Understanding and Interpreting the AB 705 Adjustments

Craig Hayward, Bakersfield College + The RP Group
John Hetts, Educational Results Partnership + CalPASS Plus
Mallory Newell, De Anza College + The RP Group
Craig Rutan, Academic Senate for California Community Colleges
Terrence Willett, Cabrillo College + The RP Group

MMAP Webinar
September 5, 2018
1. How did we get here?

2. Where does the guidance and data come from?
Multiple Measures Assessment Project

• Ongoing, multiple year collaborative effort of CCCC0, Common Assessment Initiative (CAI), RP Group, Cal-PASS Plus (Educational Results Partnership & San Joaquin Delta College), and now >90 CCC pilot colleges

• 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)
  – Very 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
## English & Math Transfer-Level Placement Recommendations

<table>
<thead>
<tr>
<th>Transfer Level Course</th>
<th>Recommended for Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>HS GPA ≥ 2.6</td>
</tr>
<tr>
<td>Statistics</td>
<td>HS GPA ≥ 3.0</td>
</tr>
<tr>
<td>Passed Algebra I (or better)</td>
<td><em>or</em></td>
</tr>
<tr>
<td></td>
<td>HS GPA ≥ 2.3 &amp; Pre-Calculus C (or better)</td>
</tr>
<tr>
<td>Pre-calculus</td>
<td>HS GPA ≥ 3.4</td>
</tr>
<tr>
<td>Passed Algebra II (or better)</td>
<td><em>or</em></td>
</tr>
<tr>
<td></td>
<td>HS GPA ≥ 2.6 &amp; enrolled in Calculus</td>
</tr>
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</table>

Placement into college-level courses

28% English (HSGPA ≥2.6)
64% (MMAP Placement)
15% Math (HSGPA ≥3.0 + HS Algebra)
40% (MMAP Placement)

Historical Placement
MMAP Placement

One example: Las Positas F2016 results: English

Transfer-Level Placement

- F2015: 35%
- F2016: 78%

Success Rate

- F2013: 75%
- F2014: 70%
- F2015: 75%
- F2016 (all): 76%
- F2016 (MM only): 77%

*Used student self-reported HSPGA ≥2.5 within 10 years of high school
Access to transfer-level courses has expanded more rapidly in English than in math

Increased access to transfer-level math is strongly linked to increases in throughput

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
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 CCCCCO 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.
Essentially…what about everyone else?
What maximizes their completion of transfer-level English and Math?

• 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
Figure 1. Interpreting Transfer Level English - L0 Y DM Decision Tree

How to Read a Decision Tree for English

Source: MMAP English Decision Rules, page 8: bit.ly/MMAPEnglishTrees
Statistics
Decision Tree

Pre-calculus Decision Tree

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
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
Technical Details of Adjustment Process

• Use multivariate regression to predict success rate in target transfer-level using GPA and test scores.
• Calculate mean high school GPA and test scores for lowest node students in each level/type of first attempted course.
• Use regression model to predict success in the target course using means in step 2.
• Rescale regression predicted success rates against the lowest node predicted success rates to create comparability between decision-tree and regression-based predictions.
• Calculate overall success rate estimate by weighting estimates from each level/type weighted by number of students beginning at each level.
• Use standard error of prediction from the regression model at each level to create lower and upper error bounds for estimates also weighted as in step 5.
Regression Models

• English
  – HS GPA + ACCUPLACER sentence skills score + ACCUPLACER reading comprehension score

• Statistics and Precalculus
  – HS GPA + ACCUPLACER college algebra score
  – Other test scores (arithmetic and elementary algebra) for statistics did not yield useful results so only college algebra was used
Additional considerations for completion of transfer-level math starting from one-level below

- Not all students goals require transfer-level math
- Need to take into account that different majors/pathways lead to different possible math
- Need to account for different curricular entry points after intermediate algebra into transfer-level math curriculum
  —College algebra, trigonometry, pre-calculus
Statistics

• For students starting one-level below
  – count any transfer-level math completions in the numerator (not just statistics)
  – adjust denominator downward \((improving\ through\ put)\ \text{twice}:\)
    • Removing percentage of students with ed goals not requiring a transfer-level math course (11.6%)
    • Removing percentage of students who are pursuing a B-STEM pathway (25%)

