Strengthening Student Success 2018
Let Them In and Support Them to Succeed: Corequisite Models for Transfer-level Math

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Agenda

• The problem: why we needed AB 705
• Early evidence of the promise of AB 705 reforms
• Concurrent support models that work
• AB 705 implementation issues
The Old Student Success Scorecard

Statewide, more than three-quarters of incoming students are classified “unprepared”

<table>
<thead>
<tr>
<th></th>
<th>College Prepared</th>
<th>Unprepared for College</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>73.2%</td>
<td>41.7%</td>
<td>49.2%</td>
</tr>
<tr>
<td>Male</td>
<td>67.3%</td>
<td>39.2%</td>
<td>46.9%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 20</td>
<td>72.3%</td>
<td>42.7%</td>
<td>50.9%</td>
</tr>
<tr>
<td>20-24</td>
<td>60.1%</td>
<td>31.6%</td>
<td>37.2%</td>
</tr>
<tr>
<td>25-39</td>
<td>52.2%</td>
<td>32.2%</td>
<td>35.2%</td>
</tr>
</tbody>
</table>

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### Placement Is Destiny

<table>
<thead>
<tr>
<th>Students’ Starting Placement</th>
<th>% Completing Transfer-Level Math in 3 Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Level Below</td>
<td>35%</td>
</tr>
<tr>
<td>Two Levels Below</td>
<td>15%</td>
</tr>
<tr>
<td>Three or more Levels Below</td>
<td>6%</td>
</tr>
</tbody>
</table>

Statewide data, Basic Skills Cohort Tracker
Fall 2009 cohort tracked through Spring 2012.

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A Structural Issue: Attrition is inevitable in the developmental math pipeline

<table>
<thead>
<tr>
<th>Where students start the sequence</th>
<th>% of students who successfully complete transfer-level math in 3 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At LMC</td>
</tr>
<tr>
<td>Intermediate Algebra</td>
<td>37%</td>
</tr>
<tr>
<td>Elementary Algebra</td>
<td>18%</td>
</tr>
<tr>
<td>Pre-algebra or Arithmetic</td>
<td>10%</td>
</tr>
</tbody>
</table>

Across CA, more than half of Black and Hispanic students in remedial math begin here.

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Placement is an Equity Issue

A study by Greg Stoup of the three colleges in Contra Costa County estimates that 50-60% of racial inequities in degree completion and transfer-readiness is explained by initial placement.
The Goals of AB 705

• Improve one-year transfer-level math completion
  – State average: 28%

• Close equity gaps
  – Low income: 23%
  – African American: 13%
  – Latinx: 19%
  – White: 36%
AB 705

• Use high school grades in placement. (BOG has not currently approved the use of placement tests.)

• Two criteria for placement:
  – Students begin in transfer-level math unless research suggests they are “highly unlikely” to succeed there.
  – Students can only be required to take pre-transfer-level math if it improves their chances of completing transfer-level math.

• Exception: students in AA programs “with specific requirements that are not met with transfer-level coursework”

• Concurrent (corequisite) support can be required if it improves pass rates.

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Implementation of AB 705

• Using statewide data, MMAP research unable to identify any group of students who are better off starting below transfer-level.

• Default placement rules
  – All students eligible for Statistics/Liberal Arts math
  – All Algebra 2 completers eligible for introductory, transfer-level Business or STEM (e.g. Applied Calculus, Precalculus, College Algebra)
  – CCCCCO strongly recommends that colleges require concurrent support for students in the lowest placement band.
The Promise of AB 705

PPIC study
Remedial Education Reforms at California’s Community Colleges: Early Evidence on Placement and Curricular Reforms released August 16, 2018

First study to provide a comprehensive look at multiple measures and corequisite remediation in California community colleges prior to AB 705.

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Highlights PPIC study

Larger share of students starting in transfer-level math correlates to higher transfer-level math completion in one year

R² = 0.78

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Highlights PPIC study

Increased access to transfer math strongly linked to increases in transfer math completion
“Early implementers” of AB 705 types of reforms had the highest one-year completion of transfer-level math statewide in 2016.

