Using High School Data for Improving College Readiness, Advising, and Placement

2013 RP Group Conference

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Louise Jaffe, Santa Monica College
Ken Sorey, Cal-PASS
Outcomes

1. Understand a range of approaches to using high school data

2. Become familiar with a model for assessing the predictive value of high school data
Session Schedule

10:15–10:20 introduction
10:20–11:10 10 minutes each on five different approaches to using high school data
11:10–11:25 information on a tool you can use
11:25–11:30 gathering questions
11:30–11:45 discussion

Write your questions down throughout. You can submit other questions, and we’ll respond to all questions in a written document.
Pathway to College

Early Assessment Program Backward Mapping Study

EAP College Readiness Compared to Prior California Standards Test Performance

2011 Report

Cal-PASSPlus
Partnership for Achieving Student Success
The Data Analysis

- Analysis of student-level data, backward-mapped from 2011 to 2002
- Data from six large urban school districts in CA
- 19,214 total records of EAP takers
- Compared matched student records for students college ready and not-college ready on the EAP in 11th grade to their performance on the CST each year back to the 2nd grade
- Includes all EAP takers for English and combined math performance (Alg II and Summative Math)
More than 80 percent of students who were college ready on the 11th grade EAP were also grade-level proficient each year on the California Standards Test back to the 2nd grade.
Prior ELA Performance College Ready

The graph shows the percentage of students across grades from 2nd to 11th who are performing at different levels of proficiency in English Language Arts (ELA). The levels are:

- **Far Below Basic**
- **Below Basic**
- **Basic**
- **Proficient**
- **Advanced**

The data indicates a general increase in proficiency from grades 2nd to 11th, with a notable peak in proficiency in grades 8th and 9th. The percentages are color-coded for clarity:

- **Orange** for Far Below Basic
- **Red** for Below Basic
- **Yellow** for Basic
- **Blue** for Proficient
- **Purple** for Advanced
Prior Math Performance College Ready
Prior Math Performance NOT College Ready
2011 Combined Language Arts/Mathematics
College Readiness All Students

Percent of Students

Kings Collegiate Proficient: 50%
Kings Collegiate Ready: 32%
Top Comparables Statewide: 42%
Top Comparables Countywide: 39%
Top Comparables Nationwide:
2011 Combined Language Arts/Mathematics
College Readiness Pathway All Students

Percent College Ready

Gr 5: 17%
Gr 6: 35%
Gr 7: 40%
Gr 8: 38%
ACT Backward Mapping – College Ready Scatterplot

2011 Combined Language Arts/Mathematics
College Readiness African American

Percent of African American College Ready vs. Percent African American
CST Data for Students Taking 11th Grade EAP

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Students College Ready on the Early Assessment Program

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Students Not College Ready on the Early Assessment Program
# Demographics of EAP Takers and Performance

## Demographic Details

### Students Taking the EAP

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<tr>
<th>Demographic Details</th>
<th>Number</th>
<th>% of CR</th>
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<tbody>
<tr>
<td>African American</td>
<td>1,777</td>
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<tr>
<td>American Indian</td>
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<tr>
<td>Asian</td>
<td>4,855</td>
<td>25.1%</td>
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<td>Filipino</td>
<td>701</td>
<td>3.6%</td>
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<td>Hispanic</td>
<td>8,069</td>
<td>41.8%</td>
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<tr>
<td>Pacific Islander</td>
<td>214</td>
<td>1.1%</td>
</tr>
<tr>
<td>White</td>
<td>3,013</td>
<td>15.6%</td>
</tr>
<tr>
<td>Socioeconomic Disadvantaged</td>
<td>8,120</td>
<td>42.0%</td>
</tr>
<tr>
<td>English Learner</td>
<td>3,322</td>
<td>17.2%</td>
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Note: total numbers and percentages are > 100% as students are in multiple subgroups. CR = College Ready; NCR = Not College Ready.
Research on College Readiness in Math for Community College (CC) Freshmen

Analyzed the effectiveness of different high school mathematics pathways in preparing students for college-level mathematics.