• Method provides an optimistic estimate of throughput from 1 level below:
  1. it counts transfer-level completions of students without transfer-level ed goals
  2. most students have transfer goals
  3. doesn’t account for terminal degrees that may still have transfer-math requirement

• Takes into account that different majors/pathways lead to different possible math

• Need to account for different curricular entry points after intermediate algebra into transfer-level math curriculum
  – College algebra, trigonometry, precalculus
Pre-calculus (Entry-level BSTEM)

- Chosen because it’s most advanced post-intermediate algebra entry-level STEM courses across the colleges
  - Rules developed for direct placement into Precalculus should work for colleges with earlier math courses (e.g., College Algebra or Trigonometry)
- For students starting one-level below
  - count any/all BSTEM transfer-level math completions in the numerator from College Algebra and up, not just pre-calculus (to be as fair as possible given colleges with courses between intermediate algebra and precalculus)
  - adjust denominator downward, removing percentage of students with ed goals not requiring transfer-level math course (as with Stats, 11.6%)
  - adjust denominator further downward to reflect percentage of students with STEM major (Reduce denominator by additional 75%)
- Conservative method, avoids underestimating throughput from 1 level below.
  - Counts any transfer-level math completion regardless of ed goal/major (no changes to numerator) while adjusting denominator downward to account for ed goal/major
Transfer-Level Course Completion in One Year from First Class in Discipline (error bars represent ±1 se)

![Bar chart showing completion rates for various courses.]

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

- **Statistics (HS GPA < 2.3)**
  - Lowest Node N=1,485
  - Regression N=809
  - 1 level below N=11,309
  - Success: 40%
  - Regression Adjusted: 29%
  - Throughput: 8%

- **Pre-Calculus (HS GPA < 2.6)**
  - Lowest Node N=1,753
  - Regression N=661
  - 1 level below N=18,917
  - Success: 38%
  - Regression Adjusted: 28%
  - Throughput: 13%
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
Placement/Support Recommendations: English

<table>
<thead>
<tr>
<th>High School Performance</th>
<th>AB 705-Compliant Placement</th>
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| HSGPA ≥ 2.6             | Transfer-Level English Composition  
  No change in level of support or concurrent support required |
| HSGPA 1.9 - 2.6         | Transfer-Level English Composition  
  Additional academic and concurrent support recommended |
| HSGPA < 1.9             | Transfer-Level English Composition  
  Additional academic and concurrent support strongly recommended |

For students with high school transcripts within 10 years of enrollment at CC, excluding students locally determined to be ESL.
## Placement/Support Recommendations: Statistics

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<th>High School Performance</th>
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<tr>
<td>HSGPA ≥ 3.0</td>
<td><strong>Transfer-Level Statistics</strong></td>
</tr>
<tr>
<td>OR</td>
<td>No additional academic or corequisite support required for students</td>
</tr>
<tr>
<td>HSGPA ≥ 2.3 &amp; ≥C in Precalculus</td>
<td></td>
</tr>
<tr>
<td>HSGPA 2.3–3.0</td>
<td><strong>Transfer-Level Statistics</strong></td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support recommended for students</td>
</tr>
<tr>
<td>HSGPA &lt; 2.3</td>
<td><strong>Transfer-Level Statistics</strong></td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support strongly recommended for students</td>
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For students with high school transcripts within 10 years of enrollment at CC, completion of HS Algebra*
## Placement/Support Recommendations: BSTEM Math

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<tr>
<td><strong>HSGPA ≥ 3.4</strong> OR <strong>HSGPA ≥ 2.6 &amp; enrolled in HS Calculus</strong></td>
<td>Transfer-Level Gateway STEM Math</td>
</tr>
<tr>
<td></td>
<td>No additional academic or concurrent support required for students</td>
</tr>
<tr>
<td><strong>HSGPA ≥2.6 or Enrolled in HS Precalculus</strong></td>
<td>Transfer-Level Gateway STEM Math</td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support recommended for students</td>
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<tr>
<td><strong>HSGPA ≤ 2.6 and no Precalculus</strong></td>
<td>Transfer-Level Gateway STEM Math</td>
</tr>
<tr>
<td></td>
<td>Additional academic and concurrent support strongly recommended for students</td>
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For students with high school transcripts within 10 years of enrollment at CC and who completed Algebra 2/Intermediate Algebra/Integrative Math 3 or higher in high school*
Common Questions and Some Answers

Can we place students one or more levels below?

