Implementing AB 705 at Citrus College Practices and Effectiveness

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MICHAEL WANGLER, DEAN OF MATHEMATICS AND BUSINESS
AB 705 Work at Citrus College

• AB705 Implementation Team
• MMAP - Self-Reported High School Record
• Curriculum Changes
• Cohort Model for Corequisite Remediation
  • Classroom Changes
  • Support Changes/Mindset Changes
• Results: the Stats Class
  • Course Success Rates
  • Student Survey and Interview
  • Overall Transfer-level Math Throughput Rate
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Implementing AB 705 at Citrus College: RP Conference, April 3-4, 2019, Burlingame, CA
<table>
<thead>
<tr>
<th>AB 705 Strike Team</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admissions &amp; Records</td>
</tr>
<tr>
<td>ASCC Representative</td>
</tr>
<tr>
<td>CalWorks/EOPS</td>
</tr>
<tr>
<td>Career/Transfer Center</td>
</tr>
<tr>
<td>Counseling</td>
</tr>
<tr>
<td>English Faculty &amp; Dean</td>
</tr>
<tr>
<td>Institutional Research</td>
</tr>
<tr>
<td>Math Faculty &amp; Dean</td>
</tr>
</tbody>
</table>

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MMAP

Multiple Measures Assessment Project at Citrus College - began in 2016

- Disjunctive Placement: Compared placement using Accuplacer vs. placement using multiple measures for *Early Decision groups*

Math placement based on:
- Last Math course taken in high school and grade earned
- High school GPA (self-reported)

- Over 90% of students placed same or higher with multiple measures
- Discontinued Accuplacer for majority of students in Fall 2018
Accuracy of Self-Reported GPA: Fall 2017 MMAP Pilot

<table>
<thead>
<tr>
<th>School-Reported GPA range</th>
<th>Count</th>
<th>Self-Reported GPA Mean</th>
<th>School-Reported GPA Mean</th>
<th>Mean diff.</th>
<th>% within +/-0.25</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0-1.4</td>
<td>5</td>
<td>1.9</td>
<td>1.3</td>
<td>0.6</td>
<td>40%</td>
</tr>
<tr>
<td>1.5-1.9</td>
<td>53</td>
<td>2.2</td>
<td>1.8</td>
<td>0.4</td>
<td>34%</td>
</tr>
<tr>
<td>2.0-2.4</td>
<td>180</td>
<td>2.6</td>
<td>2.2</td>
<td>0.4</td>
<td>38%</td>
</tr>
<tr>
<td>2.5-2.9</td>
<td>216</td>
<td>2.9</td>
<td>2.7</td>
<td>0.2</td>
<td>64%</td>
</tr>
<tr>
<td>3.0-3.4</td>
<td>138</td>
<td>3.3</td>
<td>3.2</td>
<td>0.1</td>
<td>74%</td>
</tr>
<tr>
<td>3.5-4.0</td>
<td>38</td>
<td>3.7</td>
<td>3.7</td>
<td>0.0</td>
<td>79%</td>
</tr>
<tr>
<td>Total</td>
<td>630</td>
<td>2.877</td>
<td>2.642</td>
<td>0.235</td>
<td>58%</td>
</tr>
</tbody>
</table>

- There is a strong correlation between self- and school-reported GPA ($r=0.747$, $p<0.01$) for students in the multiple measures pilot group.
- Accuracy of self-reported GPA improves as the official GPA increases.
- Students tend to over-report their GPA slightly by half a grade, which would not change their placement in math significantly.
- More local research [http://www.citruscollege.edu/admin/research/Pages/AB705.aspx](http://www.citruscollege.edu/admin/research/Pages/AB705.aspx)

Implementing AB 705 at Citrus College: RP Conference, April 3-4, 2019, Burlingame, CA
## Accuplacer vs. MMAP: Fall 2018 Early Decision Students

