Multiple Measures Assessment Project (MMAP)

California Acceleration Project (CAP) Conference
Sacramento
March 11, 2017
Project Overview

Collaboration
- CAI
- CCCCCO
- Cal-PASS+
- RP Group
- 63 CCCs

Model Development
- English
- Math
- ESL
- Reading
- Non-cognitive Variables
- Self-reported transcript data

Engagement
- Local replication
- Webinars
- Professional development
- Support
- Pilot results inform statewide implementation
The Models
Data Set for Models

• CCC students enrolled in an English, Math, Reading or ESL class with matching high school data in CalPASS
  • ~1 M cases for Math & English; ~200k for Reading & ESL
• Bulk of first CCC enrollments from 2008 through 2014
• Rules were developed with the subset of students who had four years of high school data (about 25% of total sample)
• Used rpart to create the trees
  • uses a machine learning algorithm where the order of entry of the variables does not matter. All predictors are considered in the algorithm, the predictor with the greatest gain to the model is selected for the first branch of the tree, continues to split until the splits no longer improve the model.
Variables Explored

- High School Unweighted Cumulative GPA
- Grades in high school courses
- CST scores
- Advanced Placement course taking
- Taking higher level courses (math)
- Delay between HS and CCC (math)
- HS English types (expository, remedial, ESL)
- HS Math level (Elem Algebra, Integrated Algebra, Pre-Calculus)
### Transfer-Level Placement Recommendations

<table>
<thead>
<tr>
<th>Transfer Level Course</th>
<th>Direct Matriculant</th>
<th>Non-Direct Matriculant</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>College Algebra (STEM)</strong></td>
<td>HS 11 GPA &gt;=3.2 OR</td>
<td>HS 12 GPA &gt;=3.2 OR</td>
</tr>
<tr>
<td>Passed Algebra II (or better)</td>
<td>HS 11 GPA &gt;=2.9 AND Pre-Calculus C (or better)</td>
<td>HS 12 GPA &gt;=3.0 AND Pre-Calculus or Statistics (C or better)</td>
</tr>
<tr>
<td><strong>Statistics (General Education/Liberal Arts)</strong></td>
<td>HS 11 GPA &gt;=3.0 OR</td>
<td>HS 12 GPA &gt;=3.0 OR</td>
</tr>
<tr>
<td>Passed Algebra I (or better)</td>
<td>HS 11 GPA &gt;=2.3 AND Pre-Calculus C (or better)</td>
<td>HS 12 GPA &gt;=2.6 AND Pre-Calculus (C or better)</td>
</tr>
<tr>
<td><strong>English</strong></td>
<td>HS 11 GPA &gt;=2.6</td>
<td>HS 12 GPA &gt;=2.6</td>
</tr>
</tbody>
</table>

## One-Level Below Rule Sets

<table>
<thead>
<tr>
<th>One Level Below Course</th>
<th>Direct Matriculant</th>
<th>Non-Direct Matriculant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading</td>
<td>HS 11 GPA &gt;=2.2</td>
<td>HS 12 GPA &gt;=2.4 AND 12th Grade English C (or better)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HS 12 GPA &gt;= 2.4 AND CST English &gt;= 322</td>
</tr>
<tr>
<td></td>
<td></td>
<td>HS 12 Grade GPA &gt;=1.7 AND 12th Grade English C+ (or better)</td>
</tr>
<tr>
<td>ESL</td>
<td>HS 11 GPA &gt;=2.7</td>
<td>HS 12 GPA &gt;=2.6</td>
</tr>
</tbody>
</table>

- The vast majority of ELL/ELD HS students (~85%) who enter CC begin directly in mainstream English coursework.
- Other major populations of ESL students (e.g., international students, migrants, older immigrants) will not have US high school transcripts and so other multiple measures, such as essays, must be used with those groups.
Results from the Field
Spring/Fall 2016: Mira Costa, Placement into Transfer English

