

MEMORANDUM

Presented to:

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RE: Are A-G Requirements an Indicator of College Readiness?

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Introduction

As part of our IES-funded research partnership on improving college and career readiness (and in light of current State Board of Education discussions), we closely examined the A-G subject requirements that indicate eligibility for both the University of California (UC) and California State University (CSU) systems. This memo summarizes several descriptive analyses of California's A-G requirements as a college readiness indicator, and specifically we explored the following questions:

- What proportion of California seniors in the class of 2012 were identified as A-G ready? And how does this indicator vary by key subgroups?
- What is the distribution of A-G readiness across California high schools in 2012? And how much does this measure vary by student characteristics within schools?
- How do students who have met A-G course requirements fare at CSU?

Why does academic rigor matter?

Students who acquire a stronger academic background in high school are more likely to arrive at college prepared for college-level work. The accumulation of academic skills, as well as one's preparation in high school, is a key predictor of collegiate success (Bettinger, Boatman, & Long, 2013; Kurlaender & Howell, 2010). Studies also indicate that the intensity of one's high school curriculum is associated with a number of positive postsecondary outcomes, including college entry (Long, Conger, & Iatarola, 2012), type of college entry (Attewell & Domina, 2008), college grades (Klopfenstein & Thomas, 2009), and college completion (Adelman, 1999; Adelman, 2006; Attewell & Domina,

2008). Therefore, a rigorous course of study in high school is the single most important predictor of college success.

However, despite increases in college participation, high rates of remedial or developmental course-taking and low rates of degree completion persist (Jackson & Kurlaender, 2013), suggesting that not all college-bound students' secondary schooling experiences are adequately preparing them for college.

A rigorous course of study in high school can provide students with a richer curriculum, which may expose them to more challenging material and provide them with an opportunity to develop and refine the knowledge and skills that have been developing over time (Jackson & Kurlaender, 2013). Students with higher levels of measured academic skills are then more likely to succeed in college than their peers with weaker academic skills (Adelman, 1999; Adelman, 2006; Horn & Kojaku, 2001; Long, Itarola, & Conger, 2009). Therefore, students who attend low-quality secondary schools, or do not participate in a rigorous course of study during high school, may not accumulate the academic skills and knowledge necessary to engage successfully in college-level work.

Background on A-G Requirements

The notion of rigor as it pertains to California high schools is most adequately reflected in the undergraduate admissions requirements to the State's four-year public postsecondary institutions: the University of California (UC)¹ and California State University (CSU)² systems. Colloquially referred to as the A-G requirements, these subject requirements indicate what courses students must take and satisfactorily complete in high school in order to be considered as eligible, at least in part, for admission in either postsecondary system.

These courses capture a variety of fields, as denoted by the "A-G" letters assigned to each subject area: (a) history/social science (*2 courses*), (b) English (*4 courses*), (c) mathematics (*3 courses*), (d) laboratory science (*2 courses*), (e) foreign language (*2 courses*), (f) visual/performing arts (*1 course*), and (g) an additional college preparatory elective course in any aforementioned subject. Freshman applicants, then, are required to take at minimum sixteen year-long courses during their high school career, eleven of which must be completed before the end of the eleventh grade in order to be eligible for admission.³

An additional requirement is that fifteen of the required courses for admission must be academic or preparatory courses approved by the University of California system. More specifically, for a course to satisfy A-G requirements, its initial approval hinges on whether or not the course is (1) academically challenging; (2) involves a substantial

¹ <http://regents.universityofcalifornia.edu/governance/policies/2103.html>

² http://www.csumentor.edu/planning/high_school/

³ In addition to A-G subject requirements, high school grade point average and standardized test scores from the ACT and/or SAT are additional measures of academic achievement both university systems draw on in determining applicants' admission eligibility.

amount of reading, writing, problems, and laboratory work; and (3) that the course demonstrates significant attention to analytical thinking, factual content, and the development of students' oral and listening skills.⁴ The A-G requirements, thus, reflect a concerted effort to ensure that students have developed essential critical thinking and study skills so that they can participate fully in their first-year program of study as well as "attained a body of general knowledge that will provide breadth and perspective to new, more advanced study."⁴

