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K–12 Postsecondary Alignment and School Accountability: Investigating High School Responses to California's Early Assessment Program

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Summary Notes

- Alignment efforts between K–12 and higher education under California's Early Assessment Program (EAP) may improve measures of school performance.
- Proficiency levels on the state standardized test, school accountability measures, and college application rates improved at all high schools following the introduction of the EAP. Gains in these measures of school performance were strongest at those high schools with the largest proportion of juniors participating in the program.
- Results suggest that college readiness standards that are measured appropriately by well-aligned assessments may improve measures of high school accountability within a state.

The Common Core State Standards movement has driven policy discussion on the need to better align K–12 systems with higher education within and across states to ensure a more seamless transition for young adults between high school and college. States have adopted different approaches to accomplish this goal, and the incorporation of college and career readiness measures into state assessments is one such approach that continues to gain traction.[1] California spearheaded this alignment initiative beginning in the 2003-04 academic year, with the introduction of the Early Assessment Program (EAP). This program was developed jointly by the California Department of Education (CDE), the State Board of Education, and California State University (CSU). The stated purpose of the program, now in its ninth year, is to bridge the gap between K–12 educational

1. For additional information on the standards see www.corestandards.org, National Governors Association (2009), Achieve (2010), and King (2011). See Martinez and Klopott (2005) and Venezia et al. (2003, 2005, 2007) for additional background on various alignment initiatives.

standards in English and mathematics and the requirements and expectations of postsecondary education at the California State University system, thereby improving college readiness.

With Common Core State Standards implementation well under way, it is critical to evaluate whether existing alignment efforts, which are likely to serve as models for states joining the Common Core movement, are accomplishing their intended goals. In this study, we examine the impact of the EAP on California high schools as measured by high school students' proficiency levels on California's state standardized exam — the school accountability measure in California — and the percentage of public high school graduating seniors who apply to a California State University campus.

The Early Assessment Program

The development of the EAP was motivated by a desire to increase the English and math proficiency of entering freshmen at CSU campuses, thereby reducing high systemwide remedial course-taking rates. Results from an earlier study of this program reveal promising findings for students. Specifically, participation in the EAP reduces the average student's probability of needing remediation in college by 6.2 percentage points in English and 4.3 percentage points in mathematics (Howell, Kurlaender, & Grodsky, 2010). These findings do not tell us anything about the effect of the EAP on high-school-level college readiness and accountability outcomes, which is what we seek to determine through the analyses presented in this brief.

The three explicit goals of the EAP are to: (1) identify students before their senior year who need additional course work or preparation in English and/or mathematics to succeed at a CSU campus; (2) provide students, parents, teachers, and administrators with information about their students' college readiness in order to identify shortcomings in preparation, and to remedy them before high school graduation; and (3) motivate students to take steps in their senior year to achieve readiness for college-level work.[2]

The program has three components:
(a) the 11th-grade assessment to identify academic preparation;
(b) a professional development component to aid high school teachers in facilitating improved college readiness among their students; and
(c) supplemental preparation for students in their senior year.

All three components of the program are voluntary at the student, teacher, and school levels.

The first and primary component of the program is an early assessment of English and math skills for 11th-graders that began in the spring of 2004. The EAP appends 15 optional multiple-choice questions to each of the mandatory California Standards Tests (CSTs) in 11th-grade English and mathematics.[3] These additional test items were developed by CSU and K–12 faculty to reflect both

2. Information retrieved at http://www.calstate.edu/eap/documents/presentation_cde.ppt#302.

3. The English EAP also requires that students complete an essay in a separate 45-minute session.

California high school standards and CSU placement standards. Composite scores are computed based on a subset of about 45–55 of the existing CST questions augmented with the 15 additional EAP items (and an essay in English).

Based on these scores, participating students receive a letter in the summer before their senior year of high school indicating their proficiency on both the English and math components. If their scores exceed an upper threshold in math, they are exempted from mathematics remedial course work and the CSU math placement exam if they choose to enroll at a CSU campus. An identical policy holds for English. The CSU English placement examination and relevant remedial course work are waived with a passing English EAP score. Students whose scores fall below a lower threshold are considered nonexempt from the remediation placement exams.[4] They are advised about what courses to take during their senior year of high school and directed to additional resources to improve their readiness for CSU course work following high school graduation.[5] The EAP is not the only way to gain exemption from the CSU placement exam and/or avoid remedial course work. High SAT®, ACT, or AP® scores may allow students to bypass remedial course work even in the absence of an EAP exemption. The EAP represents a targeted effort to ensure that high schools are adequately providing students with a college-ready skill set. It communicates to students, in simple terms, the likelihood that they will require remediation upon attending a CSU campus and identifies weaknesses in their academic preparation, allowing time for students to patch these academic deficiencies during their senior year. Finally, the EAP adds a high-stakes element to an otherwise low-stakes exam for students. Students cannot differentiate between the EAP questions and the regular CST questions, creating a strong incentive for these students to put forth effort when answering all exam questions. An added benefit of administering an exam that actually has consequences for the individual student is an enhancement of the exam's relevance with respect to school accountability, yielding a more accurate identification of underperforming schools in need of curricular or instructional improvement.