<table>
<thead>
<tr>
<th>Accuplacer</th>
<th>Code</th>
<th>Level</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
<td>Pre-Statistics; Elementary Algebra</td>
<td>776</td>
<td>60.6%</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>Statistics with corequisite; Intermediate Algebra with corequisite</td>
<td>15</td>
<td>1.2%</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>Intermediate Algebra</td>
<td>300</td>
<td>23.4%</td>
</tr>
<tr>
<td></td>
<td>2030</td>
<td>Statistics; Trigonometry</td>
<td>137</td>
<td>10.7%</td>
</tr>
<tr>
<td></td>
<td>2040</td>
<td>Pre-Calculus</td>
<td>12</td>
<td>0.9%</td>
</tr>
<tr>
<td></td>
<td>2050</td>
<td>Calculus I</td>
<td>2</td>
<td>0.2%</td>
</tr>
<tr>
<td></td>
<td>2060</td>
<td>Calculus II (placed by AP score or other college transcript)</td>
<td>16</td>
<td>1.2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No Accuplacer</td>
<td>23</td>
<td>1.8%</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>1281</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MMAP</th>
<th>Code</th>
<th>Level</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
<td>Pre-Statistics; Elementary Algebra</td>
<td>167*</td>
<td>13.0%</td>
</tr>
<tr>
<td></td>
<td>2015</td>
<td>Statistics with corequisite; Intermediate Algebra with corequisite</td>
<td>201</td>
<td>15.7%</td>
</tr>
<tr>
<td></td>
<td>2020</td>
<td>Intermediate Algebra</td>
<td>505</td>
<td>39.4%</td>
</tr>
<tr>
<td></td>
<td>2030</td>
<td>Statistics; Trigonometry</td>
<td>218</td>
<td>17.0%</td>
</tr>
<tr>
<td></td>
<td>2040</td>
<td>Pre-Calculus</td>
<td>42</td>
<td>3.3%</td>
</tr>
<tr>
<td></td>
<td>2050</td>
<td>Calculus I</td>
<td>148</td>
<td>11.6%</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Total</strong></td>
<td>1281</td>
<td>100%</td>
</tr>
</tbody>
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*129 of the 167 did not report a math course.
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Citrus College Math Sequence prior to Fall 2018

Implementing AB 705 at Citrus College: RP Conference, April 3-4, 2019, Burlingame, CA
Citrus College
Math Sequence for Fall 2019 (Pathways Placement)
Access to Transfer-Level Math: First-time Enrollment in Transfer-Level Math

<table>
<thead>
<tr>
<th>Year</th>
<th>Below transfer-level</th>
<th>Transfer-level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 15</td>
<td>2,291 (n=405)</td>
<td>18%</td>
</tr>
<tr>
<td>Fall 16</td>
<td>1,940 (n=366)</td>
<td>19%</td>
</tr>
<tr>
<td>Fall 17</td>
<td>2,165 (n=511)</td>
<td>24%</td>
</tr>
<tr>
<td>Fall 18</td>
<td>1,971 (n=1,101)</td>
<td>56%</td>
</tr>
</tbody>
</table>

Implementing AB 705 at Citrus College: RP Conference, April 3-4, 2019, Burlingame, CA
Shift from Basic Skills to Statistics

- **Fall 15 (n=2,291)**
  - Basic Skills (Two or more levels below): 50%
  - Intermediate Algebra (One level below): 32%
  - Statistics (Transfer-level): 10%
  - Other Transfer-level Math: 8%

- **Fall 16 (n=1,940)**
  - Basic Skills (Two or more levels below): 43%
  - Intermediate Algebra (One level below): 38%
  - Statistics (Transfer-level): 11%
  - Other Transfer-level Math: 8%

- **Fall 17 (n=2,165)**
  - Basic Skills (Two or more levels below): 45%
  - Intermediate Algebra (One level below): 31%
  - Statistics (Transfer-level): 13%
  - Other Transfer-level Math: 11%

- **Fall 18 (n=1,971)**
  - Basic Skills (Two or more levels below): 22%
  - Intermediate Algebra (One level below): 34%
  - Statistics (Transfer-level): 34%
  - Other Transfer-level Math: 9%

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Creating the Equity-Minded Classroom

- Physical Classroom Changes
  - New pod furniture
  - Whiteboards on all walls
  - Portable whiteboards
  - Manipulatives: beads, cards, dice, snap cubes, tape measures, TI-84 calculator
  - Magnets
  - PAL Carts
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“Stuck on an Escalator – Take Action” video
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### Success Rate in Statistics: Fall 2018

<table>
<thead>
<tr>
<th></th>
<th>Statistics (with Corequisite)</th>
<th>Statistics (Regular)</th>
<th>Statistics (Overall)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success Rate</td>
<td>63%</td>
<td>59%</td>
<td>60%</td>
</tr>
<tr>
<td>Enrollment</td>
<td>486</td>
<td>939</td>
<td>1,425</td>
</tr>
</tbody>
</table>

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Quantitative Data

Students were asked to take a survey containing questions about their experience in Corequisite Support For Introductory Statistics (MATH065+165)

- Number of students enrolled in MATH065+165 with Corequisite in fall 2018: 486
- Number of total responses to survey: 436
- Number of unduplicated* survey responses: 346
  *Note: If a student took the survey more than once, only their last survey entry was counted.