The rigor of A-G courses, however, likely differs across California; depending on where a student attends high school, the same course of study may amount to varying degrees of college preparedness. Generally, this variation may be due to factors such as the quality, preparation and experience of teachers, as well as the curriculum and pedagogy of instruction. In related research, we found that high school grade point average (GPA) does not indicate the same level of college preparedness for all students (Kurlaender & Jackson, 2015). This research indicates that while a 3.5 GPA in one high school may be associated with a very low likelihood of needing remediation at the CSU, students with a similar GPA in another high school may have a very high likelihood of needing remediation.⁵

Therefore, we explored California's A-G course requirements, looking specifically at who meets the A-G requirements and how that differs by key student characteristics. We also examined how A-G completion rates vary across California's public high schools and the relationship between schools' student body composition and A-G completion rates. Finally, we investigated how students who have met A-G course requirements fare upon application, admission and enrollment at a CSU campus.

Analysis of Student Data

To conduct this analysis, we leveraged two distinct datasets. As part of our partnership grant, the California Department of Education provided student-level data for the cohort of 12th graders in 2011-2012 ($n = 500,974$) enrolled in 2,881 public California schools.⁶ This dataset includes a binary indicator for whether or not each student met the A-G course requirements. We linked this dataset to individual student records of application, enrollment and academic performance at CSU. The data from CSU are available through a longstanding partnership with the CSU Chancellor's Office, aimed at better understanding college readiness throughout the state. With our merged data, we account for approximately 60% of first time freshmen enrolled in a CSU campus in fall 2012, and who graduated from California public high schools.

⁴ <http://www.ucop.edu/agguide/a-g-requirements/index.html>

⁵ See presentation on the Early Assessment Program for Policy Analysis for California Education (PACE) presentation, available at: <http://www.edpolicyinca.org/events/michal-kurlaender>

⁶ The dataset provided by California Department of Education includes 2881 unique schools serving 12th graders, which includes continuation, alternative, community day and special education schools.

What proportion of California seniors in the class of 2012 were identified as A-ready? And how does this indicator vary by key subgroups?

In the first part of our analysis, we explore the A-G completion rates across California schools. Statewide, 32% of 12th grade students in the 2011-2012 school year completed A-G requirements, a necessary (albeit not sufficient condition) for admission to either the University of California or California State University systems. The A-G completion rates vary substantially across a number of key student and school characteristics, leaving many students at a further disadvantage in their quest for admission to California's public four-year baccalaureate degree-granting institutions.

We observe substantial differences in A-G completion rates when examining student subgroups. Table 1 displays A-G completion rates by subgroups, including racial/ethnic subgroups, socioeconomic disadvantage, special education, and English Learners. Column A provides the composition of the 12th grade student enrollment across the state in 2011-2012.⁷ Column B reports the composition for the group of students who met A-G requirements and Column C provides the percent of each subgroup that met A-G requirements.

Table 1: A-G Completion Rates by Student Subgroup

	A	B	C
	12 th Grade Student Enrollment	Proportion of A-G Completers	Percent of Subgroup Meeting AG
Race/Ethnicity			
African American	7.8%	5.0%	20.7%
American Indian	0.8%	0.5%	19.8%
Asian	9.0%	17.4%	62.2%
Filipino	2.8%	4.2%	48.7%
Hispanic/Latino	48.8%	34.0%	22.4%
Pacific Islander	0.6%	0.5%	25.9%
White	28.6%	36.4%	40.8%
Multi-racial	1.5%	1.9%	40.4%
Socioeconomically			
Disadvantaged	64.7%	46.8%	23.3%
Special Education	11.3%	3.2%	9.3%
English Learners	19.9%	8.0%	13.0%

Only 23% of students from socioeconomically disadvantaged backgrounds met A-G requirements, compared to 49% of students from more affluent backgrounds. Similarly, only 9% of special education students and 13% of English Learners met A-G requirements compared to 35% of non-special education students and 37% of English fluent students. Disparities are evident when compared to students' representation in

