THE AP PIPELINE

Improving Access to Rigorous High School Coursework

SDP Convening | April 24, 2014
PANELISTS

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Maureen Reyes
2014 Strategic Data Project - Beyond the Numbers

April 24, 2014
The College Board’s mission is to connect students to college success and opportunity. We are a not-for-profit membership organization committed to excellence and equity in education.
Goals for Today

- Share information about the College Board’s AP Potential Tool
- Provide examples of how the College Board uses data to increase AP participation
- Highlight current campaigns
In 2013

- 2,000,000 students
- 19,000 high schools around the world
- 4,000,000 exams
- 4,000 colleges and universities
In the class of 2013, hundreds of thousands of students identified as having a high likelihood of success in AP did not take any recommended AP Exam.

Significant inequities in AP participation are seen along racial and ethnic lines.
What are we doing to identify students that are ready for AP and encourage them to enroll?
AP Potential

- AP Potential is a free, Web-based tool that helps you increase access to AP by using PSAT/NMSQT® score data to identify students with the potential to succeed in AP.

- Research shows that PSAT/NMSQT scores predict performance on specific AP Exams—often with more accuracy—than other traditionally used methods.

appotential.collegeboard.org
### SAMPLE SCHOOL ROSTER

#### AP Subject

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#### % probability of success on an AP Exam (a score of 3 or higher)

A “Y” indicates a student has potential for success for the subject in which it appears.

#### Name of student

- A R N, A
- AARJAN, A
- AARON, A
- AARON, A
- AARON, A A
- AARON, A
- AARON, A
- AARON, A
- ABDULLAH, A
- ABHIN, A D
- ABUL, A H
- ADAM, A S
- ADAN, A U
- ADANFA, A

- “Y” indicates a student has potential for success for the subject in which it appears.
New! Starting this year, AP feedback was featured on the Score Report Plus.

Feedback is based on PSAT/NMSQT section scores.

Level of potential for each subject can be viewed in My College QuickStart.
My AP Potential

You can use this report to see your potential for AP courses based on your PSAT/NMSQT scores. AP courses...[more...]

1. **Review the full list of courses**
   You may have potential for AP courses that aren't currently on your radar.

2. **Take a closer look**
   Sort your list to see courses related to the college majors that interest you. Learn more about each course and how it can help you succeed in college.

3. **Talk to your school counselor and teachers**
   They can help you decide the best course for you.

<table>
<thead>
<tr>
<th>AP Courses</th>
<th>Potential</th>
<th>Matches Major</th>
<th>Your School Offered This Course</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art History</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Calculus BC</td>
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<td></td>
<td></td>
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<tr>
<td>English Language</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>European History</td>
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</tr>
</tbody>
</table>

**Interpret your report**

- **Potential**
  Your scores show that you have the potential for success in this course. Speak with your school counselor to see if you have the appropriate prerequisite courses and find out how you can enroll.

- **Some Potential**
  Your scores show that you have some potential for success in this AP course. Having interest in the course subject as well as your dedication to working hard will only increase your chances for success. Speak with your school counselor to see if you have the appropriate prerequisite courses and find out how you can enroll.

- **Potential Not Yet Indicated**
  Your scores show that you may need more preparation and support to...
Dear Student,

You’ve got what it takes to take AP®.

You did it. Last year you challenged yourself with college-level work in high school and showed that your hard work pays off by earning an AP® Exam score that many colleges accept for credit or placement out of introductory courses.

And based on your most recent PSAT/NMSQT® score, you’ve shown potential to succeed in at least one AP® course and exam.

Find out about the specific AP® courses that may be right for you. You already know what it takes to succeed in AP®. So start making plans for your next AP® experience. Begin by exploring additional AP® possibilities at MyCollegeQuickStart™. To login, you’ll need your access code.

Talk to a counselor or teacher about your AP® options.

Your counselor or teacher can set you on the right path to take AP® courses that are right for you. He or she can also help you decide if AP® courses that aren’t identified by the AP® Potential™ tool, such as world language and culture courses, are appropriate.

Download our conversation starter PDF on exploraap.org to help you prepare for the discussion.

If you’re already in another AP® class, congratulations! You’ve taken a big step toward college success.