- Statewide: 28%
- College of the Siskiyous 58%
  - Embedded lab support in Statistics: 4 hours a week of contact changed to 6 hours by replacing a lecture hour with three lab hours
  - All students eligible for Statistics
- Cuyamaca College 57%, Los Medanos College 51%
  - All students eligible for Statistics, some with required 2-unit corequisite support;
  - Algebra 2 completers eligible for Precalculus and Applied Calculus, some with a required 2-unit corequisite at Cuyamaca.
Highlights PPIC study

At “early implementer” colleges students of color are much more likely to start in transfer-level math compared to the statewide average.

Percentage starting in transfer-level math

- Latinx: 50% vs. 20%
- African American: 56% vs. 18%

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Highlights PPIC study

At “early implementer” colleges one-year transfer math completion for low income students and students of color is substantially higher than the statewide average

- Low-income: 49% vs. 23%
- Latinx: 48% vs. 19%
- African American: 46% vs. 13%

And equity gaps are smaller, e.g. 1 vs 17 percentage points for African American students.
“Institutional variation should not compromise students’ likelihood of success… Location often plays an important role in determining which community college a student attends, and it would be beneficial for students if their zip codes did not limit their access to reforms that can significantly improve their likelihood of success.”

-Public Policy Institute of California, 2018, p. 27
Cuyamaca College

- Introductory transfer-level courses have 2-units of corequisite support
- All students eligible for Stats; Algebra 2 completers eligible for Precalculus and Applied Calculus
- **Cohorted model**: Students in a designated section of the transfer-level course are also enrolled together in a designated section of the support course.
  - back-to-back scheduling, same instructor
  - Integrated, just-in-time remediation
  - attention to the affective side of learning
  - ongoing professional development

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Transfer-level Completion with Co-req Support at Cuyamaca College

Completion of transfer-level math before and after change by assessment level

<table>
<thead>
<tr>
<th>Group</th>
<th>Fall 2013 Cohort (Transfer Math in 2 years)</th>
<th>Fall 2016 Cohort (Transfer math completion 1 semester w/support)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three+ Levels Below</td>
<td>4%</td>
<td>56%</td>
</tr>
<tr>
<td>Two Levels Below</td>
<td>19%</td>
<td>70%</td>
</tr>
<tr>
<td>One Level Below</td>
<td>36%</td>
<td>66%</td>
</tr>
<tr>
<td>All</td>
<td>23%</td>
<td>67%</td>
</tr>
</tbody>
</table>

Completion of transfer-level math before and after change by ethnicity

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Fall 2013 Cohort (Transfer Math in 2 years)</th>
<th>Fall 2016 Cohort (Transfer math completion 1 semester w/support)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asian</td>
<td>33%</td>
<td>75%</td>
</tr>
<tr>
<td>African American</td>
<td>6%</td>
<td>55%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>15%</td>
<td>65%</td>
</tr>
<tr>
<td>White</td>
<td>16%</td>
<td>76%</td>
</tr>
<tr>
<td>All</td>
<td>15%</td>
<td>69%</td>
</tr>
</tbody>
</table>

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Cuyamaca
Intro Transfer-level B-STEM Math Completion
(First-Time Math Enrollment in Transfer-level with Support)

![Bar chart showing completion rates for B-STEM Math courses by placement level.]

- One-level below: 36% (Before) vs. 60% (After)
- Two-levels below: 19% (Before) vs. 60% (After)
- Three+ levels below: 4% (Before) vs. 50% (After)

Legend:
- Light blue: Before (2 years)
- Red: After (1 year)
Community College of Denver

- Students with transfer intent placed into transfer math aligned with their program of study and required to enroll in a support course.
- Support is an additional 2-lab hours a week.
- Students can bypass the lab requirement by going through the placement process (multiple measures)
- Lab hour is before class with same instructor; practice skills needed for that day’s transfer-level math lesson
- Lab students comingled with “college ready” students in transfer-level class
- RESULTS: Slight overall increase in transfer-level math success rates (59% FA16 to 63% SP17)

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La Guardia (New York City)

• **Enhanced** trigonometry course includes topics from elementary and intermediate algebra
• Open to students placing into elementary algebra
• Successful students take Precalculus
• 7 hours a week for 3 units; interactive pedagogy
• 60% pass rate
• Latinx and African American students twice as likely to be eligible for Precalculus than if they followed their placement into Elementary Algebra

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Which model is best?