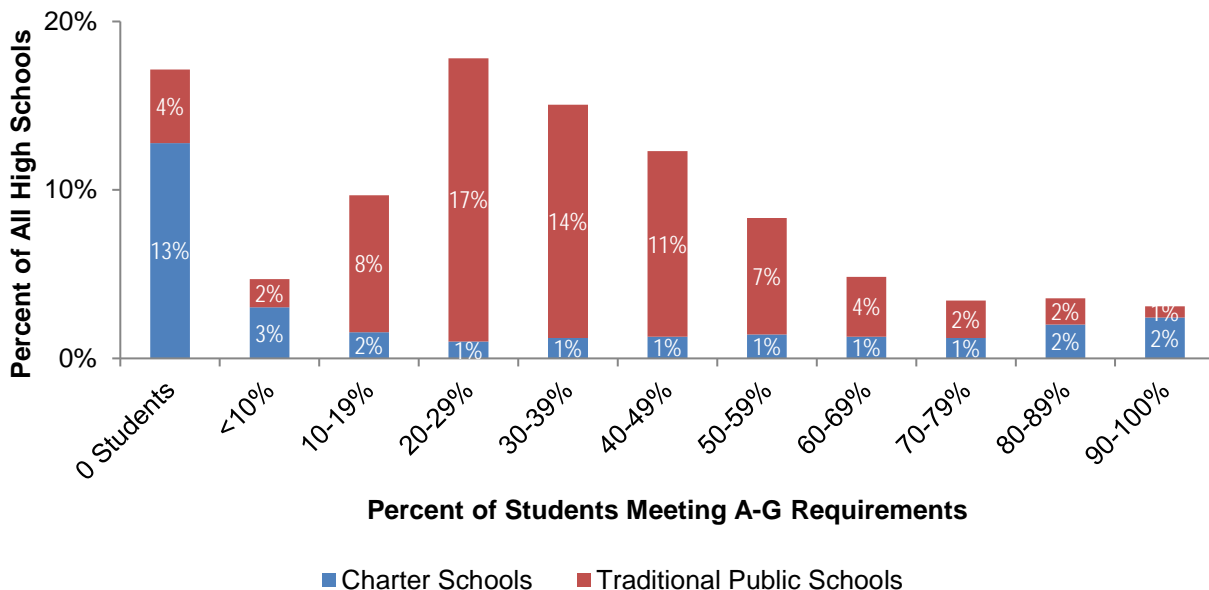
⁷ Percent of students in each subgroup was calculated using the data provided by CDE specific for this project, by aggregating individual student characteristics of 12th graders in 2011-2012.

the overall population. By student race, we note that Asian students, in particular, are over-represented among A-G completers, followed by White students, and that African American and Hispanic/Latino students are underrepresented among A-G completers, when compared to their overall representation in enrollment. In addition, although 65% of the overall 12th grade population was identified as socioeconomically disadvantaged, these students only make up 47% of 12th graders who met A-G requirements in 2011-12. Special education students account for 3% of the A-G completers; however, they represent 11% of all 12th grade students in 2011-12. Students who are English Learners make up 20% of the 12th grade student population, but only 8% of all students who met A-G requirements.

What is the distribution of A-G readiness across California high schools in 2012? And, how much does this measure vary by student characteristics within schools?

Completion rates also vary substantially across schools as shown in Figure 1. Seventeen (17%) of high schools report no students completed A-G requirements and 12 schools (3%) report 100% A-G completion rates.⁸ Almost half (49%) of all regular high schools have less than 30% of students who meet A-G requirements. In the remaining 23% of schools, more than 50% of students complete A-G requirements. Of the schools reporting that no students met A-G requirements, over three-quarters of the schools are charter schools.