Sincerely,

Advanced Placement Program®

What is AP®?
The College Board’s Advanced Placement Program® (AP®) enables willing and academically prepared students to pursue college-level studies — with the opportunity to earn college credit, advanced placement or both — while still in high school.

Who takes AP®?
Like to ask questions? Have your own point of view? Ready to take on challenges? If that sounds like you, then it sounds like you could be an AP® student.

Dear Student,

You’ve got qualities that could help you succeed in AP®.

You might think AP® is tough. That doesn’t mean you aren’t up to the task. In fact, based on your PSAT/NMSQT® score, you’re building the academic skills needed to succeed in at least one AP® course and exam.

Plus, there are other qualities, ones you rely on every day, that can help you tackle AP® — like curiosity to question the things around you, creativity to develop new ideas and opinions, and commitment to see things through.

Find out which AP® courses may be right for you.

Begin exploring what AP® courses might be right for you at My College QuickStart™. To log in, you’ll need your access code.

Talk to a counselor or teacher about your AP® options.

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# Equity Gaps Among Traditionally Underserved Students in the Class of 2013: Black/African American

<table>
<thead>
<tr>
<th></th>
<th>Participation</th>
<th>Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of Graduating Class</td>
<td>% of AP Exam Takers</td>
<td>Equity Gap Eliminated</td>
</tr>
<tr>
<td>District of Columbia</td>
<td>81.8</td>
<td>67.0</td>
</tr>
<tr>
<td>Mississippi</td>
<td>49.7</td>
<td>31.2</td>
</tr>
<tr>
<td>Louisiana</td>
<td>40.0</td>
<td>27.9</td>
</tr>
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<td>Maryland</td>
<td>35.7</td>
<td>22.0</td>
</tr>
<tr>
<td>Georgia</td>
<td>35.6</td>
<td>25.9</td>
</tr>
<tr>
<td>South Carolina</td>
<td>24.7</td>
<td>15.7</td>
</tr>
<tr>
<td>Alabama</td>
<td>31.9</td>
<td>24.3</td>
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<tr>
<td>Delaware</td>
<td>31.1</td>
<td>16.8</td>
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<tr>
<td>North Carolina</td>
<td>26.2</td>
<td>13.1</td>
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<tr>
<td>Tennessee</td>
<td>22.7</td>
<td>17.1</td>
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<td>Virginia</td>
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<td><strong>UNITED STATES</strong></td>
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<tr>
<td>Pennsylvania</td>
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<td>Texas</td>
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<td>Connecticut</td>
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<td>Kentucky</td>
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<td>Indiana</td>
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<tr>
<td>Oklahoma</td>
<td>10.1</td>
<td>7.4</td>
</tr>
<tr>
<td>Nevada</td>
<td>8.5</td>
<td>5.4</td>
</tr>
</tbody>
</table>
| Massachusetts        | 8.3           | 5.7                      | ▲                        | 3.2                                          | ▲                     | ▲                         

Identifying and closing the equity gap
Support for schools

Partnerships to expand AP opportunities for students

• Google provided funding to start 530 new AP math and science courses in fall 2013 for schools with 10+ underrepresented minority and female students with AP Potential

• Dell is providing funding to start 150 new AP courses in fall 2014 for low-income schools with 10+ students with AP Potential
A multi-year, multi-faceted, coordinated campaign to change public understanding, institutional practices, student behaviors, and public policy so that more students with AP Potential are taking advantage of the opportunities they’ve earned.
All In outreach to date

- **Snail Mail Campaign**
  - Sent *30,000* letters and received almost *1000* responses from parents interested in enrolling their children and expanding opportunities for other African American, Latino, and Native American students

- **Email Campaign**
  - Mobilized star power (Richard Sherman and Shonda Rhimes)
  - Emailed over *20,000* students with AP Potential
  - Emailed over *40,000* education professionals including teachers, principals, superintendents, AP coordinators, and counselors

- **Social Media Campaign**
  - *7,000* new visits to the AP Student site
  - Almost *1000* new followers of the AP for Students Twitter handle
AP participation has increased in Providence, RI, high schools after the district began using AP Potential data more systematically.

The number of AP Exam takers in Providence increased more than 400%, from 200 in 2008-09 to 937 in 2012-13.

Hillsborough, FL

Hillsborough began providing the PSAT to all 9th, 10th, and 11th graders for free and using AP Potential to identify and recruit students for AP.