- Comparative studies have yet to be conducted
- Multiple studies show that corequisite support substantially outperforms:
  - Emporium model: computerized, self-paced remediation in a lab with instructor or tutor support
  - Modularized remediation: a diagnostic test identifies a student’s deficits and remediation is chunked and targeted at specific deficits
  - Boot camps: short, non-credit courses designed to help students pass the placement test or bypass levels of remediation
  - Remedial stretch courses: remediation is stretched out over two semesters to provide students more time to master concepts
  - Fast-track block scheduling: a remedial course followed by a transfer-level course in one semester

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It’s all about the structure, not the specific model … for now

Percent of Remedial Students Who Complete Transfer-level Math

<table>
<thead>
<tr>
<th>State</th>
<th>In two years for prerequisite models</th>
<th>In one year for corequisite models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Georgia</td>
<td>20%</td>
<td>63%</td>
</tr>
<tr>
<td>Indiana</td>
<td>29%</td>
<td>64%</td>
</tr>
<tr>
<td>Tennessee</td>
<td>12%</td>
<td>61%</td>
</tr>
<tr>
<td>West Virginia</td>
<td>14%</td>
<td>62%</td>
</tr>
</tbody>
</table>

Adapted from Educational Results Partnership & The RP Group presentation
AB 705 implementation questions

• Aren’t some students better off in a two-course sequence or stretch model?
Corequisite support vs. two-course models

PPIC study: One-year transfer-level math completion

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Corequisite support vs. two-course models

What would it take for a two-course pathway to exceed the throughput of the co-requisite model (70%)?

What if 70% passed and persisted at each exit point?

\[(0.70)(0.70)(0.70) = 34\%\]

If 80% passed and persisted at each exit point?

\[(0.80)(0.80)(0.80) = 51\%\]

If 90% passed and persisted at each exit point?

\[(0.90)(0.90)(0.90) = 73\%\]

**Answer:** 89% success and persistence rates
Accelerated Statway

Two-course Statway: 50% completion

Of students not completing the two-course Statway, 36% do not persist after passing the first course; only 14% fail one of the two courses.

Five Statway colleges revamped Statway into a single course completed in one semester.

Maintained Statway design principles: group work, intentional strategies to support productive persistence and growth mindset

RESULTS:
• Higher average completion rates than two-semester Statway: 67% in one-term vs. 50% in one-year.
• Some colleges implemented both forms of Statway: success rates in accelerated Statway were higher than the sequence completion rate for standard Statway.

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Corequisite support for lowest placing students?

Tennessee Community Colleges Transfer Math Success in One Year For Corequisite Support Students

<table>
<thead>
<tr>
<th>ACT Math</th>
<th>Prerequisite Model 2012-13 Cohort</th>
<th>Co-requisite Full Implementation AY 2015-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;14</td>
<td>2.7%</td>
<td>32.9%</td>
</tr>
<tr>
<td>14</td>
<td>3.8%</td>
<td>45.5%</td>
</tr>
<tr>
<td>15</td>
<td>6.8%</td>
<td>55.3%</td>
</tr>
<tr>
<td>16</td>
<td>11.5%</td>
<td>63.4%</td>
</tr>
<tr>
<td>17</td>
<td>19.7%</td>
<td>70.1%</td>
</tr>
<tr>
<td>18</td>
<td>25.6%</td>
<td>79.5%</td>
</tr>
<tr>
<td>No ACT</td>
<td>13.1%</td>
<td>48.7%</td>
</tr>
<tr>
<td>Total</td>
<td>12.3%</td>
<td>54.8%</td>
</tr>
</tbody>
</table>

n = 173  n = 690  n = 1420  n = 2056  n = 1571  n = 947  n = 515  n = 7372
AB 705 implementation questions

• Should we continue to offer our pre-transfer-level courses as a student option?