– Searched for routes to college readiness
– Found predictors of college un-readiness
Research Question

How do different high school mathematics course-taking patterns and achievement predict placement into community college mathematics?
## Multinomial Logistic Regression Model

### Independent and Predictor Variables Tested

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<table>
<thead>
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<tbody>
<tr>
<td>1.</td>
<td>Gender</td>
</tr>
<tr>
<td>2.</td>
<td>Ethnicity: Black, Latino, Asian/Pacific Islander, White</td>
</tr>
<tr>
<td>3.</td>
<td>Highest-Level of Parent Education</td>
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<td>4.</td>
<td>Indication of Low Socio-Economic-Status</td>
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<td>5.</td>
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<tr>
<td>6.</td>
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<td>7.</td>
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<td>8.</td>
<td>Grade 11 Mathematics Grade Point</td>
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<td>9.</td>
<td>California High School Exit Exam Mathematics Scores</td>
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<td>Highest-Level High School Mathematics Course</td>
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<td>11.</td>
<td>No Mathematics in Grade 12</td>
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### Ordered Dependent/Outcome Variable

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<tr>
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<tbody>
<tr>
<td>1.</td>
<td>Community College Assessment into 1-, 2-, 3-, or 4-Levels Below College-Level Mathematics</td>
</tr>
</tbody>
</table>
CC Math Assessment Placement

- 32.3%: College-level math
- 13.2%: 1-level below: Intermediate Algebra
- 12.4%: 2-levels below: Algebra 1
- 21.6%: 3-levels below: Pre-Algebra
- 20.5%: 4-levels below: Basic Arithmetic

CC Freshmen (n=606)
Significant Predictors of Placement in Below College-Level Mathematics

<table>
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<tr>
<th>Variable: Math GPA</th>
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<td>Grade 9</td>
<td></td>
<td></td>
<td></td>
<td>14.42**</td>
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<tr>
<td>Grade 10</td>
<td></td>
<td></td>
<td></td>
<td>16.74*</td>
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<tr>
<td>Grade 11</td>
<td>14.96**</td>
<td>16.69**</td>
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* $p < .05$, ** $p < .01$
## Significant Predictors of Placement in Below College-Level Mathematics

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<tr>
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<td>21.99**</td>
<td>22.27*</td>
<td>22.39**</td>
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<td>CAHSEE Math</td>
<td>22.64***</td>
<td>22.72***</td>
<td>22.53***</td>
<td>21.54***</td>
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<tr>
<td>Grade 12 No Math</td>
<td>57.64**</td>
<td>45.66*</td>
<td>49.20**</td>
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* *p < .05, **p < .01, ***p < .001*
# Finding Suggests Off-Label Use of CAHSEE Math to Improve College-Readiness (n=857)

## CAHSEE Math By College Placement

<table>
<thead>
<tr>
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<th>CAHSEE Math SS</th>
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<tr>
<td><strong>SOLID PROFICIENCY</strong></td>
<td>431-450 (n=77)</td>
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<td><strong>MODERATE PROFICIENCY</strong></td>
<td>401-430 (n=201)</td>
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<td>16.4%</td>
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<td><strong>LOW PROFICIENCY</strong></td>
<td>380-400 (n=206)</td>
<td>28.2%</td>
<td>18.4%</td>
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<td><strong>PASS</strong></td>
<td>350-379 (n=340)</td>
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*** p < .001

Mathematics from High School to Community College: Preparation, Articulation, and College Un-readiness
Students traveled different paths through high school mathematics

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<tr>
<th>High School Observed Pathways</th>
<th>Grade 9</th>
<th>High School Mathematics Grade 12</th>
<th>Highest-Level Math</th>
<th>All Students N=2363</th>
<th>CC Freshmen N=739</th>
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<td>&gt; Algebra 1</td>
<td>Yes</td>
<td>&gt; Algebra 2</td>
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Different pathways led to college readiness; Same pathways led to different levels of un-readiness

