH 130: 37%
- MATH 110: 27%
- No Accuplacer Placement Available: 1%
Cohort completion rates for Transfer-Level Math: F2008 First time students vs. Promise Pathways (by Accuplacer Placement)

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- Math 110 placement: 41%

F2008 (Cohort completion rate over 4 years)
Promise Pathways (First-term completion rate among students placed)
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- Math 130 (n=764/28, p<0001): 51%
- Math 110 (n=753/83, p=.078): 42%
- Math 815 (n=375/35, p=.18): 50%

Non-Pathways

Promise Pathways
What happened in Math 130? (and Math 110)

- Full Five LBUSD Cohorts from Cal-PASS data set: 36% Math 110, 40% Math 130
- Full Five LBUSD Cohorts Excluding Students Advanced by Model: 31% Math 110, 29% Math 130
- F2012 Pathways Cohort Excluding Catalog Rights Qualifiers: 35% Math 110, 29% Math 130
- F2012 Pathways Cohort Qualification by Catalog Rights Only: 6%
Example: 4 Levels Below Transfer: Short (assuming generously 70% pass, 80% persist)

Math 805: 100 Students

Math 815: 56 students

Math 110: 31 students

Math 130: 17 Students

Transfer Level: 9 Students

Transfer Math Completed: 6 students
Example: 3 Levels Below Transfer: Short
(assuming generously 70% pass, 80% persist)

Math 815: 100 Students
Math 110: 56 students
Math 130: 31 students
Transfer Level: 17 Students
Transfer Math completed: 12 Students
Example: 2 Levels Below Transfer: Short (assuming generously 70% pass, 80% persist)

- Math 110: 100 Students
- Math 130: 56 students
- Transfer Level: 31 students
- Transfer Math completed: 21 Students
Do developmental sequences change student trajectories? Evidence from regression discontinuity designs
If there is a treatment effect, there will be a discontinuity in the regression lines at the cutoff.
Math (CCRC: 17 CUNY CCs)
Purpose of Assessment

• The purpose of assessment is to identify the skill levels of students so that they will enroll in appropriate courses.

• For many of our students, that means a standardized test first thing in the morning...

• What if we applied that concept to conferences...

• The purpose of this very brief assessment is to identify the skill levels of attendees to make certain that they are adequately prepared for and attend appropriate presentations.
Question 1

• Select the best substitute for the underlined parts of the following sentence. The first answer [choice A] is identical to the original sentence.

• If you think the original sentence is best, then choose A as your answer.
1. Although only sixteen years old, the university accepted her application because of her outstanding grades.

A. the university accepted her application because of her outstanding grades.

B. her application was accepted by the university because of her outstanding grades.

C. her outstanding grades resulted in her being accepted by the university.

D. she was accepted to study at the university because of her outstanding grades.
1. Although only sixteen years old, the university accepted her application because of her outstanding grades.

A. the university accepted her application because of her outstanding grades.
B. her application was accepted by the university because of her outstanding grades.
C. her outstanding grades resulted in her being accepted by the university.
D. she was accepted to study at the university because of her outstanding grades.

The phrase Although she was only sixteen years old describes the characteristics of the female student. Phrases like this one need to be followed by the name of the person or thing they are describing. Therefore, "she" needs to come after this phrase.
Questions 2 & 3

• Rewrite the following sentence mentally in your own head.
• Follow the directions given for the formation of the new sentence.
• Remember that your new sentence should be grammatically correct and convey the same meaning as the original sentence.
“It will be easy to pass my math test, but I cannot say the same about my physics test.”

Rewrite, beginning with “Unlike my physics test,”
The next words will be:

A. it will be easy
B. I should easily
C. my math test
D. passing math
“It will be easy to pass my math test, but I cannot say the same about my physics test.”

Rewrite, beginning with “Unlike my physics test,”
The next words will be:

A. it will be easy
B. I should easily
C. my math test
D. passing math

The phrase "Unlike my physics test" is an adjectival phrase that makes a direct comparison with "my math test." Therefore, "my math test" must come directly after the comma.
"She is a good teacher because she is kind and patient."

Rewrite, beginning with: “Kind and patient”
Your new sentence will include:

A. of a good teacher
B. is a good teacher
C. make a good teacher
D. which a good teacher
“She is a good teacher because she is kind and patient.”

Rewrite, beginning with: “Kind and patient”
Your new sentence will include:

A. of a good teacher
B. is a good teacher
C. make a good teacher
D. which a good teacher

As in any sentence, you should put a descriptive phrase directly before or after the person or thing it is describing. Also remember that you may need to use a comma after your phrase.

Therefore, your new sentence will be: Kind and patient, she is a good teacher.
A job is shared by 4 workers, W, X, Y, and Z. Worker W does 1/4 of the total hours. Worker X does 1/3 of the total hours. Worker Y does 1/6 of the total hours. What fraction represents the remaining hours allocated to Worker Z?

A. 2/3
B. 5/12
C. 1/3
D. 1/4
does 1/4 of the total hours. Worker X does 1/3 of the total hours. Worker Y does 1/6 of the total hours. What fraction represents the remaining hours allocated to Worker Z?

A. 2/3
B. 5/12
C. 1/3
D. 1/4

Find the lowest common denominator to solve: $\frac{1}{4} + \frac{1}{3} + \frac{1}{6} + Z = 1$

3, 4, and 6 are denominators so the lowest common denominator is 12.

Now convert the fractions:
$\frac{1}{4} \times \frac{3}{3} = \frac{3}{12}, \frac{1}{3} \times \frac{4}{4} = \frac{4}{12}, \frac{1}{6} \times \frac{2}{2} = \frac{2}{12}$

Now add the fractions together:
$\frac{3}{12} + \frac{4}{12} + \frac{2}{12} + Z = 1$
$\frac{9}{12} + Z = 1$
$Z = 1 - \frac{3}{4}$
$Z = \frac{1}{4}$
How many 4 letter permutations can be made from the letter set: A B C D E?

A. 120
B. 100
C. 60
D. 9
How many 4 letter permutations can be made from the letter set: A B C D E?

<table>
<thead>
<tr>
<th>Option</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>120</td>
</tr>
<tr>
<td>B.</td>
<td>100</td>
</tr>
<tr>
<td>C.</td>
<td>60</td>
</tr>
<tr>
<td>D.</td>
<td>9</td>
</tr>
</tbody>
</table>

- Permutations take into account the order of the items in each group. In order to calculate the number of permutations of size \( S \) taken from \( N \) items, use: \( N! \div (N - S)! \)

\[
N = 5 \text{ and } S = 4
\]

\[
N! \div (N - S)! = (5 \times 4 \times 3 \times 2 \times 1) \div (5 - 4) = (5 \times 4 \times 3 \times 2) \div 1 = 120
\]