> With the introduction of the Early Assessment Program, California maintains a common curriculum, comparable assessments, and standardized performance levels — the three components of common education standards — on those assessments for determining college readiness at the state universities and community colleges (Loveless, 2012).

Who Participates in EAP?

The EAP is voluntary for students and schools, so naturally the participation rates on this exam will vary across public high schools in California. In order

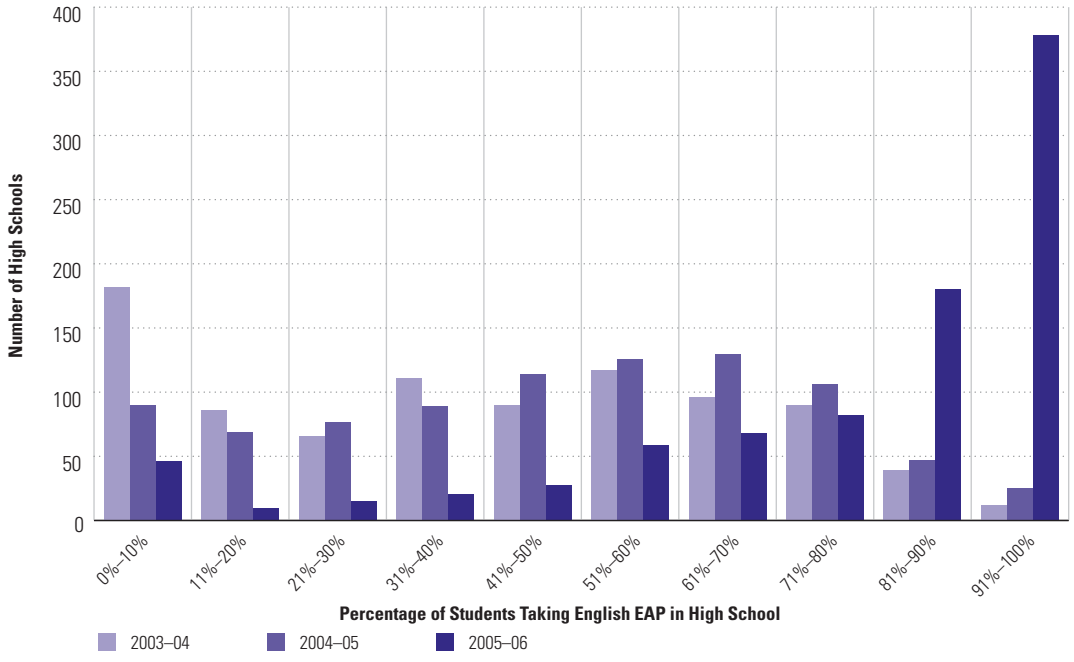
4. While there is only one threshold in English to distinguish the exempt and nonexempt outcomes, the mathematics EAP also includes a middle range for scores that yields an outcome of exempt that is conditional on students completing certain courses during their senior year of high school with a grade of C or higher.

5. For additional information, see CSU-developed online resources to help students and their families make sense of their EAP results and what to do to prepare for CSU at www.csusuccess.org.

to quantify the impact of the EAP on student achievement measured at the high school level, we must first examine how participation varies over schools and time. Based on data from the California Department of Education and the CSU Chancellor's Office, Figure 1 displays the variation in EAP participation rates of public high schools in the first three years of the program. For this analysis, we focus on English participation because all high school juniors are eligible to take the English EAP, whereas math EAP participation comes with several restrictions.[6] School-level EAP participation has been on the rise since the program's inception. In 2003-04, the first year of the program, 40 percent of schools had at least half of their students participate in the English portion of the EAP. By 2005-06, nearly two-thirds of all California public high schools (over 80 percent of juniors) had nearly universal participation in the English EAP and only 4.5 percent of California high schools had none of their juniors participate in the English EAP. Despite the overall rise in participation rates over time evident in Figure 1, by 2005-06, considerable school-level variation in EAP participation remained. In this study, we utilize school-level variation in EAP uptake rates present in the first two years of the program to investigate EAP's effects on CST proficiency, the school's academic performance index, and application rates to the CSU system.