## Patterns of Progress to CC Math

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<th>CAHSEE Math Score*</th>
<th>Math in Grade 12 *</th>
<th>Highest-level Math</th>
<th>Community College Placement Level</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geometry</td>
<td>380+</td>
<td>Yes</td>
<td>&gt; Algebra 2</td>
<td>College-level</td>
<td>103</td>
<td>11%</td>
</tr>
<tr>
<td>Geometry</td>
<td>380+</td>
<td>No</td>
<td>&gt; Algebra 2</td>
<td>College-level</td>
<td>43</td>
<td>5%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>380+</td>
<td>Yes</td>
<td>&gt; Algebra 2</td>
<td>College-level</td>
<td>33</td>
<td>4%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>380+</td>
<td>No</td>
<td>Algebra 2</td>
<td>2-levels below</td>
<td>20</td>
<td>2%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>380+</td>
<td>No</td>
<td>Algebra 2</td>
<td>3-levels below</td>
<td>19</td>
<td>2%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>350-379</td>
<td>No</td>
<td>Algebra 2</td>
<td>College-level</td>
<td>17</td>
<td>2%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>350-379</td>
<td>No</td>
<td>Algebra 2</td>
<td>1-level below</td>
<td>17</td>
<td>2%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>350-379</td>
<td>Yes</td>
<td>&gt; Algebra 2</td>
<td>1-level below</td>
<td>17</td>
<td>2%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>350-379</td>
<td>No</td>
<td>Algebra 2</td>
<td>3-levels below</td>
<td>34</td>
<td>4%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>350-379</td>
<td>Yes</td>
<td>Algebra 2</td>
<td>3-levels below</td>
<td>20</td>
<td>2%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>350-379</td>
<td>No</td>
<td>Algebra 2</td>
<td>4-levels below</td>
<td>48</td>
<td>5%</td>
</tr>
<tr>
<td>≤ Algebra 1</td>
<td>350-379</td>
<td>Yes</td>
<td>Algebra 2</td>
<td>4-levels below</td>
<td>36</td>
<td>4%</td>
</tr>
</tbody>
</table>

|  |  |  |  |  | 407 | 45% |
An Early Alert System for Remediation Needs of Entering Community College Students: Leveraging the California Standards Test

WILLET, HAYWARD, AND DAHLSTROM (2008)
Project Background

- Long standing interest in placement issues at the community college
  - Accuracy of placement
  - Standardization versus local customization
  - Remediation

- Climate of assessment, testing, and remediation
  - Harriet Robles’ 2004 letter
  - Consultation Council Task Force on Assessment
Project Background

- Related assessment issues in K12 and CSU
  - California Standards Tests (CST) in K-12
  - Early Assessment Program (EAP) by CSU
Project Questions

- Can the CST be used for placement and assessing readiness in college?
- Can 11th grade achievement be used to assess readiness for college-level work?
Project Partners

- California Partnership for Achieving Student Success (Cal-PASS)
- William and Flora Hewlett Foundation
- Final report can be found on their websites
Research Questions

★ Do 11th grade CST scores and GPA in math and English predict college placement level at a community college?

★ Do 11th grade CST scores and GPA in math and English predict successful completion of initial college coursework in these subjects?
Fig. 1. Relationships examined in this study

California State Test (CST) scores: 11th grade English

11th grade English achievement (GPA)

Level of first attempted community college English course

Grade in first attempted community college English course

California State Test (CST) scores: 11th grade math

Level of first attempted community college math course

Grade in first attempted community college math course

11th grade math achievement (GPA)
Sample Selection

- Cal-PASS member schools who gave permission to participate

- Students with both 11\textsuperscript{th} grade CST English or math scores and respective community college English or math enrollments
Data Set Overview

- CST summary and cluster scores
- First attempted community college English or math used, a proxy for placement
- Data set has limitations due to:
  - Student flow to other schools not in data base or data sharing agreements or within time frame of data
  - Record matching errors
  - Course and test coding errors
  - Institutions not randomly selected
Dependent Variables