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-Reform</th>
<th>Post-Reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>62%</td>
<td>77%</td>
</tr>
<tr>
<td>Asian</td>
<td>65%</td>
<td>79%</td>
</tr>
<tr>
<td>African American</td>
<td>49%</td>
<td>63%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>52%</td>
<td>69%</td>
</tr>
<tr>
<td>PI</td>
<td>59%</td>
<td>67%</td>
</tr>
<tr>
<td>White</td>
<td>72%</td>
<td>83%</td>
</tr>
</tbody>
</table>
Mira Costa Transfer-Level English Success rate by year/placement type

- Pre-Reform
- Post_Reform
- Compass
- MMAP
- EAP

S2016:
- n=1094
- 65%
- 69%
- 64%
- 67%
- 71%

F2016:
- n=179
- 68%
- 75%
- 70%
- 80%
- 72%

n=498
n=1150
Las Positas Preliminary 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%
Rule set: English = 2.3 AND B- or better; Math = 3.2 AND C or better

bit.ly/MMAPPilotLessons
Fall 2016 pilot Norco College

Statewide rule set: English = 196; Math = 205
Spring 2015: Shasta College

Percentage of Students Placed in English Courses by Course Level within Student Group

- Transfer Level: 55.48% Traditionally Assessed, 66.44% All Others, 86.83% Multiple Measures Cohort
- One Level Below: 27.92% Traditionally Assessed, 20.10% All Others, 10.22% Multiple Measures Cohort
- Two Levels Below: 7.87% Traditionally Assessed, 8.61% All Others, 1.88% Multiple Measures Cohort
- Three Levels Below: 8.73% Traditionally Assessed, 4.64% All Others, 1.08% Multiple Measures Cohort

Rule set: GPA 2.7 AND B or better in last English course; 471 students in cohort
## Spring 2015: Shasta College

- No significant difference in success rates among the three student groups
- Multiple Measures Cohort (93.01%) significantly more likely to be retained in English courses (overall) than Traditionally Assessed (84.49%) group
- Neither group differed from All Others group (89.54%)

### Success Rate

<table>
<thead>
<tr>
<th></th>
<th>Multiple Measures Cohort</th>
<th>Traditionally Assessed</th>
<th>All Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average (all courses)</td>
<td>67%</td>
<td>64%</td>
<td>65%</td>
<td>65%</td>
</tr>
<tr>
<td>Transfer level</td>
<td>67%</td>
<td>68%</td>
<td>71%</td>
<td>69%</td>
</tr>
<tr>
<td>Below transfer</td>
<td>65%</td>
<td>60%</td>
<td>55%</td>
<td>58%</td>
</tr>
</tbody>
</table>

### Retention Rate

<table>
<thead>
<tr>
<th></th>
<th>Multiple Measures Cohort</th>
<th>Traditionally Assessed</th>
<th>All Others</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average (all courses)</td>
<td>93%</td>
<td>84%</td>
<td>90%</td>
<td>88%</td>
</tr>
<tr>
<td>Transfer level</td>
<td>93%</td>
<td>84%</td>
<td>92%</td>
<td>89%</td>
</tr>
<tr>
<td>Below transfer</td>
<td>94%</td>
<td>85%</td>
<td>87%</td>
<td>86%</td>
</tr>
</tbody>
</table>
Fall 2015: SDCCD Pilot

Transfer-level Success Rates by Method of Entry

Accuplacer  MMAP  Other  Sequence

Math
- 60%
- 58%
- 61%
- 59%

English
- 68%
- 79%
- 69%
- 70%

Summary from Pilot College Analysis

– MMAP rules generally performing as expected
– Messaging around the use of multiple measures should be done in a single voice and specifically state which course they should enroll in
  • Placing via a test and then trying to overwrite placement with later messages leads to a sharp reduction in use of enhanced placement
– Implementation of MM recommendations is nuanced, requiring careful attention to details
– MMAP started conversations within departments that did not exist prior
– Collaboration between high schools and colleges has increased and is an important element of success
Self-Reported Transcript Data and Non-Cognitive Variables
Self-reported high school transcript data

• 69 community colleges are now collecting self-reported data through the Open CCCApply application
  – this includes a mix of pilot and non-pilot colleges

• The team is currently trying to get access to these data to analyze the validity of self-reported data.
  – however preliminary data from the pilot colleges shows reliability between self-reported transcript data and actual transcripts
Preliminary Self-Report Data
(Small sample of pilot college data with full matched HS data, n=459)