=71% Response Rate
Survey Results

Q1. How would you rate the helpfulness of each of the following teaching methods and materials used in this course?

- Calculator
- Diversity of format for the content delivered (e.g. video, audio, online, etc.)
- Instructor’s lectures
- Manipulatives (e.g. dice, coins, cards, etc.)
- Movable furniture
- Quality of materials provided (e.g. worksheets, PowerPoint presentations, etc.)
- Whiteboard
- Workbook
- Working in groups

<table>
<thead>
<tr>
<th>Method</th>
<th>% Rated Moderately or Very Helpful</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calculator</td>
<td>96%</td>
</tr>
<tr>
<td>Whiteboard</td>
<td>89%</td>
</tr>
<tr>
<td>Quality of materials provided</td>
<td>83%</td>
</tr>
<tr>
<td>Working in groups</td>
<td>83%</td>
</tr>
<tr>
<td>Instructor’s lectures</td>
<td>82%</td>
</tr>
<tr>
<td>Manipulatives</td>
<td>76%</td>
</tr>
<tr>
<td>Movable furniture</td>
<td>73%</td>
</tr>
<tr>
<td>Diversity of format for the content delivered</td>
<td>71%</td>
</tr>
<tr>
<td>Workbook</td>
<td>51%</td>
</tr>
</tbody>
</table>

Ranking from most to least helpful (% that rated _______ as moderately or very helpful)

- Calculator (96%)
- Whiteboard (89%)
- Quality of materials provided (83%)
- Working in groups (83%)
- Instructor’s lectures (82%)
- Manipulatives (76%)
- Movable furniture (73%)
- Diversity of format for the content delivered provided (71%)
- Workbook (51%)
Survey Results

Q2. During this semester, how often did you use: STEM Center tutoring
(% that used it at least once)
- one-on-one STEM Center tutoring (58%)
- study group STEM Center tutoring (51%)

Q3. How would you rate the helpfulness of each of the following services used in this course?
(% that rated it moderately helpful or very helpful)
- in-class tutor (78%)
- one-on-one STEM Center tutoring (47%)
- study group STEM Center tutoring (47%)

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Survey Results

Q4. How much do you agree or disagree with the following statements?
(% agree or strongly agree)

- Group work (i.e. working with peers) was effective in helping me learn in this course. (90%)
- I gained a sense of responsibility by being in this course. (89%)
- My instructor helped me succeed in this course by reviewing foundations skills right before we tackled more complex problems. (87%)
- I gained a sense of community by being in this course. (86%)
- The instructor’s lectures were effective in helping me learn in this course. (83%)
- The collaborative learning environment is one reason I came to class. (80%)
Survey Results

Q5. Which of the following best captures your feeling about this course?*

➢ This course is too easy for me. (5%)
➢ This course is the right level for me. (73%) - the majority of students felt the course was just right for them
➢ This course is too difficult for me. (22%)

…but how well did these students do in the course?

<table>
<thead>
<tr>
<th>Q5 Response</th>
<th>Total respondents (that provided Student ID)</th>
<th>% of respondents successful in course</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course is too easy for me.</td>
<td>11</td>
<td>91%</td>
</tr>
<tr>
<td>This course is the right level for me.</td>
<td>218</td>
<td>90%</td>
</tr>
<tr>
<td>This course is too difficult for me.</td>
<td>61</td>
<td>64%</td>
</tr>
</tbody>
</table>

*3 students (0.9%) did not answer this question
Qualitative Data

Statistics with Corequisite Support Student Interviews

5 Focus Groups
  ◦ 21 students total

Asked each group 5 questions
  1. What do you like about this class?
  2. Who or what has helped you succeed in this class?
  3. How has this class impacted your success at this college?
  4. How has this class helped you achieve your educational goal?
  5. Lastly, is there anything else you would like to add?