★ Level of First Attempted Community College Math Course
  ★ 1 = Basic Math (Basic Skills)
  ★ 2 = Pre-Algebra (Basic Skills)
  ★ 3 = Beginning Algebra/Geometry (Basic Skills)
  ★ 4 = Intermediate Algebra (Precollegiate)
  ★ 5 = Statistics/Transfer level math (College)
  ★ 6 = Advanced Algebra/Pre-Calculus (College)
  ★ 7 = Calculus/Other higher math (College)

★ Level Of First Attempted Community College English Course
  ★ -3 = Three or more levels below college English
  ★ -2 = Two levels below college English
  ★ -1 = Precollegiate English
  ★ 0 = College English

★ Grade Points In First Attempted Community College Math or English Course
Independent Variables

- 11th Grade CST Scaled Score
- 11th Grade CST Cluster Scores
- 11th Grade Class Grade Points
- 12th Grade Class Indicator (Math Only)
  - -1 = Did not take math in senior year
  - 0 = Took math in senior year but did not succeed (grade of C or better)
  - 1 = Successfully completed senior year math with a grade of C or better
- 12th Grade Class Grade Points
- Year Enrolled In 11th Grade
- Time (In Years) Between High School and Community College Class Attempts
Control Variables

- Gender
- English Proficiency Status
  - English Only, RFEP, IFEP, EL
- Parent Education Level
- Home Language
- Ethnicity
- Disability Status
- High School District Pseudo Code
- Community College Pseudo Code
<table>
<thead>
<tr>
<th>11th Grade English Outcome Measure</th>
<th>College Course Level</th>
<th>College Course Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Number of Students</td>
</tr>
<tr>
<td>English CST Scores</td>
<td>0.49**</td>
<td>4700</td>
</tr>
<tr>
<td>English Grade</td>
<td>0.23**</td>
<td>4700</td>
</tr>
</tbody>
</table>

**p ≤ .01  *p ≤ .05  Note: Darker cell shadings indicate stronger correlations.
<table>
<thead>
<tr>
<th>English CST Cluster</th>
<th>Correlation with level of first attempted community college English course</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Score</td>
<td>0.49**</td>
<td>4700</td>
</tr>
<tr>
<td>Word analysis and vocabulary</td>
<td>0.35**</td>
<td>4700</td>
</tr>
<tr>
<td>Reading comprehension</td>
<td>0.40**</td>
<td>4700</td>
</tr>
<tr>
<td>Literary response and analysis</td>
<td>0.40**</td>
<td>4700</td>
</tr>
<tr>
<td>Written and oral language conventions</td>
<td>0.33**</td>
<td>4700</td>
</tr>
<tr>
<td>Writing strategies</td>
<td>0.42**</td>
<td>4700</td>
</tr>
</tbody>
</table>

\*\*\*p ≤ .01
### Table 5. Example Math “Cut Score” Guide for High School Advising and Community College Placement

<table>
<thead>
<tr>
<th>11th Grade CST Score (Proficiency Level)</th>
<th>11th Grade Course Grade</th>
<th>11th Grade High School Course Taken</th>
<th>Probability of Success</th>
<th>Summative Math</th>
<th>Probability of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>375 (Proficient)</td>
<td>A</td>
<td>Pre-Calculus</td>
<td>&gt;90%</td>
<td>Pre-Calculus</td>
<td>&gt;90%</td>
</tr>
<tr>
<td>375</td>
<td>B</td>
<td>Pre-Calculus</td>
<td>&gt;90%</td>
<td>Pre-Calculus</td>
<td>85%</td>
</tr>
<tr>
<td>375</td>
<td>C</td>
<td>Transferable General Education</td>
<td>79%</td>
<td>Pre-Calculus</td>
<td>73%</td>
</tr>
<tr>
<td>375</td>
<td>D</td>
<td>Transferable General Education</td>
<td>67%</td>
<td>Transferable General Education</td>
<td>53%</td>
</tr>
<tr>
<td>375</td>
<td>F</td>
<td>Intermediate Algebra</td>
<td>58%</td>
<td>Transferable General Education</td>
<td>&lt;50%</td>
</tr>
<tr>
<td>275 (Below Basic)</td>
<td>A</td>
<td>Intermediate Algebra</td>
<td>88%</td>
<td>Transferable General Education</td>
<td>&gt;90%</td>
</tr>
<tr>
<td>275</td>
<td>B</td>
<td>Intermediate Algebra</td>
<td>78%</td>
<td>Transferable General Education</td>
<td>78%</td>
</tr>
</tbody>
</table>