6. For math, there is a requirement that 11th-grade students be enrolled in Algebra II or a higher math class in order to take the EAP exam. This means far fewer students take the EAP mathematics exam, because of a lack of eligibility. Moreover, most students who did take the math exam also participated in the English exam, suggesting that the participation variable would not look much different if math were included.

Figure 1: High School Participation in English EAP, by Participation Rate Decile



Note: Participation rates are based on authors' calculations using data from the California Department of Education, the California State University, and the Educational Testing Service.

Although participation in the EAP is voluntary for individual students, we hypothesize that school-level factors over which the students exercise no control may influence students' EAP participation decisions. To ascertain which high school characteristics are most closely related to EAP participation rates during the 2003-04 and 2004-05 academic years, we utilize a rich set of high-school-level data from the California Department of Education, such as school enrollment, student body demographic composition (e.g., racial/ethnic composition and percentage who are eligible for free or reduced-price lunch), teacher characteristics, and overall academic performance. In addition, we examine whether there are possible differences across school districts that may drive differential EAP participation rates.

Correlations between a high school's EAP participation in the first two years of the program (2003-04 and 2004-05) and selected school characteristics, depicted in Table 1, show that very few school-level characteristics are strongly associated with rates of EAP participation at a high school. The highest absolute value of all correlation coefficients in Table 1 is 0.245, which represents a modest positive correlation between a school's accountability measure, the Academic Performance Index (API), in the 2004-05 academic year and the school's EAP participation rate.[7] Even when all measures in Table 1 are combined in a regression framework, these school characteristics jointly explain only 11 percent of the variation in school EAP participation rates that we observe in the data. Furthermore, school district controls add little to our understanding of EAP participation differences across schools.

Given that the EAP is a voluntary program for students, it is perhaps not surprising that it took a bit of time to catch on, yielding no systematic school-level attributes to explain initial participation in the program. In fact, by the third year of the program, (as illustrated in Figure 1), we see many schools with nearly universal

7. API is a score used to determine a school's performance level on statewide testing and to determine whether a school has made Adequate Yearly Progress (AYP) targets under the federal accountability measures of No Child Left Behind. School API is composed of a school's standardized test scores in all grades and on the California high school exit exam.

Table 1: Correlation Between Schools' EAP Participation Rate and High School Characteristics in the First Two Years of the Program

	2003-04	2004-05
Academic Performance Index (API)	0.197***	0.245***
Free/Reduced-Price Lunch (%)	-0.027**	-0.094**
Underrepresented Minority Students (%)	0.028	-0.018
Enrollment	0.077*	0.048
Emergency Credentialed Teachers (%)	-0.032	-0.093*
Student–Teacher Ratio	0.073*	0.106**
Parent with Less than HS Diploma (%)	-0.084*	-0.052

Note: Statistical significance of pair-wise correlations are defined as follows: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. API lagged one year.

EAP participation. Of course, there may be other dimensions of school participation rates that we do not observe, such as coordination with the nearby CSU campus and affiliated EAP coordinator, which may also contribute to the school-level variation in EAP participation. The methodology that we employ in the analyses that follow reduces the potential influence of these unobservable school factors and utilizes the early variation in EAP participation rates across California schools to investigate the potential benefits to high schools.

Assessing High School Benefits of EAP Participation

The possible school and student ramifications of EAP introduction are numerous and, in this study, we focus only on analyzing the EAP's impact on:

(1) proficiency levels on the state standardized test (CST);
(2) the school accountability measure (API); and
(3) the number of applications to CSU campuses.

This study does not attempt to identify the mechanism through which the EAP impacts these three outcomes. Again, the plausible mechanisms are countless and include improved instruction, a coordinated effort between the CSU system and high school teachers through professional development to align the 11th- and 12th-grade college-preparatory curriculum with the rubric established through the EAP, and increased incentives for students to develop the academic skill sets assessed through the CST and accompanying EAP. Alternatively, any improved outcomes may simply result from students exerting more effort when sitting for the exam. We hypothesize that all of these factors may operate simultaneously, ultimately driving the outcomes discussed below.[8]

Data and Methodology

This study relies on detailed school-level data for California public high schools between the 2001-02 and 2004-05 academic years, a time period including two years prior to and two years following the implementation of the EAP. Gains in school performance measures are examined two years prior to EAP introduction and two years following EAP introduction. By comparing the gains of high-participation schools to the gains made by low-participation schools, the extent to which EAP participation intensity may have contributed to improved school-level outcomes is isolated.[9]

- 850 public California high schools
- Four academic years spanning 2001-02 to 2004-05
- At average school, 33% of students are on free/reduced-price lunch
- At average school, 42% of students are underrepresented minorities
- At average school, 36% and 13% of students perform at "Proficient" and "Advanced," respectively, on the state standardized test

8. See Loveless (2012) for a discussion of the theoretical mechanisms by which the Common Core State Standards might improve outcomes, including the quality theory, the rigorous performance standards theory, and the standardization theory.