• Yes but only under very limited conditions
• You have to use evidence based on high school data that demonstrates that they are highly unlikely to successfully complete the transfer-level course
  — Plain meaning interpretations (https://en.wikipedia.org/wiki/Plain_meaning_rule) would typically place highly unlikely around 10% on average.
  • When asked to interpret range of probabilities indicated by “highly unlikely”, both those using such words professionally (e.g., Kent, 1964) and lay audiences (e.g., bit.ly/HighlyUnlikely) interpreted highly unlikely to represent outcomes that happen 5-10% of the time on average. Except for significant outliers, highest individual estimates range between 20-30%
  — CCCC Guidance currently defaulting to synonymous with maximization of likelihood
• Has to maximize their likelihood of completion of transfer-level course (compared to students with similar levels of high school performance)
Can we continue to offer courses one or more levels below?

- Yes
  - Such courses may serve specific subsets of a college’s student population
- However:
  - Very likely cannot be required
  - Worth careful consideration whether it’s good practice to offer paths that might attract certain types of students when we have evidence that that path may not be best for them
  - Construction, entrances, and ease, candy placement and deliciousness
Do we have 2 years starting in Fall 2019 to study our current placement/sequence to determine whether it complies with AB705?

• No

• A fair amount of data exists on your existing curriculum that can be reasonably used to determine whether your current placement/sequence might comply

• In addition to your local data/IR team, CalPASS Plus has retrospective datasets immediately available to support local exploration.
Can we adopt new placement rules and prerequisites and study them for two years?

- Possibly but such rules/curriculum would require:
  - evidence-based use of high school achievement data
  - only students demonstratively highly unlikely to succeed be required to take pre-transfer-level courses
  - a meaningful logic model with supportive evidence to explain how the new pre-transfer level courses would be likely to achieve sufficiently higher success rates and persistence rates to maximize students’ likelihood of completing the transfer-level course

- Local placement rules into transfer-level courses with varying required or recommended supports would be easier - don’t need to meet the highly unlikely standard
  - Possibly couldn’t require them for students highly likely to succeed (such as those identified by earlier MMAP research)

- More specific guidance on this will be coming later this Fall.
Do we just have to meet the minimum successful completion rate when students are placed directly in transfer-level per the guidance for a new sequence to be acceptable?

• Not exactly

• It must meet that rate specifically among students that are highly unlikely to succeed (the only students allowed to be assigned to developmental courses) — you cannot use the overall success rates for the sequence if you allow students more likely to succeed to opt to take it
Can we use a standardized test as part of our placement method?

- Right now, barring action from the Board of Governors, no.
Can we require corequisite courses?

• Yes
• The AB705 legislation expressly allows colleges to require concurrent support
  — As a law, supersedes existing regulation (e.g., Title 5) if in conflict
  — Should be able to demonstrate likelihood that required concurrent support
    • will improve student outcomes AND
    • not adversely impact unit requirements/financial aid
• The guidance uses recommended language to speak to the colleges not as examples of language that must be used with students
Questions?

All webinars are archived here: http://rpgroup.org/Our-Projects/All-Projects/Multiple-Measures/Presentations-and-Webinars

Upcoming webinars:

Replicating AB 705 Adjustments Locally
Wednesday, September 19 | 2 - 3 pm
https://cccconfer.zoom.us/j/731474457
1 646 876 9923 (US Toll)
Meeting ID: 731 474 457

Validating Innovative Curriculum Under AB 705
Tuesday, October 9 | 12 - 1 pm
https://cccconfer.zoom.us/j/937608807
1 646 876 9923 (US Toll)
Meeting ID: 937 608 807

AB 705 Adjustments, Ethnicity, Gender and Special Populations
Thursday, October 25 | 10 - 11 am
https://cccconfer.zoom.us/j/553127255
1 646 876 9923 (US Toll)
Meeting ID: 553 127 255

Developing an AB 705 Evaluation/Research Plan
Wednesday, November 7 | 10:30 – 11:30 am
https://cccconfer.zoom.us/j/440539610
+1 646 876 9923 (US Toll)
Meeting ID: 440 539 610