No.

CAP recommends: Do not offer options for students that reduce their chance of success.

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Should we continue to offer pre-transfer-level options?

At multiple CAP colleges, we observed

• When given the choice, large numbers of students will underplace themselves in math and this has dire consequences for their completion of transfer math requirements

• Policies that result in high rates of underplacement, particularly for our most underrepresented and vulnerable populations:
  — Two conflicting placements based on assessment method (multiple measures vs. test score) or math pathway without meta-majors guidance
  — Requiring transcripts
AB 705 implementation questions

• What about students who do not intend to transfer?

• AB 705: “for students who seek a goal other than transfer, and who are in certificate or degree programs with specific requirements that are not met by transfer-level coursework” maximize the probability of completion of college-level math in a year.
What about students who do not intend to transfer?

CAP recommends: Transfer-level Liberal Arts Math or Statistics placement instead of intermediate algebra for students seeking a terminal AA degree in a program that is not math intensive, e.g. Child Development or Administration of Justice

Benefits of this approach:

- Liberal Arts Math and Statistics have better pass rates than intermediate algebra
- Math that is more useful to an educated citizenry
- Completion of and important milestone to transfer will encourage “stackable degrees”
Is intermediate algebra the right course for some associate degree programs?

For programs “with specific requirements that are not met by transfer-level coursework” …

CAP recommends: New associate degree-level contextualized math courses for programs that are math intensive instead of intermediate algebra

Example: Electrical Technology or Process Technology at LMC

• These programs are math intensive: some arithmetic, algebra, trig, boolean algebra, statistics and other topics not covered in traditional math curricula.

• New contextualized math course developed for each program: ETEC 009, PTEC 009
  – Taught by disciplinary faculty in the program
  – Counts for AA degree (has Algebra 1 prerequisite)
  – EdReady modules on select topics in Algebra I for those not meeting the prerequisite
AB 705 implementation questions

- What do we do about science courses that have developmental math prerequisites?
What about courses outside of math that have math prerequisites at the pre-transfer-level?

Example: Introductory chemistry course with Algebra I prerequisite, e.g. chemistry required for pre-nursing

Solutions in the AB 705 world:
• Use HS work to satisfy prerequisites
• Verify the legitimacy of the prerequisite
  - UC/CSU/C-ID do not require math prerequisites for introductory science courses for non-majors.
• Design concurrent support
  - College of the Redwoods: 1-unit algebra refresher for Chemistry
AB 705 implementation questions

• What happens when a student fails transfer-level + support?
Tennessee Community Colleges

Adapted from TBR Brief #3: Co-Requisite Remediation Full Implementation 2015-16

- 52% of students passed both courses.
- 3% of students passed only the credit course.
- 36% of students failed both courses.

Earned hours as a percentage of attempted hours

ACT Math Score

Fail Both  Fail LS  Fail Credit  Pass Both

Adapted from TBR Brief #3: Co-Requisite Remediation Full Implementation 2015-16
Caleb Rendon-Guerrero, Cuyamaca College

**Background:** High school dropout who’d been in and out of criminal justice system

**Goal:** To “be the solution not the problem” in his family, create a non-profit to help kids like him

**Placement via Standardized Test:**
Elementary Algebra
**Probability of completing transfer-level math:** 36%

**Corequisite Remediation:**
Enrolled directly in College Statistics with 2 units of concurrent support

**Grade in Statistics:** B

**Follow Up:** Third-year student, GPA of 3.6

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Karly Franz, Cuyamaca College

**Background:** Returning adult student, away from math for 5 years; studied fashion design, worked as a historical costumer

**Goal:** Teach high school biology

**Placement via Accuplacer:** Intermediate Algebra  
**Probability of completing transfer-level math:** 36%

**Given access to transfer-level:** Enrolled directly in Pre-Calculus with 2 units of concurrent support

**Grade in Pre-Calculus:** 89  
**Grade in Calculus:** A

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