Source: Willett, Terrence; Hayward, Craig; Dahlstrom, Eden. (2008).
Implications

★ 11th grade CST’s and achievement provide enough information to be considered:
   ★ during high school advising on readiness for college
   ★ for use in community college placement systems for recent high school students

★ Greater alignment of curriculum should result in stronger correlations and predictive power of 11th grade CST’s and achievement
Future Research

- Focus on a small subset of schools
- Include qualitative analyses such as content review between high school English and math and community college curriculum
- Test the use of 11th grade CST’s and achievement in advising and placement
- Look at relationships between 10th grade and 9th grade scores/achievement and college outcomes
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THE STUDENT TRANSCRIPT-ENHANCED PLACEMENT PROJECT (STEPS)

Nathan Pellegrin, RP Group
The Potential of Transcript-Based Placement: CCCCIO, April 2013

Cox & Snell pseudo R-square \(~\) 0.35

Predicting College English Level

Predictor Variable Category

- CST's A-G Courses
- HS Course Level
- HS Course Grade
- HS GPA*

Count of Colleges Showing Significance

- Weakest
- Intermediate
- Strongest

Graph showing the count of colleges showing significance for different predictor variables.
In English tests predict tests, grades and courses matter but vary by college.
Predicting College Math Level

Count of Colleges Showing Significance

<table>
<thead>
<tr>
<th>Predictor Variable Category</th>
<th>CST's Courses</th>
<th>A-G Courses</th>
<th>HS Course Level</th>
<th>HS Course Grade</th>
<th>HS GPA*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weakest</td>
<td>11</td>
<td>8</td>
<td>6</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Intermediate</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Strongest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Cox & Snell pseudo R-square ~ 0.50
In math, the tests predict tests most consistently among colleges but high school level also strongly predictive
The Potential of Transcript-Based Placement: CCCCIO, April 2013

Predicting College English Success

Count of Colleges Showing Significance

Predictor Variable Category

Cox & Snell pseudo R-square \( \sim 0.20 \)
In English, grades predict grades.
The Potential of Transcript-Based Placement: CCCCIO, April 2013

Cox & Snell pseudo R-square ~ 0.20

Predicting College Math Success

Count of Colleges Showing Significance

Predictor Variable Category

CST's Courses
A-G Courses
HS Course Level
HS Course Grade
HS GPA*
College Course Level

Weakest
Intermediate
Strongest

The Potential of Transcript-Based Placement: CCCCIO, April 2013
In math, success predictors vary by college.
LBCC Cal-PASS Research

• Examined predictive utility of wide range of HS achievement
  • Most notably 11th grade CST scores and HS grades on:
    • How students assess and place into the developmental skills sequences
    • How students perform in those classes
Alignment in English

Predicting Placement

Predicting Performance

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

Predicting Placement

- CST Math (z) = 0.75
- Math GPA = 0.20
- GPA (12) = 0.00
- GPA (11) = 0.07

Predicting Performance

- CST Math (z) = 0.73
- Math GPA = 0.20
- GPA (12) = 0.25
- GPA (11) = 0.21

*p < .05, **p < .01, ***p < .001, x = p < 1 x 10^-10
Reimagining the Transition to College: Fall 2012 Promise Pathways