9. This methodology is called "Difference-in-Differences." Please see the Technical Appendix for details.

The California Department of Education supplied information on attributes of all public high schools in the state. Data from the CDE include school demographic measures, aggregate test scores, and other state accountability outcomes. We merged these data with a file from Education Testing Service, which administers the EAP, to include information on school-level EAP participation rates. We limit our sample to schools classified by the Common Core of Data as "regular" high schools, a designation that excludes vocational and alternative schools. This restriction results in the inclusion of approximately 850 public California high schools in our analyses. To construct the outcome variables used in these analyses, we also utilize a unique data set made available by the CSU Chancellor's Office on applicants and placement assessments for CSU enrollees.

Participation in the EAP is measured at these 850 schools as the percentage of 11th-grade students who voluntarily take the English EAP test and receive early information about their college readiness. Although most students in most schools now participate in the EAP, as shown in Figure 1, there was substantial variation in participation across schools in the early years of the program.

For illustrative purposes, schools are divided into quartiles based on EAP participation for each year analyzed. Table 2 shows the English EAP participation quartile thresholds utilized in these analyses.

School Outcomes

In these analyses, we focus on three outcome measures:

1. California Standardized Test (CST) scores in English (not augmented by the EAP). All students in the 11th grade take the same English CST and are assigned a proficiency level based on their test results. The proficiency categories are: "Far Below Basic" (20 percent of all students in CA in 2003), "Below Basic" (19 percent), "Basic" (29 percent), "Proficient" (21 percent), and "Advanced" (11 percent). Schools benefit from having more students in the Proficient or Advanced categories, as those two categories contribute to the schools' federal Adequate Yearly Progress (AYP) measures. We examine two CST-specific outcomes: The percentage of students categorized as Proficient and above, and the percentage of students categorized as Advanced.

2. Schools' Academic Performance Index (API). We investigate changes to the API, schools' state and federal accountability metric. The possible API scores range from 200 to 1000, and although a score of 800 or

Table 2: 2004-05 English EAP High School Student Participation Quartiles

Participation Quartile	Minimum Participation Rate	Maximum Participation Rate	# of Schools
1 (Low)	0.0%	28.2%	218
2	28.3%	50.0%	218
3	50.2%	66.9%	219
4 (High)	67.0%	100.0%	218

more is desirable, most schools do not reach that goal. In our sample, the API ranges from 304 to 988, with an average score of 693.[10]

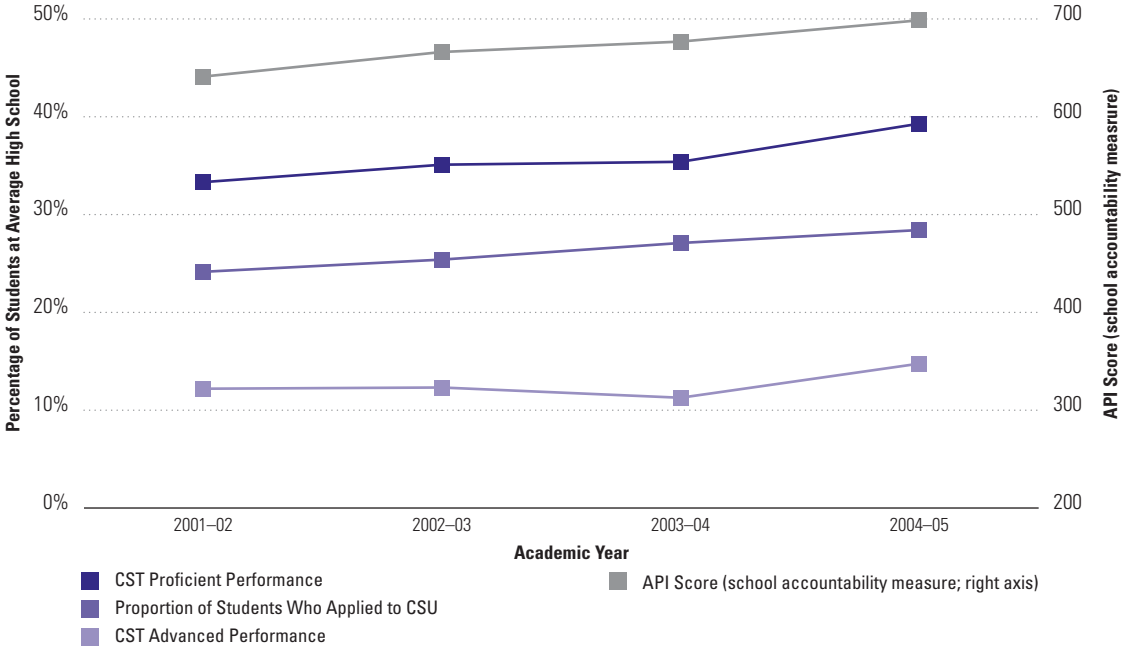
3. CSU applications. Although the EAP is not specifically designed to increase the percentage of students at a given high school who apply to a CSU campus, better articulation between K–12 and CSU could cause more students to be willing to apply to a CSU campus. Since most students who participate in the EAP do not receive a score designating them as exempt from remediation (only 21 percent in English are deemed exempt[11]), it is also possible that the EAP may actually reduce applications to CSU, as students are sent a strong signal that they are not college ready. The applications measure we employ is constructed using the high school of origin for each CSU application and placement test indicator, respectively. The numerator on the CSU application rate measure represents the number of students who applied to CSU, and the denominator represents the number of eventual graduates from the 11th-grade cohort from each high school. In our sample, the percentage of students from a particular high school who applied to a CSU campus ranges from 18 percent to 100 percent, with a mean of 26.4 percent.