- Overall strong correlation between self-reported high school GPA and actual GPA observed: $r(457) = .69$
- Students generally (55%) within 1 category of their overall GPA ($\pm .3$)
- Students with lower overall GPA somewhat less likely to report accurately
- Correspondence could be improved by
  – encouraging students to bring/consult transcripts at beginning of application and/or
  – making clear that inaccurate information could invalidate application
    - (though it would rarely be in college’s or student’s best interest for college to follow through on that threat).
Social-psychological (non cognitive variables) data

• 14 pilot colleges have reported they are in the process of collecting Social-psychological (noncognitive variables) data
  – the team is currently following up to try to get access to these data
  – these include: Grit, Hope, Mindset, Conscientiousness, Teamwork Scale, Academic Self-Efficacy Scale, College Identity Scale

• Preliminary results from a few colleges have not shown strong relationships between the measured variables and course outcomes, but this could be due to many factors:
  – small sample sizes
  – limited data to be able to control for prior achievement
Integration of MMAP with CAI

- Common Assessment platform will house a transcript data repository
  - repository will be source-agnostic & store transcript data from variety of sources, including CalPASS & self-report via CCC Apply
  - statewide decision trees programmed into platform, for internally generated Multiple Measures placement recommendation
  - expect data points used in MM placement recommendation

- Students will receive single placement recommendation created from disjunctive placement model

- Platform users with the “Counselor” role will have access to all placement recommendations for a student as will college SIS
Subsequent integration with CAI

- Initial integration may allow some minimal local customization.
  - Future phases will support Conjunctive and Compensatory methods
  - Guidance, limits, and thresholds for local customization will be provided as phased releases progress
- Functionality for additional local multiple measures not yet determined.
  - Will rely on feedback and direction from field (e.g., the MMAP project and all of you)
- Timeline for subsequent phases to be determined in forthcoming road mapping exercise.
How do MMs interact with Acceleration?

• Less underplacement
• Reducing number of students placed into basic skills
• See the “true” remedial reveal itself
  – The hard-core basic skills students
  – Acceleration or co-requisite
    • Principles of backwards design, just-in-time remediation
  – We have not yet found a population that does not benefit from acceleration
  – Curricular redesign to treat remediation as an on-ramp to college
Integrated discussion

• MMAP
• Acceleration
• Co-requisites
• Non-cognitive supports
• Intrusive advising
• Guided Pathways
• How do these things interact?
Upcoming MMAP Webinars

Implementation for New Pilot Colleges: Tuesday, March 14 - 10:00 - 11:00 AM
• This webinar is for new pilot colleges who have not yet placed a cohort using the models. The MMAP Team will walk you through the steps from start to finish.

Developing a Research Plan: Wednesday, March 29 - 1:00 - 2:00 PM
• This webinar is for colleges who would like assistance developing a comprehensive research plan to track the impact of the statewide models on student placement, success, and sequence completion.
MMAP Research Team

Loris Fagioli
The RP Group
lfagioli@ivc.edu

Mallory Newell
The RP Group
newellmallory@deanza.edu

Terrence Willett
The RP Group
twillett@rpgroup.org

Craig Hayward
The RP Group
chayward@rpgroup.org

Rachel Baker
UC Irvine
rachelbb@uci.edu

Nathan Pellegrin
The RP Group
nathan.pellegrin@gmail.com

Peter Bahr
University of Michigan
prbahr@umich.edu

John Hetts
Educational Results Partnership
jhetts@edresults.org

Ken Sorey
Educational Results Partnership
ken@edresults.org

Daniel Lamoree
Educational Results Partnership
dlamoree@edresults.org
Common Concerns about MMAP

- Students placed via MMs will not be successful
- Our courses will have lower pass rates
- Our test is different
- Students would be better off in remedial coursework
- We are only looking at GPA
- Students will only get a “C” in transfer-level work
- Students who get a “C” in transfer-level won’t be able to transfer
- High school GPA is only good for recent graduates
Evidence for grade inflation low at best