• Predictive placement in English & Math using:
  – *English*: A or B in 12th Grade English (as proxy)
  – *Math*: Predicted success rate ≥ average success rate in course

• Prescriptive, full-time course load via pre-populated first-semester success plan
First-term P2 Results: English

Early educational milestone achievement rates

- Attempted Transfer English: 5.5% (LBUSD '11), 3.8% (Promise Pathways)
- Successfully Completed Transfer English: 52.9% (LBUSD '11), 32.8% (Promise Pathways)

F2012 Success Rates in Transfer Level English

- Transfer Level English (English 1, English 1H, English 3)
  - Non-Pathways (n=2095): 63.9%
  - Promise Pathways (n=516): 62.0%

*Note: Promise Pathways (N=976*), LBUSD '11 (N=1660)
First-term P2 Results: Math

Early educational milestone achievement rates

F2012 Success Rates in Transfer Level Math

- Attempted Transfer-Level Math
- Successfully Completed Transfer Math

LBUSD F2011 (n=1660)
- Promise Pathways (n=976)

Non-Pathways (N=1803)
- Promise Pathways (N=156)
Completion Rates: English

- Transfer-Level English: 68.4%
- One Level Below: 66.7%
- Two Levels Below: 52.4%

Legend:
- Grey: F2008 First Time Student Cohort 4-year Completion Rate
- Red: F2012 Promise Pathways First-term completion rates of Alternative Placement Students
Completion Rates: Math

- Transfer-Level Math: 63% (F2008), 68% (F2012)
- One Level Below: 27% (F2008), 57% (F2012)
- Two Levels Below: 13% (F2008), 41% (F2012)

Legend:
- Dark gray: F2008 First Time Student Cohort 4-year completion rate
- Red: F2012 Promise Pathways Alternative Assessment (First-term completion rate)
Might this change how we understand college readiness?

**College Readiness – All 2011-2012 LBUSD Seniors**

- **English**
  - Plus LBUSD Alternative Placement for all: 30%
  - Plus LBCC (Accuplacer & Alternative Placement): 8%
  - EAP - LBUSD: 18%

- **Math**
  - Plus LBUSD Alternative Placement for all: 27%
  - Plus LBCC (Accuplacer & Alternative Placement): 6%
  - EAP - LBUSD: 6%
Implementing the STEPS study

Visit [http://www.rpgroup.org/content/participation-instructions](http://www.rpgroup.org/content/participation-instructions) for information on how to implement an analysis of the predictive value of various high school data elements for community college course-taking and success.

For information about the STEPS project, contact:
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Senior Researcher
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831.461.4586

For questions related to the Access module, contact:
Dan Lamoree
dlamoree@gmail.com

For questions on how these findings have been implemented on a campus, contact:
John Hetts
Director of Institutional Research
jhetts@lbcc.edu
562.938.4111 X 4052
[http://www.lbcc.edu/ie/](http://www.lbcc.edu/ie/)
How is STEPS 2.0 different?

• Interface
  • Redesigned the initial STEPS Database using VBA, SQL, and Shell scripts to fully automate data management
  • Forms to facilitate data validation
    • High School Course Id (CBEDS code)
    • Prior to College (CB21)

• Dataset
  • Includes students having enrolled at your institution in the immediate summer term after graduating from high school
  • Includes students not having enrolled at your institution in the immediate fall term but subsequently enrolled after this term
  • Includes students not enrolling in MATH or ENGL in their first term at your institution
    • Many students do not enroll in their remedial courses their first, second, or even third term in college!

*Note: You may restrict the dataset to fully mirror STEPS 1.0 methodology!
Selection Methodology

1. Students from your local feeder high schools
2. Their most recent high school academic year (MATH or ENGL)
3. Their most recent high school term (MATH or ENGL)
4. Their highest high school course within subject (CBEDS)
5. Their highest grade
6. Their most recent term at your institution
7. Their lowest level (CB21) course within ToP code (MATH or ENGL)
8. Their highest grade