

Project 1: SAT and ACT scores analysis

By Andrew Chia – SG DSI 23

Background of Project

Who am I?

Education policy advisor to State Government of California in 2020

California State

- Highest population state (~39.5 million, ~12% of US population)^[1].
- **~420,000** high school students graduated every year^[2].

Problem: Only **63%** of these students able to enroll into college.^[3]

Task:

- To look for ways to increase college enrollments.
 - One aspect is to improve the **college admission test** results of students.



[1] US Census Bureau, Quick Facts <https://www.census.gov/quickfacts/CA>

[2] US National Center for Education Statistics https://nces.ed.gov/programs/digest/d16/tables/dt16_219.20.asp

[3] Where California High School students attend college, Policy Analysis for California Education <https://edpolicyinca.org/sites/default/files/Statewide%20NSC%20Report%20Final%20Online.pdf>

Background of Project

College Admission Test

Most California schools enrolled their students in taking SAT test (63% of schools)^[1] and/or ACT test (23% of schools)^[2].



Problem statement:

Project aims to identify insights from graduated students' performance in the 2019 SAT and ACT tests. And hence to provide recommendations to government to improve college admission test results of students, so as to improve the college enrollment rates.

[1] 2019 SAT Scores by State <https://blog.prepscholar.com/average-sat-scores-by-state-most-recent>

[2] 2019 ACT Scores by State <https://blog.prepscholar.com/act-scores-by-state-averages-highs-and-lows>

SAT Test

- There are 2 subjects to be taken^[1]:

Subjects	Score Range	SAT College and Career Readiness Benchmarks
Evidence-based Reading and Writing (ERW)	200 - 800	480
Math	200 - 800	530
Total	400 - 1600	1110

SAT College and Career Readiness Benchmark:

- Students with scores \geq benchmark scores will have a 75% chance of earning at least a C in 1st semester in college for credit bearing courses.^[2]
- **Meaning:** For **graduating (Year 12) students** have scores of **both** subjects \geq benchmarks,
-> They are college-ready, more likely to be accepted into college.

For **county** with higher % of Year 12 students have scores of both subjects \geq benchmarks, the county is likely to have more students made it to college, and vice versa.

[1] Inside the SAT test, <https://collegereadiness.collegeboard.org/sat/inside-the-test>

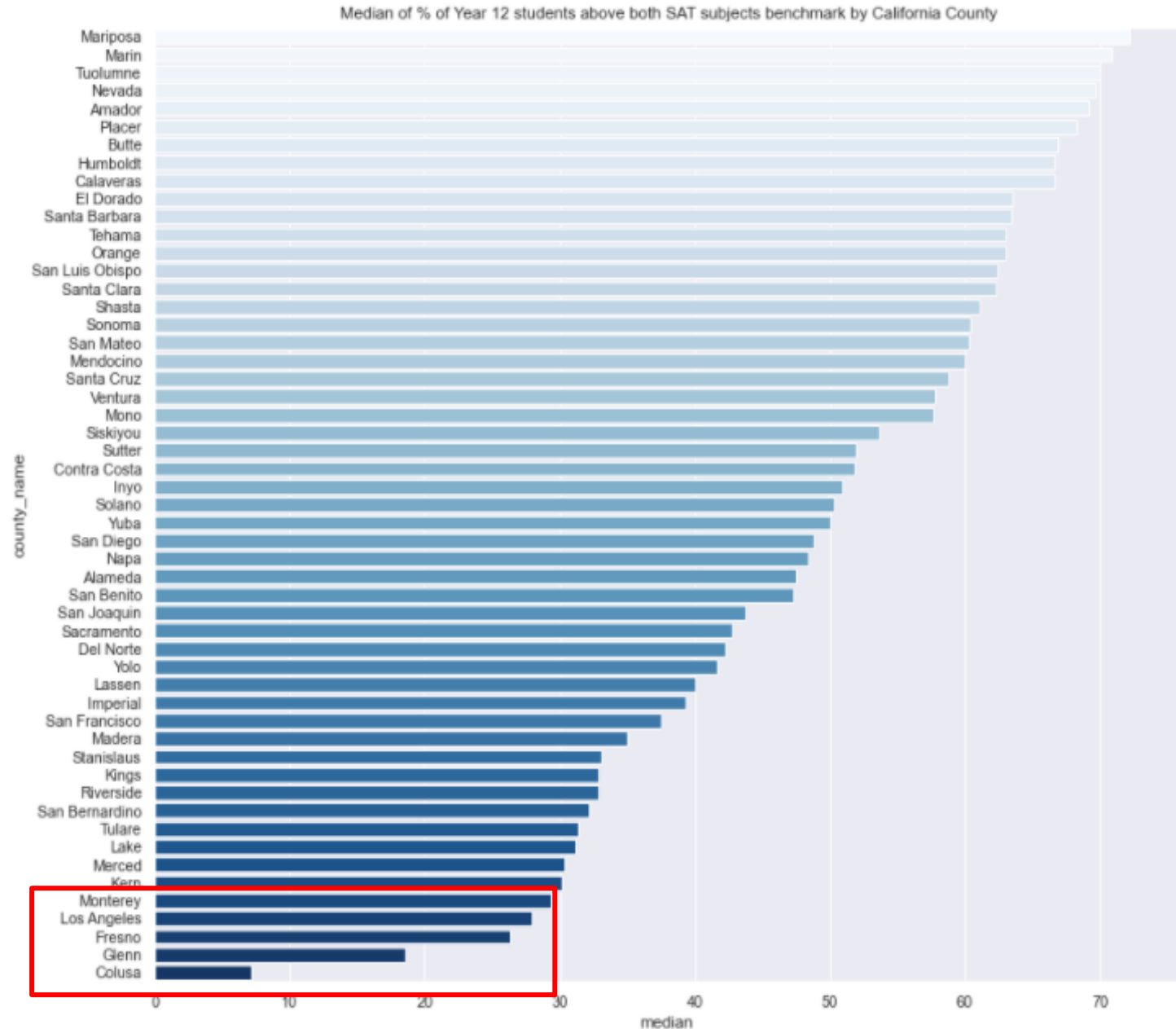
[2] SAT College and Career Readiness Benchmarks <https://collegereadiness.collegeboard.org/about/scores/benchmarks>