Hillsborough achieved a 60% increase in the total number of students taking AP Exams and a 54% increase in the number of students scoring a 3 or higher.
Maureen Reyes
Senior Director, AP Program Management
mreyes@collegeboard.org
Advanced Placement Strategy

A Framework for Identifying School-level Barriers to AP Success

Tennessee Department of Education
Office of Research and Policy
The percentage of Tennessee students taking and passing AP exams has increased, but continues to lag behind the national average.

Note: Graph shows the percentage of seniors in recent graduating cohorts taking and passing at least one AP exam throughout their high school career.
Within Tennessee, we see large disparities between economically disadvantaged students and other students, with the gap again increasing over time.

Note: Graph shows the percentage of seniors in recent graduating cohorts taking and passing at least one AP exam throughout their high school career.
Our Approach

- Identify AP-ready students based on 8th grade test scores
- Chart AP pipeline at the school level to diagnose problem areas
- Identify school-specific interventions based on pipeline data
To raise AP success, we need to more successfully steer students along the AP pipeline
At the state level, we see drop-offs at every point in the AP pipeline and large gaps between ED and non-ED students.
But the state-level picture hides a host of school-specific issues that require different intervention strategies

- Among 347 high schools, 180 schools include at least 9 AP-ready students

- We classify these 180 high schools into the following types:
  - **Low access**: AP-ready students have little to no access to AP classes
  - **Low Enrollment**: AP-ready students do not enroll in AP classes
  - **Differential enrollment**: AP-ready enrollment rates differ by ED status
  - **Low test-taking**: AP-ready students take classes but not AP tests
  - **Differential test-taking**: AP-ready test-taking rates differ by ED status

Not every school needs to fall into one of these categories, and some high schools can fall into multiple categories
AP Pipeline Graphs

• Each of the following graphs shows the AP pipeline for an actual Tennessee high school

• The graphs were selected to provide examples of five major pipeline issues that can be found in schools across the state
Low Access
Little to no opportunities for students to enroll in AP coursework

This school does not offer any AP courses even though it has students who are considered AP-ready.

There are 46 schools with AP-ready students that offer no or few AP classes.
Low Enrollment
AP-ready students enroll in AP courses at low rates

Less than 40% of AP-ready students at this school enroll in an AP course.

There are 66 schools in TN with low enrollment.
Differential Enrollment

AP-ready students enroll in AP courses at different rates, depending on ED status.

Less than 30% of AP-ready ED students at this school enroll in AP courses.

There are 66 schools in TN with a similar issue.
Low Test-Taking
AP-ready students enroll in AP courses but do not take exams

At this school, close to 80% of AP-ready students enrolled in a course, but only 40% took the exam.

There are 55 schools in TN with a similar issue.
Differential Test-Taking
AP-ready ED and non-ED students test at different rates

Of the AP-ready students at this school, about 30% of ED students took the AP exam, while over 60% of their non-ED peers tested.

There are 30 schools in TN with a similar issue.
This research informed two AP pilots

- **2013-15 AP Exam Fee Pilot**
  - Legislation passed in 2013 establishing a two-year pilot program to pay for AP exam fees in an effort to increase the number of students in AP courses who participate in the AP exam.
  - Analysis was used to determine the criteria for site selection

- **Advanced Placement Rural Expansion Pilot**
  - Analysis lead to the development of this pilot, which will provide rural schools assistance in starting AP programs
  - Using data from this research, we identified rural schools that have AP-ready students but do not currently offer AP courses.
Observations from New York & Future Research Directions

Chris Avery
Roy E. Larsen Professor of Public Policy & Management, Harvard Kennedy School
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Updating Algebra for All?: Evidence of a middle-grades math acceleration policy

Darryl Hill

Coauthors:
Shaun Dougherty
Joshua Goodman
Erica Litke
Lindsay Page
Motivation

- Observational data suggest connection between taking algebra and taking more math, and positive college outcomes. (Gamoran & Hannigan, 2000; Adelman, 2006)

- Black & Latino students are underrepresented in advanced courses, particularly algebra. (Moses & Cobb, 2001)

- Algebra-for-all has been tried in Charlotte, Chicago and California; may harm “misplaced students.” (Loveless, 2008; Nomi, 2012)