Figure 2 depicts trends in the outcome measures over time. From this figure we note that, from 2001-02 to 2004-05,

10. While it may not be recommended to compare API scores over long periods of time because of changes in the API formula, the API is the main measure that California uses to hold schools accountable, so it is important that we examine any potential changes in the API because of the EAP.

11. http://www.calstate.edu/eap/testing.shtml

Figure 2: Trends in High School Outcome Measures that May Be Affected by EAP



Note: Based on authors' calculations using data from the California State University, the California Department of Education, and the Educational Testing Service.

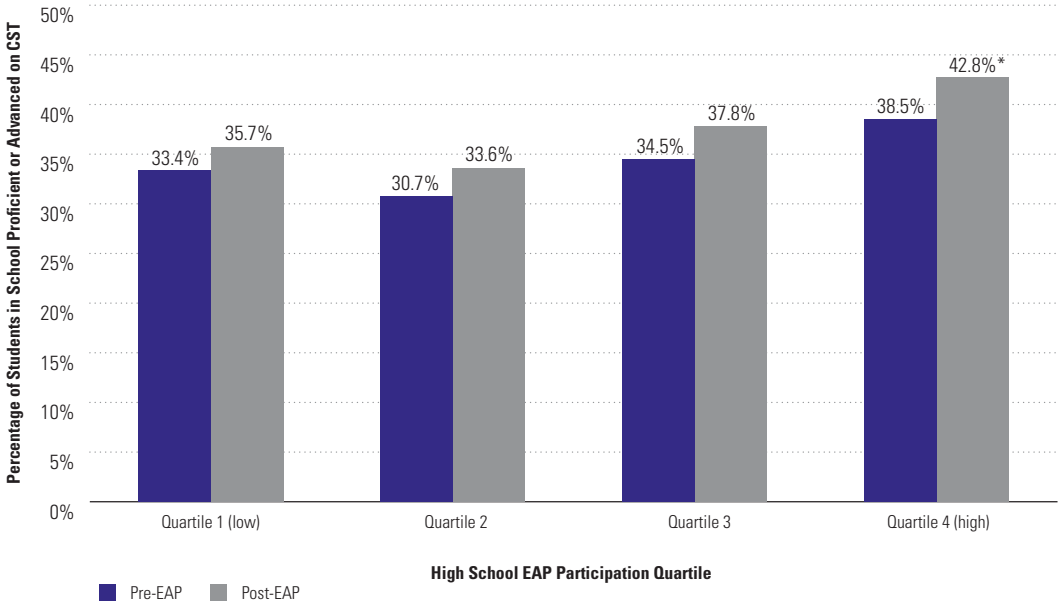
California high schools experienced slight improvements in all of these outcomes (increases in CST scores, API, and application to CSU).

Results

Results from the analyses, presented in Figure 3, indicate that schools across the EAP participation quartiles experienced an increase in the percentage of students designated as Proficient or Advanced on the CST. However, only in the schools with the greatest EAP participation rates was the gain in proficiency statistically significantly larger than the gain in proficiency at schools with the lowest participation rates. In these quartile 4 schools, the percentage of students with a Proficient or Advanced designation increased by roughly 2 percentage points above and beyond the corresponding percentage point increase in the lowest EAP participation quartile.