*ERW Benchmark for Year 12 Students: 480
*Math Benchmark for Year 12 Students: 530

SAT Test (County Analysis)

- Among the 53 counties in California, the **bottom 5 counties** in terms of **median %** of Year 12 students achieving scores above benchmarks for both subjects:

- Colusa - 7.1%
- Glenn – 8.5%
- Fresno – 26.3%
- Los Angeles – 27.9%
- Monterey – 29.3%



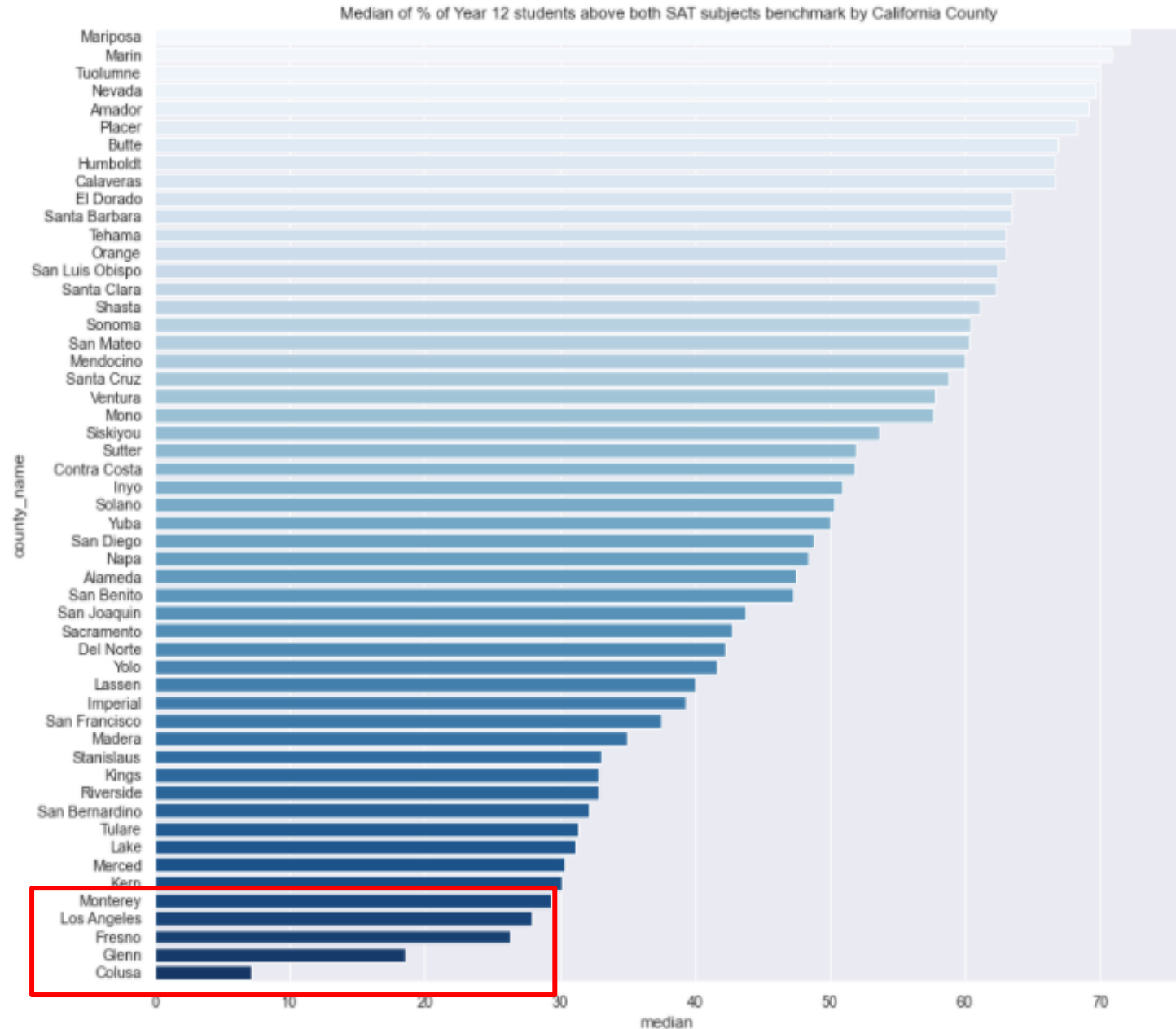
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Recommendations:

