Paradigm Shift: From Developing Multiple Measures Practice To Informing Mandates

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Outline

• Brief history of the Multiple Measures Assessment Project (MMAP)
• Early evaluation results
• Pivot to AB 705 Default Placement Rules
  – Adjusting throughput rates
  – Special populations and AB 705
• Implementation is coming!
Multiple Measures Assessment Project

• Ongoing, multiple year collaborative effort of CCCCO, Common Assessment Initiative (CAI), RP Group, Cal-PASS Plus (Educational Results Partnership & San Joaquin Delta College), and now >90 CCC pilot colleges

• Original, “MMAP Classic” focus: Identify, analyze, & validate multiple measures data (including HS transcript data, non cognitive variable data, & self-report HS transcript data)

• Focus on predictive validity (success in course) using classification and regression tree models (robust to missing data, non-linear effects, and interactions)
  – Conservative approach: target ≥70% success rate in college level course

• Engage pilot colleges to conduct local replications, test models and pilot use in placement, and provide feedback

bit.ly/MMAP2017
Why high school grades?

• AB 705 requires colleges to use one or more of the following when placing students into courses in math and English:
  – High School GPA
  – High School Coursework (which courses, how far you’ve gotten)
  – High School Grades

• If official grades are unavailable, colleges may use self reported grades or guided placement.

• Why is the use of high school grades required?
  – Everyplace anyone looks they are the strongest, most reliable predictor of college performance, including students’ first courses in English and math
Early Evaluation Results
Access to transfer-level courses has expanded more rapidly in English than in math.
FIGURE 2
Increased access to transfer-level math is strongly linked to increases in throughput

FIGURE 3
Increased access to transfer-level English lead to increases in throughput

Change in throughput rate (pp)

Change in the share of first-time English students starting directly in transfer-level (pp)

Pivot to AB 705

Developing compliant default placement rules
A Brief History of AB 705’s Origins and Development

• STEPS started with 14 colleges
• MMAP – started in 2014-15 with the 14 STEPS colleges
• CAI and Multiple Measures Work Group formed
• MMAP decision rules guidance released – over 90 colleges eventually join pilot
• AB 705 passed (October, 2017)
• AB 705 Implementation Committee formed and an ESL subcommittee formed
• Selection bias question: Are students with a certain GPA who were placed into a course representative of all students with that GPA, including those not so placed?
• RP Group adjusted predicted pass rates for the AB 705 Implementation Committee
• RP Group recommendations incorporated into CCCCOC guidance memos on English and math
• AB 705 Implementation Committee and ESL subcommittees continue to meet to provide additional guidance
Adapting MMAP to AB 705

• MMAP decision trees were based on identifying students who were **highly likely** to be successful
  – At least 70% probability of success in transfer-level

• Now, students can only be assigned to developmental education if:
  – They are *highly unlikely* to succeed at the transfer-level class
  – **AND**
  – Developmental education maximizes probability of successful completion of transfer-level coursework in one year.
What about everyone else who isn’t 70%+ likely to succeed in transfer-level?
What maximizes their transfer-level throughput?

• Can we identify any students more likely to complete transfer-level English or Math if they start in developmental education?
  —Let’s look at the students least likely to succeed based on their HS performance
Statistics
Decision Tree

Root Node

\( \text{HS\_11\_GPA\_CUM} \geq 2.3 \)

- Node 1
  - Internal Node/split
  - Branch
  - \( \text{HS\_11\_GPA\_CUM} \geq 3 \)
  - Node 2
    - Internal Node/non leaf
    - \( \text{PRE\_CALC\_UP11} \geq 0.5 \)
      - Node 3
        - Terminal node/leaf
        - \( 0.88 \) 30%
      - Node 4
        - \( \text{PRE\_CALC\_UP11} \geq 0.5 \)
          - Node 5
            - Probability of success
            - \( 0.81 \) 8%
          - Node 6
            - \( \text{ALG\_II\_UP11} \geq 0.5 \)
              - Node 7
                - 0.4 12%
              - Node 8
                - \( \text{PRE\_CALC\_UP11} \geq 0.5 \)
                  - Node 9
                    - \( 0.7 \) 16%
                  - Node 10
                    - \( \text{ALG\_II\_UP11} \geq 0.5 \)
                      - Node 11
                        - 0.58 19%
Statistics Throughput Rates