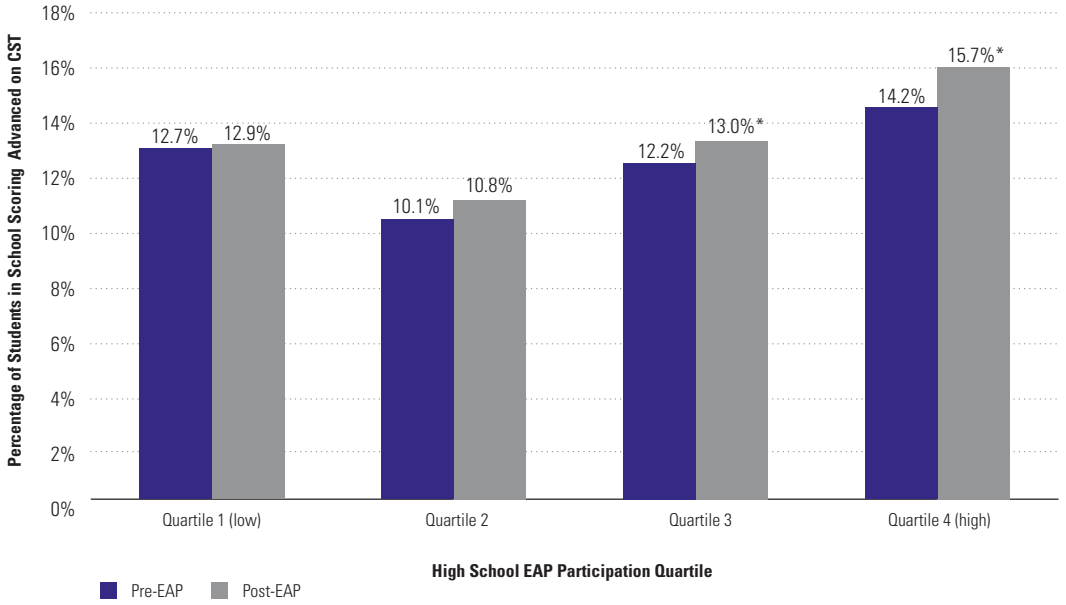
Figure 4 shows the impact of the EAP on the percentage of students classified as Advanced on the CST. The findings presented in Figure 4 parallel those shown in Figure 3. The improvement in this measure among the quartile 4 schools exceeds that found in the quartile 1 schools by 1.3 percentage points, and the improvement in the quartile 3 schools exceeding that of the quartile 1 schools by 0.6 percentage points is also statistically significant. Figure 5 depicts important increases in schools' API over this time period, with a statistically significant additional gain of 5.4 index points (the equivalent of about one-tenth of a standard

Figure 3: California Standards Test Proficient and Advanced Levels Pre- and Post-EAP, by EAP Participation Quartile



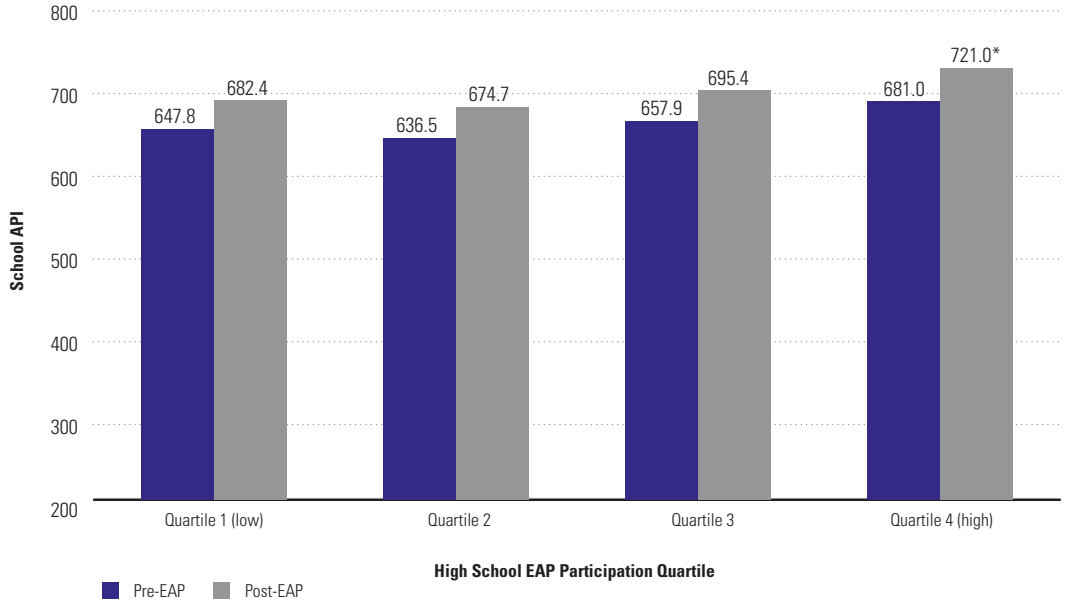
*The pre-/post-EAP difference in quartile is statistically significantly different than the quartile 1 pre-/post-EAP difference (p<.05); based on 852 public California high schools.