Data Analysis: coded the data into themes, ideas, or concepts

Themes
  ◦ **Yellow** = Teaching method/materials
  ◦ **Green** = Struggles in “traditional” classroom settings
  ◦ **Blue** = Shift in how this class/group setting
  ◦ **Teal** = Feelings about math
  ◦ **Purple** = Shift in affect towards math
  ◦ **Grey** = Additional Support
  ◦ **Red** = Benefits of “one and done” math sequence

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“I feel like with the group setting it’s less intimidating because when it is a classroom just focusing it’s like you are worrying about how others are doing and you are thinking ‘they are getting it. I don’t get it. Am I stupid?’ It gives a lot more pressure when it’s not a group setting.”

-Crystal

“I feel like the main thing that makes us succeed in the class is each other. Because we’re always helping each other out in group work and obviously Professor B. helped a lot in understanding because we do Productive Struggle where we try to do the problem first and then he shows us how to do it and then it’s easier from there on.”

-Jacob

“The group sharing and the group learning is really critical for me. I have a tough time with math all along so knowing that I can rely on friends and ask friends and that is acceptable is very reassuring that I am okay and on the right track.”

-Phillip

“In high school in math nobody really worked as a group. There was always that one person who would do all the work and answer all the questions […] Working in groups really has helped and everyone shares their part of the work; they get involved and help one another.”

-Oscar

“I feel like you feel more confident to ask for help […] because you know someone else feels the same way. As opposed to a traditional class where you may be stuck on something in a math class and then you are too shy to raise your hand or you don’t get to really talk to your classmates. So I feel like the group work really helps.”

-Rosalía

“I think the group setting definitely helps. In math classes I’m just used to going to class, not talking to anyone, just taking notes down then leaving. But here in the group setting you can talk to your friends who can actually help with all the work.”

-Brandon

“I’ve always had to retake math classes with F’s and D’s all my life. This is the first one I get and I think it does have a lot to do with the group settings.”

-Samantha
“When I understand the concept... once I make that connection and understand it, it makes me feel happy. *When you’re happier, you are going to try harder and be more successful so I do feel like this class has made me feel better about myself mentally.*”

- Samantha

“It is okay if we don’t get it the first or third time; *as long as we just try hard and push ourselves we will eventually get there.*”

- Courtney

“It had helped me not have a fixed mindset about doubting myself, instead actually trying it and trying to learn instead of doubting myself that I can’t learn it. That has really helped me.”

- Crystal

“I feel like it’s mostly having the confidence to be able to do the math work because I know in high school I didn’t have the confidence. I still overthink myself but I keep trying...”

- Oscar

“From time to time [Professor Berberyan will] show inspirational videos – he’ll show a lot of Michael Jordan and stuff. But outside of math, *being able to look at a problem and not give up necessarily and just know that it is a temporary setback and you can figure it out.*”

- Phillip

[The phrase] “Never give up” is something that has always helped me but now receiving it every day from team mates younger than me and from the professor who is always saying, “The fact that I tried matters.’ So that helped me a lot. I feel like I’m not alone.”

- Reina

“Normally I’m not good at math but I felt it helped me feel more motivated that I could actually understand math.”

- Anonymous

“We learned how to struggle in the beginning will actually help you succeed in life. *We learned nothing is easy and if you do struggle, it will be easier later in life to do other problems.*”

- Izabel

“We learned how to struggle in the beginning will actually help you succeed in life. *We learned nothing is easy and if you do struggle, it will be easier later in life to do other problems.*”

- Izabel
“Michael Jordan Failure” video
"There's also the aid that we have, he's always there and if you have a hand up he goes to you straightaway. He really dives in for you to understand the problem."  
-Izabel

"Another thing I like about the class is having the professor and the tutor... You can always get your questions answered and get help."  
-Rosalia

"We can talk to our teacher, we can talk to the tutors, and then we can come here to the STEM Center and practice more math."  
-Phillip

"I think also, we are so close to the STEM Center – the position of our class, we are literally right next to the STEM Center – so I think for a lot of people that's really helpful because I know people will go here to the STEM Center right after class and be there for a while and get the help that they need."

-Mallory

"At the STEM Center you always get the help you need."