AB 705 Analysis of Pass Rates of Groups of Students in Transfer-level Statistics

<table>
<thead>
<tr>
<th>GPA Range</th>
<th>Algebra II</th>
<th>Pre-Calculus</th>
</tr>
</thead>
<tbody>
<tr>
<td>11th grade GPA &lt; 2.3 and C- or worse</td>
<td>• 40% pass rate</td>
<td>• 70% pass rate</td>
</tr>
<tr>
<td>11th grade GPA &gt;= 2.3 and C or better</td>
<td>• 49% pass rate</td>
<td>• 80% pass rate</td>
</tr>
<tr>
<td>in Algebra II</td>
<td>• ~10% of students</td>
<td>• ~62% of students</td>
</tr>
</tbody>
</table>

Maximizing Throughput: Statistics

One-year Math throughput rate by placement level for students with less than a 2.3 high school GPA

- 40% pass rate
- ~12% of students

<table>
<thead>
<tr>
<th>Placement Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer-level</td>
<td>40%</td>
</tr>
<tr>
<td>One-level below</td>
<td>7%</td>
</tr>
<tr>
<td>Two-levels below</td>
<td>2%</td>
</tr>
<tr>
<td>Three-levels below</td>
<td>2%</td>
</tr>
<tr>
<td>Four-levels below</td>
<td>1%</td>
</tr>
</tbody>
</table>
## Placement/Support Recommendations: English

<table>
<thead>
<tr>
<th>High School Performance Metrics</th>
<th>Recommended AB 705 Placement for English</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSGPA ≥ 2.6</td>
<td>Transfer-Level English Composition</td>
</tr>
<tr>
<td></td>
<td>No additional academic or concurrent support required</td>
</tr>
<tr>
<td>HSGPA 1.9 to 2.6</td>
<td>Transfer-Level English Composition</td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support recommended</td>
</tr>
<tr>
<td>HSGPA &lt; 1.9</td>
<td>Transfer-Level English Composition</td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support strongly recommended</td>
</tr>
</tbody>
</table>

For more information, see the July, 2018 AB705 Implementation Memo at [https://assessment.cccco.edu/resources/](https://assessment.cccco.edu/resources/)
## Placement/Support Recommendations: Statistics/Liberal Arts Mathematics

<table>
<thead>
<tr>
<th>High School Performance Metric</th>
<th>Recommended AB 705 Placement for Statistics/Liberal Arts Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSGPA ≥ 3.0</td>
<td>Transfer-Level Statistics/Liberal Arts Mathematics</td>
</tr>
<tr>
<td>Or</td>
<td>No additional academic or concurrent support required</td>
</tr>
<tr>
<td>HSGPA ≥ 2.3 &amp; ≥C in Precalculus</td>
<td>Transfer-Level Statistics/Liberal Arts Mathematics</td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support recommended</td>
</tr>
<tr>
<td>HSGPA 2.3–3.0</td>
<td>Transfer-Level Statistics/Liberal Arts Mathematics</td>
</tr>
<tr>
<td>HSGPA &lt; 2.3</td>
<td>Transfer-Level Statistics/Liberal Arts Mathematics</td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support strongly recommended</td>
</tr>
</tbody>
</table>
## Placement/Support Recommendations: BSTEM Math

<table>
<thead>
<tr>
<th>High School Performance Metric</th>
<th>Recommended AB 705 Placement for BSTEM Mathematics</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSGPA ≥ 3.4 OR HSGPA ≥ 2.6 &amp; enrolled in HS Calculus</td>
<td>Transfer-Level BSTEM Mathematics No additional academic or concurrent support required</td>
</tr>
<tr>
<td>HSGPA ≥ 2.6 or Enrolled in HS Precalculus</td>
<td>Transfer-Level BSTEM Mathematics Additional academic and concurrent support recommended</td>
</tr>
<tr>
<td>HSGPA ≤ 2.6 and no Precalculus</td>
<td>Transfer-Level BSTEM Mathematics Additional academic and concurrent support strongly recommended</td>
</tr>
</tbody>
</table>