• Little evidence for grade inflation over last decade
• Earlier observations of grade inflation may have been partly artifactual
  – adjustments to GPA for AP/IB/Honors
• Most importantly – not consistent with the data
**Concern: Our test is different - Compass**

<table>
<thead>
<tr>
<th>Course</th>
<th>Compass Test</th>
<th>Compass</th>
<th>HSGPA</th>
<th>HSGPA + Compass</th>
</tr>
</thead>
<tbody>
<tr>
<td>English 1</td>
<td>Writing Skills</td>
<td>.31</td>
<td>.57</td>
<td>.62</td>
</tr>
<tr>
<td>Arithmetic</td>
<td>Pre-Algebra</td>
<td>.57</td>
<td>.34</td>
<td>.66</td>
</tr>
<tr>
<td>Algebra</td>
<td>Pre-Algebra</td>
<td>.36</td>
<td>.65</td>
<td>.80</td>
</tr>
<tr>
<td>Intermediate Algebra</td>
<td>Algebra</td>
<td>.47</td>
<td>.66</td>
<td>.84</td>
</tr>
<tr>
<td>College Algebra</td>
<td>Algebra</td>
<td>.41</td>
<td>.76</td>
<td>.88</td>
</tr>
<tr>
<td>College Algebra</td>
<td>College Algebra</td>
<td>.51</td>
<td>.76</td>
<td>.94</td>
</tr>
</tbody>
</table>

## Concern: Our test is different - Accuplacer

<table>
<thead>
<tr>
<th>English</th>
<th>Accuplacer</th>
<th>11th Grade GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer</td>
<td>.10</td>
<td>.27</td>
</tr>
<tr>
<td>1 level below</td>
<td>.12</td>
<td>.24</td>
</tr>
<tr>
<td>2 levels below</td>
<td>.12</td>
<td>.25</td>
</tr>
<tr>
<td>3 levels below</td>
<td>.12</td>
<td>.18</td>
</tr>
<tr>
<td>4 levels below</td>
<td>.07</td>
<td>.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Math</th>
<th>Accuplacer</th>
<th>11th Grade GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer - STEM</td>
<td>.19</td>
<td>.24</td>
</tr>
<tr>
<td>Transfer – Stats</td>
<td>.16</td>
<td>.31</td>
</tr>
<tr>
<td>Transfer – GEM</td>
<td>.09</td>
<td>.26</td>
</tr>
<tr>
<td>1 level below</td>
<td>.21</td>
<td>.28</td>
</tr>
<tr>
<td>2 levels below</td>
<td>.11</td>
<td>.26</td>
</tr>
<tr>
<td>3 levels below</td>
<td>.11</td>
<td>.23</td>
</tr>
<tr>
<td>4 levels below</td>
<td>.05</td>
<td>.19</td>
</tr>
</tbody>
</table>

MMAP (in preparation): Correlation with success (C or better) in course in CCC
Concern: Our tests is different – UC System

Figure 10
Relative Weight of High School GPA and SAT Scores, Before and After Controlling for SES, in Predicting 5-Year Graduation: All UC Freshmen vs. Underrepresented Minorities, 1994 to 2005

Concern: We are only looking at GPA and students will only get a “C” in the transfer-level course
Concern: Students will only get a “C” in transfer course

Distribution of Statistics Node 8

- A: 24%
- B: 29%
- C: 23%
- D: 7%
- E: 7%
- F: 10%
Concern: Transfer-oriented students are better off in remediation than getting a “C” in transfer-level

Transfer rates by grades in first English course

<table>
<thead>
<tr>
<th>Grade</th>
<th>Transfer A</th>
<th>Transfer B</th>
<th>Transfer C</th>
<th>L1 A</th>
<th>L1 B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63%</td>
<td>59%</td>
<td>49%</td>
<td>46%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Irvine Valley College, first course enrolled in, Spring 2000 to Fall 2011 who took an English course. N= 28,279, transfer within 4 years.
Concern: High school GPA is only good for recent graduates

Decay function for the predictive utility of HSGPA on English grades

Semesters of Delay (approx. 6 months each)
Concern: High school GPA is only good for recent graduates.