Figure 4: California Standards Test Advanced Levels Pre- and Post-EAP, by EAP Participation Quartile



*The Pre-/post-EAP difference in quartile is statistically significantly different than the quartile 1 pre-/post-EAP difference (p<.05); based on 852 public California high schools.

Figure 5: California Academic Performance Index Pre- and Post-EAP, by EAP Participation Quartile



*The pre-/post-EAP difference in quartile is statistically significantly different than the quartile 1 pre-/post-EAP difference (p<.05); based on 785 public California high schools.

deviation) among schools with high EAP participation above and beyond what was experienced in schools with low EAP participation. The differences in Figures 3, 4, and 5 suggest important, albeit small, positive gains in overall school-level testing outcomes, which result directly from the EAP.

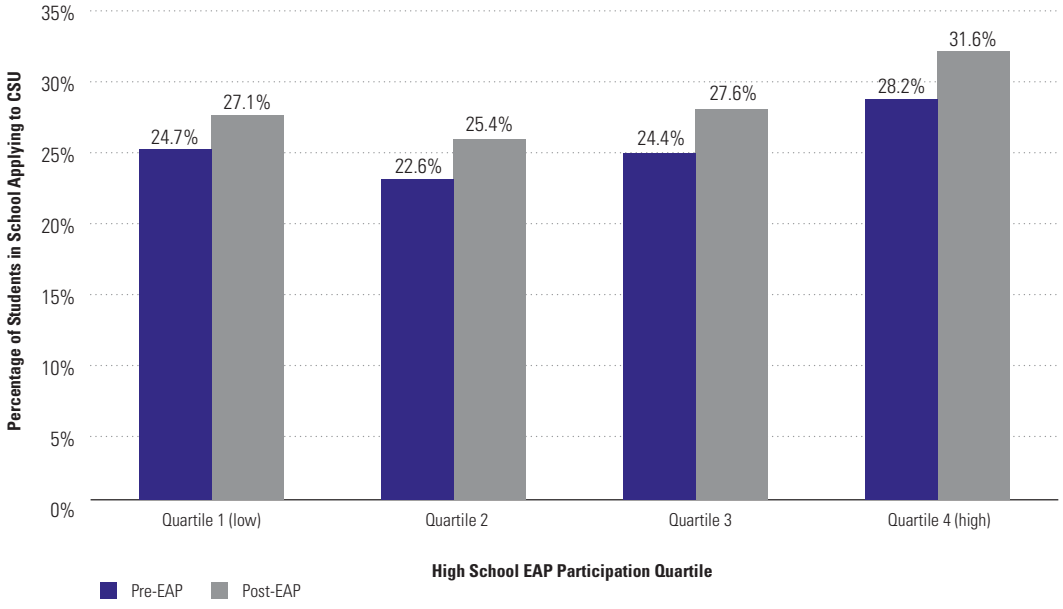
The final school-level outcome we examine in this study is the percentage of students who apply to a California State University campus. As indicated in Figure 6, the post-EAP period was characterized by higher rates of application to CSU campuses for high schools with varying levels of EAP participation. Application rates increased by about 2.4 percentage points in the quartile 1 schools and about 3.4 percentage points in the quartile 4 schools. In light of the relatively uniform increases across the EAP participation quartiles, it is not surprising that we are unable to detect any statistically significant differences in application rate changes between quartiles 1, 2, 3, and 4. Consequently, we are unable to conclude that the EAP increased application rates to the CSU campuses.

Policy Implications

There has been a growing interest in the possibility that seemingly disparate education systems of secondary and postsecondary schooling could be better connected, particularly through the assessment process. The rationale for assessment alignment between secondary and postsecondary levels is that, through assessments that build toward college-level academic work, high school students and their teachers can become better informed about the requirements of college (Callan et al., 2006).

Currently, mandatory state achievement tests are closely aligned with state K–12

Figure 6: Application Rates to California State University Pre- and Post-EAP, by EAP Participation Quartile



standards. The CSTs are designed to assess student mastery of the academic standards agreed upon by educators and policymakers in the state of California. Successfully integrating the expectations of what should be learned in high school and what academic skills are necessary for postsecondary success is beneficial to students, colleges, and high schools. Students receive clear signals of whether or not they are college ready. Colleges potentially benefit through a reduction of instructional resources dedicated to remediation, and high schools are provided with important information about whether they are achieving their mission of preparing students for the academic challenges of postsecondary education.