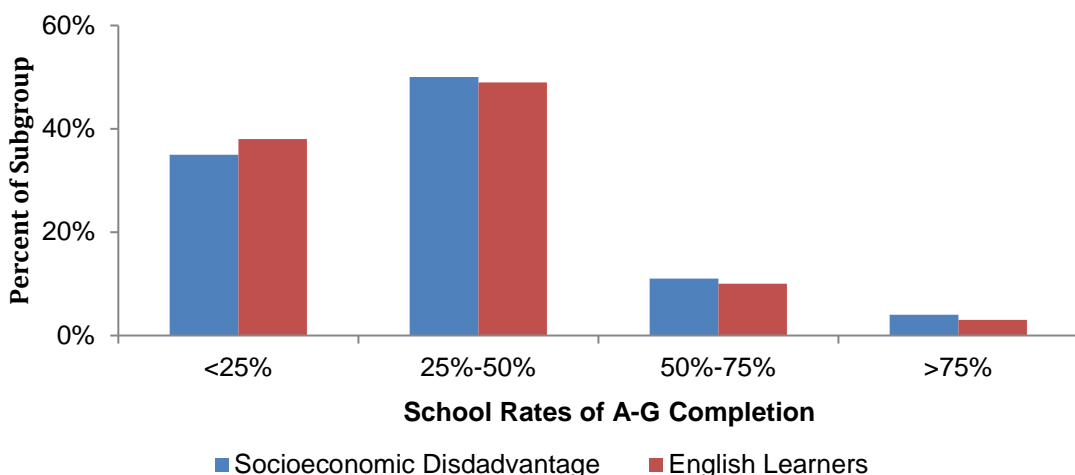
Figure 1: Distribution of School-Level A-G Completion Rates



⁸ The dataset provided by California Department of Education includes 2881 unique schools serving 12th graders. For our analysis of variation across schools, we limit the dataset to 1487 regular high schools and K-12 schools that serve 12th graders using the public schools database.

The differences in school-level completion rates are, in part, related to the subgroup differences described above. As depicted in Figure 2, English Learners and students from socioeconomically disadvantaged backgrounds are concentrated in schools with lower A-G completion rates. Further, a concentration of certain subgroups is correlated with A-G completion rates. For example, a 10 percentage point increase in the proportion of socioeconomically disadvantaged students in a school is correlated with a 2.9 percentage point decrease in the number of students who complete A-G requirements. Similarly, a 10 percentage point increase of special education students or English learners is associated with a 2.7 percentage point decrease in number of students meeting A-G requirements.

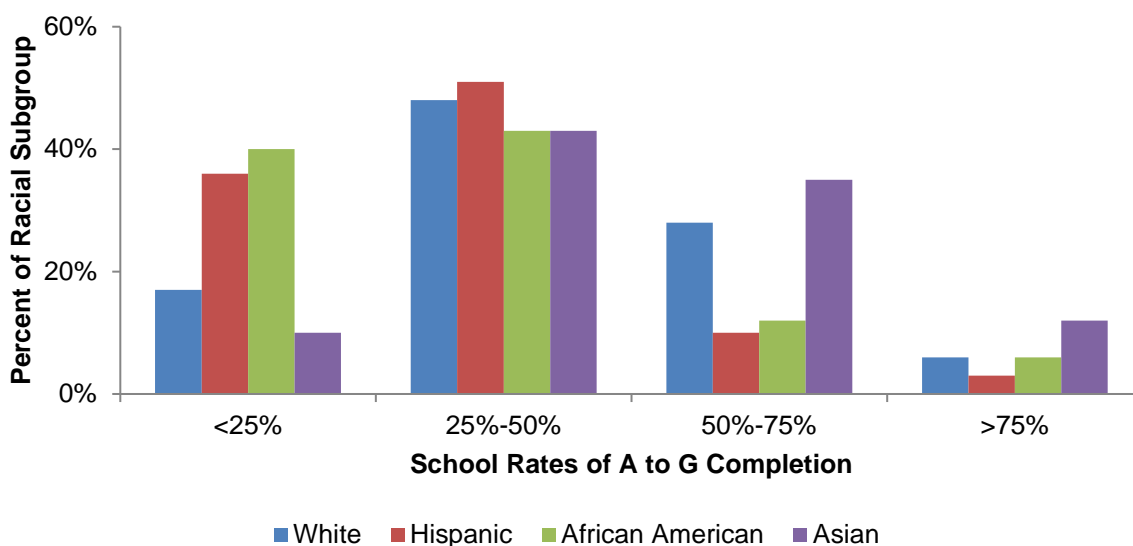
Figure 2: Percent of Socioeconomically Disadvantaged Students and English Learners Attending Schools with Varying A-G Completion Rates