Note: The BSTEM table presumes student completion of Intermediate Algebra/Algebra 2, an equivalent such as Integrated Math III, or higher course in high school.
CCCCO Default Placement Rules

English Placement Sort per Default Rules

- Transfer-level English w/ highest level of support [<1.90]: 17%
- Transfer-level w. support [1.90-2.59]: 36%
- Transfer-level [2.60+]: 47%
CCC CO Default Placement Rules

SLAM Placement Sort per Default Rules

- Transfer-level SLAM with highest level of support [<2.30] (34%)
- Transfer-level w. support [2.30-2.99] (32%)
- Transfer-level [3.0+ & 2.3 w/Precalc.] (34%)
CCCCCO Default Placement Rules

BSTEM Placement Sort per Default Rules

- **Local decision [no Alg. II in high school]**: 15%
- **Transfer-level BSTEM with highest level of support [<2.60 & Alg II/no Precalc.]**: 32%
- **Transfer-level w. support [2.60-3.39 or Precalc.]**: 36%
- **Transfer-level [3.40+ or 2.60+ w/Precalc.]**: 17%
Checking for what would maximize likelihood of successful completion of transfer-level course

Compare:

A. The success rate of similar students, in this case the lowest performing HS students, if placed directly into transfer—level course

Vs.

B. Rate of successful completion of transfer-level course within one year (AB705) for students who start one level below
   Note: not success rate in transfer-level only if transfer-level is taken
Addressing selection bias

• Differences in test scores, high school grades, and other factors that led to different placement may also be related to course performance
  – REMINDER, however – tests are more weakly related to course performance

• Still, the transfer-level course performance of students with low HSGPA who test into transfer-level courses may not fully generalize to those same students who didn’t place into transfer-level.
  – Have to adjust for differences in test scores and overall GPA
Transfer-Level Course Completion in One Year from First Class in Discipline (error bars represent ±1 se)

- **Transfer-Level English (HS GPA < 1.9)**
  - Lowest Node: 43%
  - Regression: 12%
  - Throughput from 1 level below: 12%
  - Lower Node N=7,248
  - Regression N=1,749
  - 1 level below N=13,241

- **Statistics (HS GPA < 2.3)**
  - Lowest Node: 43%
  - Regression: 29%
  - Throughput from 1 level below: 8%
  - Lower Node N=1,485
  - Regression N=809
  - 1 level below N=11,309

- **Pre-Calculus (HS GPA < 2.6)**
  - Lowest Node: 38%
  - Regression: 28%
  - Throughput from 1 level below: 13%
  - Lower Node N=1,753
  - Regression N=661
  - 1 level below N=18,917
Adjusting Projected Success Rates

- Difference in GPA and placement test score can be accounted for statistically and the projected success rates of similar students but from lower placement levels can be adjusted (lowered)
- Magnitude of the adjustment depends on:
  - extent of differences in test scores and GPA between those in the MMAP models and those who would potentially be entering, and;
  - strength of the association between the test scores/GPA and success in the target class
What did disaggregation of the student body show?

- There were no identifiable groups of students within the timeframe of this study who completed a transfer-level course at a higher rate when placed into developmental education than if placed directly into transfer-level.
  - This pattern holds by ethnicity, gender, EOPS and DSPS status, ELL status in high school, and Pell-eligible students as well.
Female Transfer-Level Course Completion in One Year from First Class in Discipline for Lowest HSGPA

- Transfer-Level English (HS GPA < 1.9)
  - Lowest Node N=2,721
  - 1 level below N=5,697
  - Lowest Node Success: 42%
  - 1 level below: 17%

- Statistics (HS GPA < 2.3)
  - Lowest Node N=577
  - 1 level below N=4,323
  - Lowest Node Success: 38%
  - 1 level below: 9%

- Pre-Calculus (HS GPA < 2.6)
  - Lowest Node N=498
  - 1 level below N=7,590
  - Lowest Node Success: 36%
  - 1 level below: 12%
Male Transfer-Level Course Completion in One Year from First Class in Discipline for Lowest HSGPA