1. Focus on allocating more and higher quality teaching resources to these 5 counties in **urgent need**.



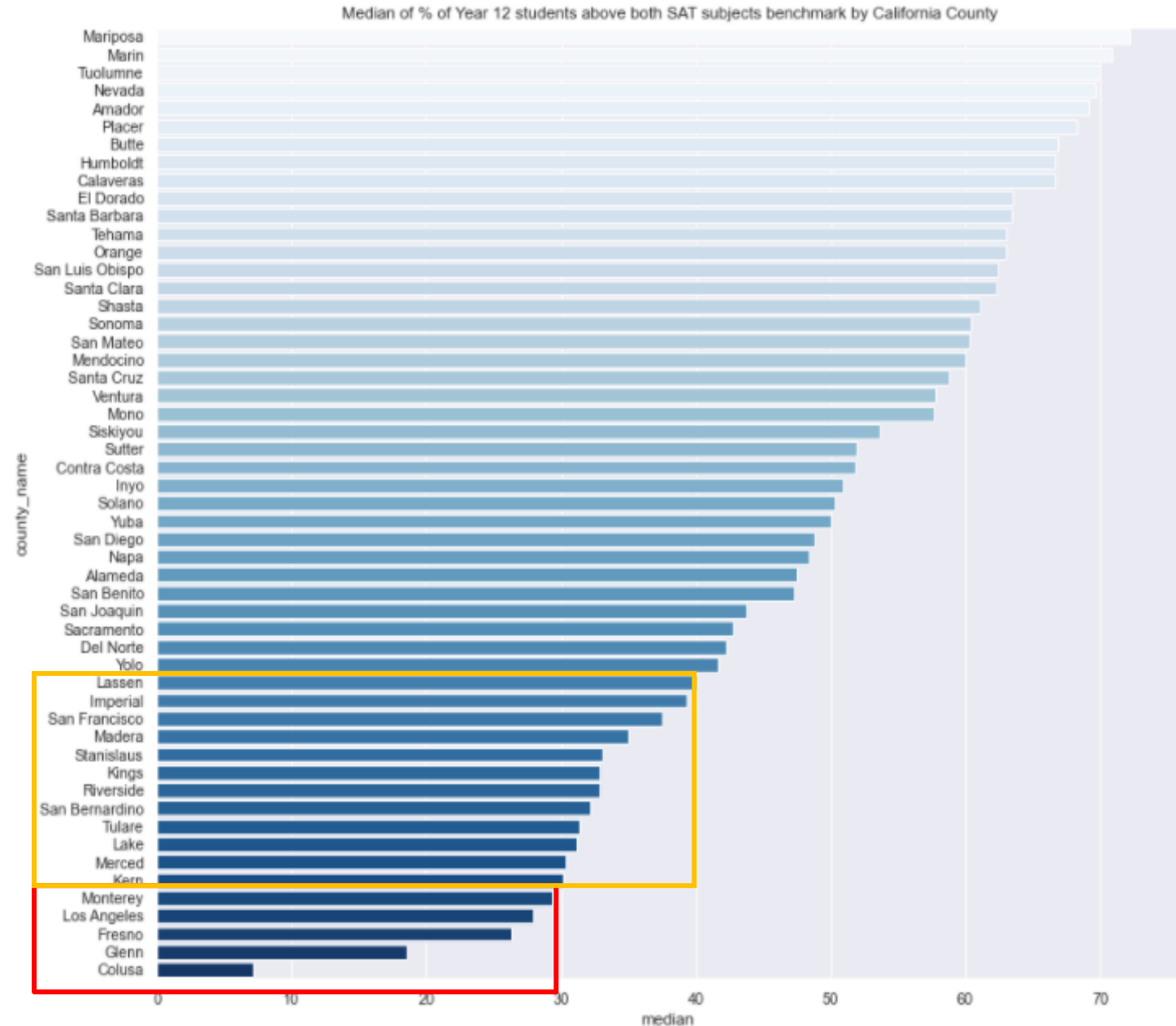
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2. If there are additional teaching resources, the government can also focus on the next **12 counties** which have 30-40% of median % of Year 12 students achieving scores above benchmarks for both subjects.