Analysis shows that concentration of students by racial/ethnic group is also related to A-G completion rates. Each 10 percentage point increase of African American or Hispanic students enrolled in a given school is correlated with a 1.6 percentage point lower rate of students meeting A-G requirements. Conversely, each 10 percentage point increase of White or Asian students at a school is correlated with a 1.7 percentage point higher rate of students meeting A-G requirements. This is largely a function of the high association between racial/ethnic and socioeconomic composition of the school, where the percent of African American and Hispanic students is correlated with the percent of socioeconomically disadvantaged students ($r = .714$).

Thus, as depicted in Figure 3, a greater proportion of Hispanic/Latino and African American students attend schools with low rates of A-G completion, whereas a greater percentage of White and Asian students attend schools with higher rates of A-G completion.

Figure 3: Percent of Students in Each Racial Category Attending Schools with Varying A-G Completion Rates



How do students who have met A-G course requirements fare at CSU?

Completing A-G course requirements is considered an indicator of college readiness. Yet, many first time college enrollees from California’s public high schools are in need of remediation. To better understand this indicator, we examine the relationship between A-G completion and students’ need for remediation in the CSU system, as well as first term performance at a CSU campus.

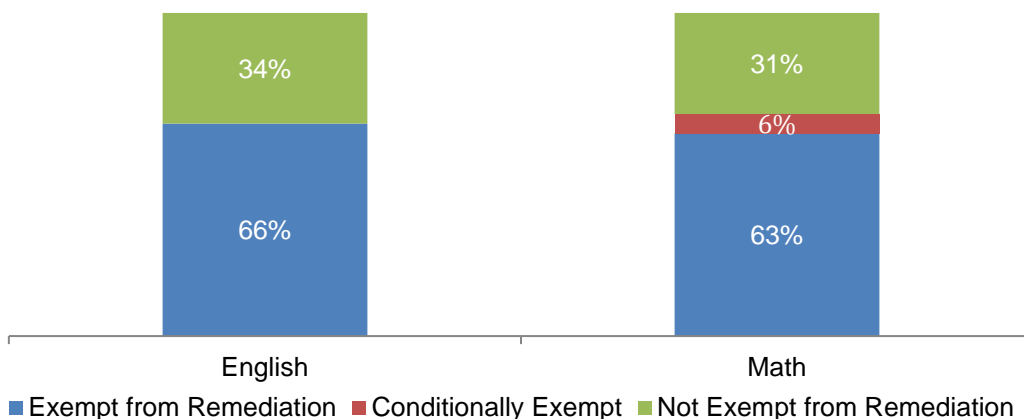
While A-G course completion is a requirement for admission, CSU determines a student’s need for remediation based on performance on a range of assessments, rather than A-G completion. That is, CSU identifies college readiness with indicators other than successful completion of the A-G courses. Students must demonstrate their readiness for college level work (i.e. be exempt from remedial coursework) based on satisfactory scores on one of the following assessments: ACT or SAT, AP test, or Early Assessment Program (EAP) (now part of the SBAC assessments), or CSU placement exams in English and mathematics respectively.

Despite completing A-G requirements, 40% of students were unable to demonstrate college readiness in English, and 44% were unable to demonstrate college readiness in math, through scores on acceptable assessments while in high school (i.e. ACT, SAT, AP, EAP). Therefore, these students participated in the English Proficiency Test and/ or the Entry Level Mathematics assessment prior to enrollment at CSU.

After all of these are accounted for, 66% of 2012 high school graduates who met A-G requirements were deemed proficient, and exempt from remediation, in English language arts and 63% were considered proficient in math at the time of application (Figure 4). An additional 6% were considered conditionally exempt in math, which is

based on EAP scores in 11th grade and requires the documented completion of specific 12th grade coursework prior to CSU enrollment. Importantly, these proficiency rates indicate 34% of California public high school students who meet A-G requirements were still identified as in need of remediation in English language arts and at least 31% were deemed not college ready in math.