- **Transfer-Level English (HS GPA < 1.9)**
  - Lowest Node: N=4,527
  - 1 level below: N=7,477
  - Lowest Node Success: 42%
  - Throughput from 1 level below: 16%

- **Statistics (HS GPA < 2.3)**
  - Lowest Node: N=908
  - 1 level below: N=6,986
  - Lowest Node Success: 41%
  - Throughput from 1 level below: 9%

- **Pre-Calculus (HS GPA < 2.6)**
  - Lowest Node: N=1,255
  - 1 level below: N=11,327
  - Lowest Node Success: 39%
  - Throughput from 1 level below: 16%
EOPS Transfer-Level Course Completion in One Year from First Class in Discipline for Lowest HSGPA

- **Transfer-Level English** (HS GPA < 1.9)
  - Lowest Node N=604
  - 1 level below N=1,249
  - Lowest Node Success in Target Course: 42%
  - Throughput from 1 level below: 24%

- **Statistics** (HS GPA < 2.3)
  - Lowest Node N=133
  - 1 level below N=1,084
  - Lowest Node Success in Target Course: 44%
  - Throughput from 1 level below: 9%

- **Pre-Calculus** (HS GPA < 2.6)
  - Lowest Node N=166
  - 1 level below N=1,652
  - Lowest Node Success in Target Course: 42%
  - Throughput from 1 level below: 15%
DSPS Transfer-Level Course Completion in One Year from First Class in Discipline for Lowest HSGPA

- **Transfer-Level English (HS GPA < 1.9)**
  - Lowest Node: N=208
  - 1 level below: N=450
  - Success: 43%
  - Throughput: 17%

- **Statistics (HS GPA < 2.3)**
  - Lowest Node: N=34
  - 1 level below: N=305
  - Success: 50%
  - Throughput: 6%

- **Pre-Calculus (HS GPA < 2.6)**
  - Lowest Node: N=34
  - 1 level below: N=503
  - Success: 46%
  - Throughput: 13%
Hispanic Transfer-Level Course Completion in One Year from First Class in Discipline for Lowest HSGPA

- **Transfer-Level English (HS GPA < 1.9)**
  - Lowest Node: N=3,424
  - 1 level below: N=7,439
  - Lowest Node Success: 41%
  - 1 level below: 15%

- **Statistics (HS GPA < 2.3)**
  - Lowest Node: N=628
  - 1 level below: N=5,585
  - Lowest Node Success: 35%
  - 1 level below: 8%

- **Pre-Calculus (HS GPA < 2.6)**
  - Lowest Node: N=695
  - 1 level below: N=8,916
  - Lowest Node Success: 34%
  - 1 level below: 14%
No one is saying that these success rates are acceptable

- However, AB705 requires that we only place students into developmental education if:
  - students are highly unlikely to succeed at transfer-level
  - it maximizes their likelihood of completion of the transfer-level course
- Neither of these conditions appear to be met even for the lowest performing HS students
- That limits us to providing concurrent or corequisite support
Corequisite students completed college composition at rates 2 to 4 times higher than students in traditional remediation.

Corequisite students were more likely than those in other remediation to complete transfer-level statistics within one year.

- **Cuyamaca**
  - Traditional: 32
  - Pre-Stats: 33
  - Corequisite: 72

- **Los Medanos**
  - Traditional: 12
  - Pre-Stats: 20
  - Corequisite: 69
Implementation is coming!
IMPLEMENTATION IS COMING
Implementing the Default Placement Rules at Bakersfield: A Case Study

1. Obtain HS GPA and coursework data
   - CalPASS Plus & CCCApply
2. Merge data into master set
3. Compare to historical placement table
4. Determine which students need a placement upgrade
5. Compare master data set to enrollment records and filter out students who have completed the upgraded courses.
6. Message students regarding placement upgrade.
Discussion
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Perceptions of Probability

- Almost Certainly
- Highly Likely
- Very Good Chance
- Probable
- Likely
- We Believe
- Probably
- Better Than Even
- About Even
- We Doubt
- Improbable
- Unlikely
- Probably Not
- Little Chance
- Almost No Chance
- Highly Unlikely
- Chances Are Slight

Assigned Probability

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%