- Evidence is mixed. (Allenswoth et al, 2009; Burris et al, 2006; Clotfelter, Ladd, & Vigdor, 2011; Rickles, 2011; Stein et al, 2011)

- Some districts and states have made policy shifts as a result of negative outcomes (Fensterwald, 2013)

- Relationship/role of increasing competition at low end in advanced courses
The Math Acceleration Policy in Wake County

- 15th largest school district in the US (>150,000 students)
  - 50% White, 25% Black, 15% Hispanic, 6% Asian.
  - One-third are eligible for free or reduced-price lunch
- Task force focusing on equity for disadvantaged and minority students pushed for increased access to Algebra I in middle school.
- SAS’s Education Value-Added Assessment System (EVAAS) predicts probability that a student will pass Algebra I End-of-Course exam.
- Starting in 2010-11, students with EVAAS ≥ 70% were recommended for Advanced 6th grade Math (6), Pre-Algebra (7), or Algebra I (8).
- A directive from the superintendent led to stronger compliance with this rule in the 2011-2012 school year.
- WCPSS now a partner with the Strategic Data Project to research outcomes and inform policy decisions.
Empirical strategy

- A **fuzzy regression discontinuity design** compares students who barely qualified for acceleration to those who barely missed qualifying, two nearly identical groups but for math placement.

- We fit the following RD model in which *share of years in advanced math* has been instrumented by having an EVAAS probability of at least 70% ($Elig=1$):

$$ Y_{it} = \beta_0 + \beta_1 \cdot Advanced_{it} + \beta_2 \cdot EVAAS_{it} + \beta_3 \cdot Elig_{it} \cdot EVAAS_{it} + \mu_{it} $$

  - $\beta_1$ measures the impact of math acceleration on students induced to enroll as a result of the assignment rule.

  - Running variable is each student’s end of 5th grade EVAAS score, to avoid endogeneity concerns.
Math acceleration rates

- Clear discontinuity in share of middle-school math years spent in advanced math coursework at the assignment threshold, implying a strong first stage.

![Graph showing fraction of years advanced vs. EVAAS (earliest)](image)
Components of the treatment

• Students at or above the 70% probability threshold were recommended for classes designated as advanced.

• Accelerated students were in classes with:
  – Much more highly skilled peers (1.3 standard deviations higher)
  – Fewer minority peers (29 pp increase in % of peers white/Asian)
  – More students (accelerated classes were 4 students larger)
  – No difference in peer heterogeneity (measured by st. dev. of skill)

• Accelerated students were:
  – More likely to be a taught by a novice (7.2 percentage points)
  – Less likely to be taught by a teacher in lower-tail of ability (34 percentage points)
Outcomes: Math GPA & Test Scores

- Modest negative impacts on Math GPA
- Little clear overall impact on end-of-grade math test scores

Math GPA

```
~ -0.1 GP
```

Math Z-score

```
~ -0.02 SD
```
Outcomes: Heterogeneity of effect

- Negative effects are particularly large for female students (possible small difference in take-up).

![Math GPA](~ -0.2 GP)  ![Math Z-score](~ -0.07 SD)
Sensitivity Tests

- No difference in first-stage take up of treatment by gender, race/ethnicity, or low-income status.
- Gender results not sensitive to choice of bandwidth.
- Results are stronger (though power more limited) when we drop the first year of implementation.
- These results are preliminary.
Implications

• We provide preliminary evidence of negative impact of middle-school math acceleration on short-run measures of student achievement.

• Negative results are largely driven by girls, with no differential effect by race/ethnicity.

• Girls more at risk for internal distress at challenging times in their educational trajectory (Angold & Rutter, 1992) and most vulnerable when doing poorly in school (Pomerantz et al., 2002)

• We hypothesize that the higher math track may be a more competitive environment and that girls induced by the policy to enroll respond negatively given their position as lower performers relative to the rest of class (Niederle & Rustichini, 2003; Niederle & Vesterlund, 2010).
Next steps

- How do the patterns in test scores relate to students self-perceptions?
- Are students induced into advanced math in middle school more likely to complete a college-preparatory curriculum in high school?
- How do these short-run effects for girls impact long-term likelihood of enrolling and succeeding in higher-level math courses?
- What can we learn from cross-school variation in policy implementation?
- What is the impact of the policy on behavioral outcomes and attendance?
QUESTIONS?