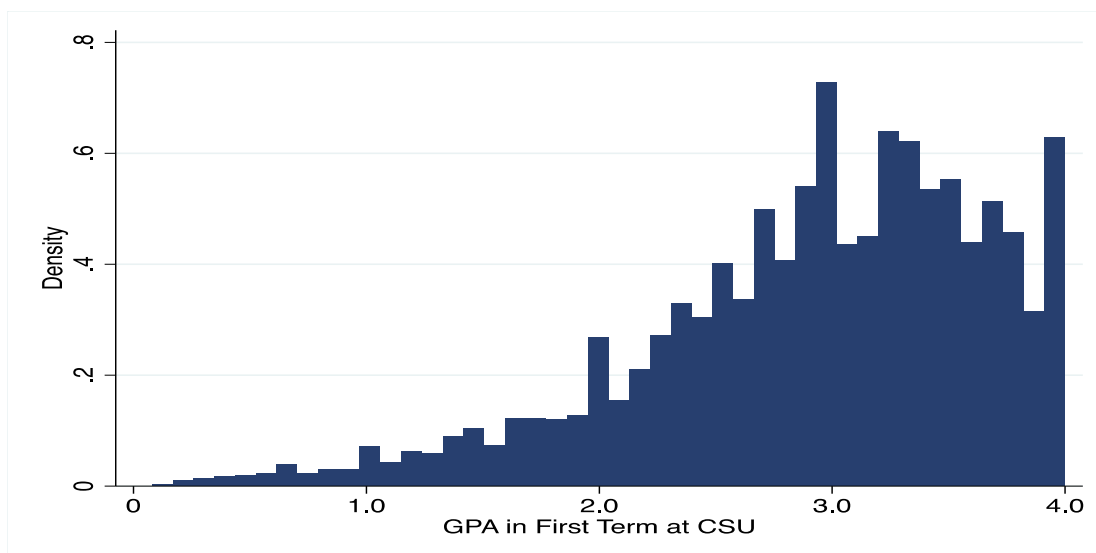
Figure 4: Percent of Students Exempt and Not Exempt from Remediation at CSU at Application



Although the majority of students satisfy their remediation requirements in the first year at CSU, these courses are costly to both institutions and students, reducing credit bearing course loads and increasing time to degree. Some students are not able to remediate in the first year; a full year after initial enrollment at a CSU, 5% of students who met A-G in high school, but were identified as needing remediation at entry, are still in need of remediation.

In addition to investigating the relationship between A-G and the need for college remediation, we examine student performance in college, specifically students' grade point average (GPA) in their first term of enrollment. As depicted in Figure 5, more than half of all students (51%) who met A-G requirements in high school and subsequently enrolled in a CSU earned a 3.0 or above. An additional, 37% of students earned between a 2.0 and 3.0 GPA. Yet, 12% of students who demonstrated college readiness through A-G course requirements earned below a 2.0 GPA during their first term in college.

Figure 5: GPA during First Term at CSU for Students Meeting A-G Course Requirements in High School



Conclusion

For many, A-G completion signifies a level of rigor in college readiness and an opportunity for a college education. Yet, A-G completion rates are not the same for all students. Completion rates vary greatly across California's public high schools. In fact, A-G completion may be a function of the school one attends. Nearly a quarter of schools serving 12th graders report that no (or very few) students complete A-G course requirements, indicating the possibility that not all students have the opportunity to enroll in and successfully complete a rigorous course of study in high school. A-G completion rates are also associated with the composition of the student body. Students from disadvantaged backgrounds and non-White and non-Asian racial/ethnic groups disproportionately attend schools where A-G completion rates are low, further indication of limited opportunities and persistent opportunity gaps.

Even when students complete A-G course requirements, not all are prepared for college-level work. About 40% of graduates from California public high schools who met A-G requirements and subsequently enrolled in a CSU were required to participate in college entrance exams because they were unable to demonstrate college readiness on other acceptable assessments. Further, after reviewing standardized assessment scores and college entrance exams, CSU deemed 34% of students who met A-G requirements as needing remediation in English and at least 31% in math. This is clearly an indication of the potential misalignment in college readiness indicators between K-12 and postsecondary systems of education, and signals an important opportunity to assess the merits and disparities of California's longstanding A-G pathway.

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