The push to adopt state standards at the K–12 level has been reinvigorated by the emergence of the Common Core State Standards (adopted by 46 states and three U.S. territories at the time of this writing).[12] This more recent wave of standards has developed simultaneously with initiatives at the state and federal levels around substantially increasing the number of college graduates in the United States, yet these two broad-based goals are often curiously disconnected. Despite the rhetoric surrounding college readiness, the standards that states assess end at the 12th grade with no apparent bearing on students' postsecondary careers, and are not built into states' accountability systems. In an increasingly K–16 policy environment, standards taught and tested in the K–12 years should provide the necessary information to evaluate college readiness and success, not just to students, but also to schools. The analyses in this brief suggest several important findings on the impact of a promising state effort to do just that — California's Early Assessment Program.

The EAP was not introduced with the explicit goal of high school improvement. Nevertheless, the introduction of the EAP did change the rules of the game for many students now taking the state's standardized test with the intention of going to college, and for the teachers and schools that desire to prepare them to successfully do so. As a result, it is important to consider the consequences of the program for California's high schools. State accountability systems end in high school, with no explicit incentives for high schools to prepare students for progression through the postsecondary pipeline. The disjuncture between the K–12 and postsecondary systems is illustrated by the lack of an integrated data system to evaluate how efforts in K–12 may lead to changes in postsecondary outcomes, such as graduation and retention. By many accounts, the EAP is a huge success for simply providing students and schools with important information about college readiness. Its popularity and perceived importance are evident in the steady increase in EAP participation across schools over time. Yet, as a model for utilizing state assessments to better align K–12 and postsecondary schooling, the potential of the EAP may only be fully realized when students' college readiness is explicitly incorporated into the state's K–12 accountability system.

12. Included in this 46 is Minnesota, which had adopted the standards in English Language Arts, but not in mathematics.

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Technical Appendix

The results presented in Figures 3, 4, 5, and 6 are based on Difference-in-Differences models. In these models, the difference between post-EAP and pre-EAP outcomes is examined in each participation quartile (reading across the rows in the table below). These differences are differenced again (reading down the penultimate column relative to the Q1 difference) so that the effect of EAP can be further disaggregated by program participation intensity. The Difference-in-Difference estimates for quartiles 2, 3, and 4 are relative to the impact experienced by the low-participation quartile 1 high schools (e.g., high-participation high schools experienced a statistically significant 2.0 percentage-point increase in the proportion of students who performed "Proficient" or "Advanced" on the CST above and beyond the 2.3 percentage-point gain at low-participation high schools).

Table A1: Difference-in-Difference Results: Participation Quartiles and Outcomes

CST Proficient/Advanced (Figure 3)				
	Pre-EAP	Post-EAP	Difference	Difference-in-Difference (compared to Q1)
Q1	33.4	35.7	2.3	--
Q2	30.7	33.6	2.9	0.5
Q3	34.5	37.8	3.3	1.0
Q4	38.5	42.8	4.2	1.9*
CST Advanced (Figure 4)				
	Pre-EAP	Post-EAP	Difference	Difference-in-Difference (compared to Q1)
Q1	12.7	12.9	0.1	--
Q2	10.1	10.8	0.7	0.6
Q3	12.2	13.0	0.8	0.7*
Q4	14.2	15.7	1.5	1.3*
API (Figure 5)				
	Pre-EAP	Post-EAP	Difference	Difference-in-Difference (compared to Q1)
Q1	647.8	682.4	34.6	--
Q2	636.5	674.7	38.2	3.6
Q3	657.9	695.4	37.5	2.9
Q4	681.0	721.0	40.0	5.3*
Apply to CSU (Figure 6)				
	Pre-EAP	Post-EAP	Difference	Difference-in-Difference (compared to Q1)
Q1	24.7	27.1	2.4	--
Q2	22.6	25.4	2.8	0.3
Q3	24.4	27.6	3.2	0.7
Q4	28.2	31.6	3.4	0.9

* The pre-/post-EAP difference in quartile is statistically significantly different than the quartile 1 pre-/post-EAP difference ($p<.05$).
Note: Differences may appear inaccurate due to rounding.

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About the College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success — including the SAT® and the Advanced Placement Program®. The organization also serves the education community through research and advocacy on behalf of students, educators and schools. For further information, visit **www.collegeboard.org**.

The College Board Advocacy & Policy Center

The College Board Advocacy & Policy Center was established to help transform education in America. Guided by the College Board's principles of excellence and equity in education, we work to ensure that students from all backgrounds have the opportunity to succeed in college and beyond. We make critical connections between policy, research and real-world practice to develop innovative solutions to the most pressing challenges in education today. For further information, visit **advocacy.collegeboard.org**.

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