-Melissa

"I like that we have an extra instructor in the class because it gives me the ability to be helped quicker."

-Jonathon

"And Mr. B has made it clear that the STEM Center is a good place to come if you need help. I've gone multiple times. And I don't remember any other teachers really having that be a resource."

-Phillip

"I come here at least every other day because they are really helpful."  
-Jonathon

"I struggle throughout and the fact that the motivation I got, the help I got here in the [STEM] Center...I have a lot of support from them"

-Reina

"I like that we have an extra instructor in the class because it gives me the ability to be helped quicker."

-Jonathon

"I come here at least every other day because they are really helpful."

-Jonathon

"Implementing AB 705 at Citrus College: RP Conference, April 3-4, 2019, Burlingame, CA"
“I was [originally] taking one or two classes but once I knew that this was the last math class and I only had three more classes next semester I just starting doing a full schedule.”
- Victoria

“I feel very lucky to have my first year here and only have to take one math class to transfer. I hope other students get the same opportunity because it’s so awesome.”
- Izabel

“It’s a lot easier... it used to be you had to pass several different courses before we even got to Stats. So it makes it a lot easier to transfer as a History major because I don’t need any more math. I just need to pass Stats.”
- Hailey

“I was afraid I was going to be that person, that math was going to keep me here at community college and I wasn’t going to be able to transfer. But now with this course and how well it’s been going for me, I know I’m going to be able to transfer in my two years which is my goal and I’ll be able to continue my education at a University.”
- Rosalia

“I’m a Psychology transfer major so this is the only math class but I’m also going to be taking the Psychology class with statistics embedded in it and I feel like this class will help me a lot because I’m not going to feel intimidated to ask questions because statistics is really hard.”
- Crystal

“For me to come in here I thought I was never going to leave Citrus because I could never make it through Algebra; I kept failing but I didn’t want to give up on it. But this class has given me a different outlook.”
- Reina

“I’m trying to transfer with a criminal justice degree and for my requirements it is only this math class so I feel like that’s an advantage that I don’t have to take any more math or worry about it.”
- Oscar

“Being a Liberal Arts major, this is the last math that I need to get my transfer status so it being so easy with the group setting and all that stuff its helping me get it out of the way so I don’t have to worry about math for the rest of my Citrus College career.”
- Brandon

“I feel very lucky to have my first year here and only have to take one math class to transfer. I hope other students get the same opportunity because it’s so awesome.”
- Izabel

“One and Done” Math Sequence

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<thead>
<tr>
<th>Year</th>
<th>Below transfer-level</th>
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<td>18%</td>
</tr>
<tr>
<td>Fall 16</td>
<td>1,940 (n=366)</td>
<td>19%</td>
</tr>
<tr>
<td>Fall 17</td>
<td>2,165 (n=511)</td>
<td>24%</td>
</tr>
<tr>
<td>Fall 18</td>
<td>1,971 (n=1,101)</td>
<td>56%</td>
</tr>
</tbody>
</table>

Implementing AB 705 at Citrus College: RP Conference, April 3-4, 2019, Burlingame, CA
One-year Completion Rate in Transfer-Level Math

<table>
<thead>
<tr>
<th>Period</th>
<th>Completion Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall 15-Spring 16</td>
<td>19%</td>
</tr>
<tr>
<td>Fall 16-Spring 17</td>
<td>23%</td>
</tr>
<tr>
<td>Fall 17-Spring 18</td>
<td>28%</td>
</tr>
<tr>
<td>Fall 18</td>
<td>32%</td>
</tr>
<tr>
<td>Fall 18 Statistics</td>
<td>59%</td>
</tr>
<tr>
<td>Spring 2019</td>
<td></td>
</tr>
</tbody>
</table>

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One-year Completion Rate in Transfer-Level Math

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Implementing AB 705 at Citrus College: RP Conference, April 3-4, 2019, Burlingame, CA
Words of Wisdom from Math Dean

"We talk a lot about believing in the capacity of our students, which is critical for the concurrent support model to work; however, it's just as important to believe in the capacity of faculty and provide them the resources and space to innovate and create a student-centered classroom environment where students can build confidence and get the support they need in order to thrive and be successful.

It's also important to believe in the capacity of yourself and your colleagues to develop a data driven process for AB 705 implementation that's inclusive, collaborative, and committed to getting the job done despite the obstacles."
Questions?

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