SAT Test (Subject Analysis)

Which subject's teaching resources should government be providing to Year 12 students?

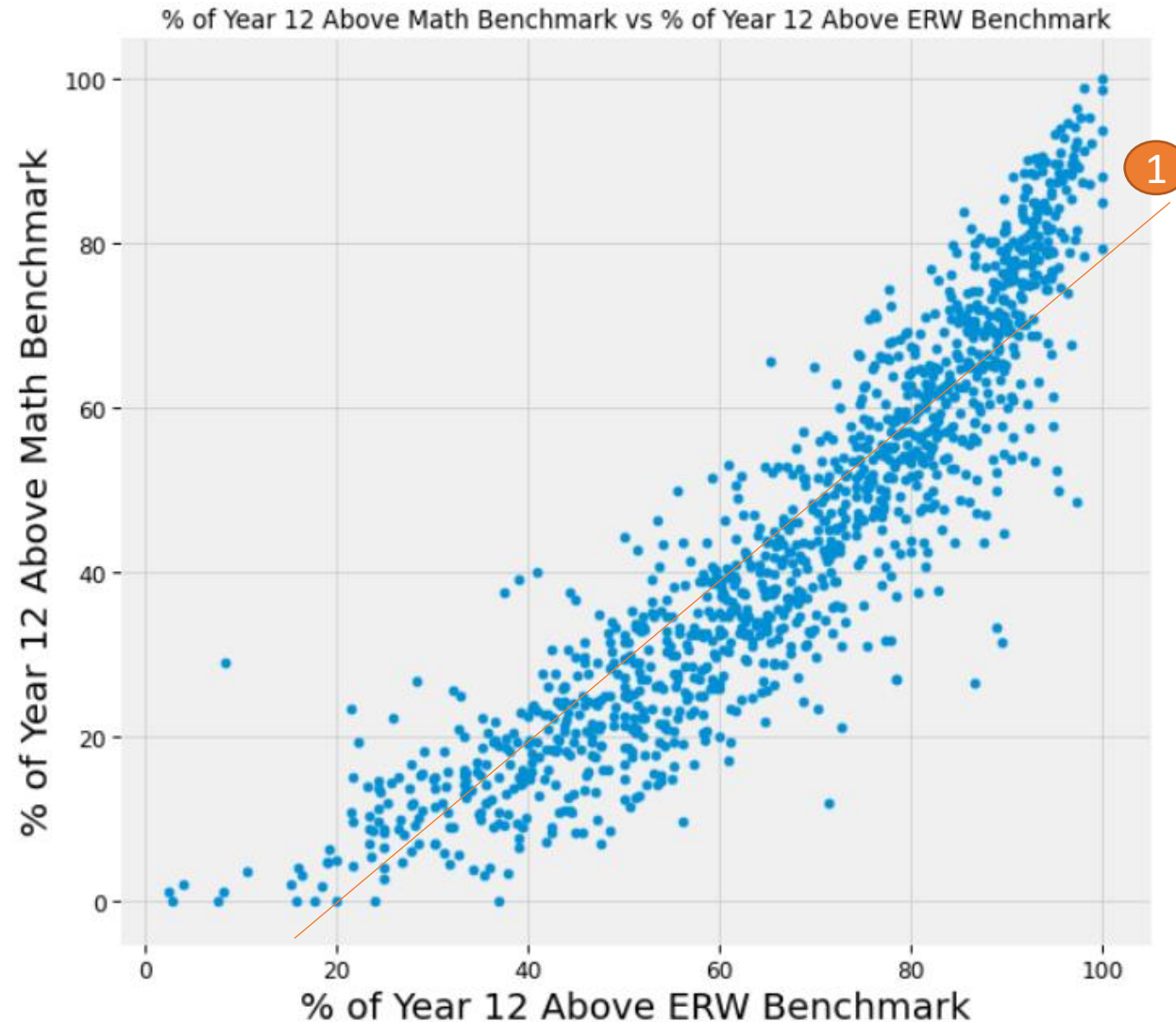
- 1 Based on a correlation study between % of Year 12 above **math** benchmark vs % of Year 12 above **ERW** benchmark, there is a **strong +ve linear** correlation ($r=0.91$), indicating that students with weak ERW background could possibly have weak Math background as well.

Recommendation

1. For students in need, the state will need to provide additional and higher quality teaching resources for both Math and ERW.

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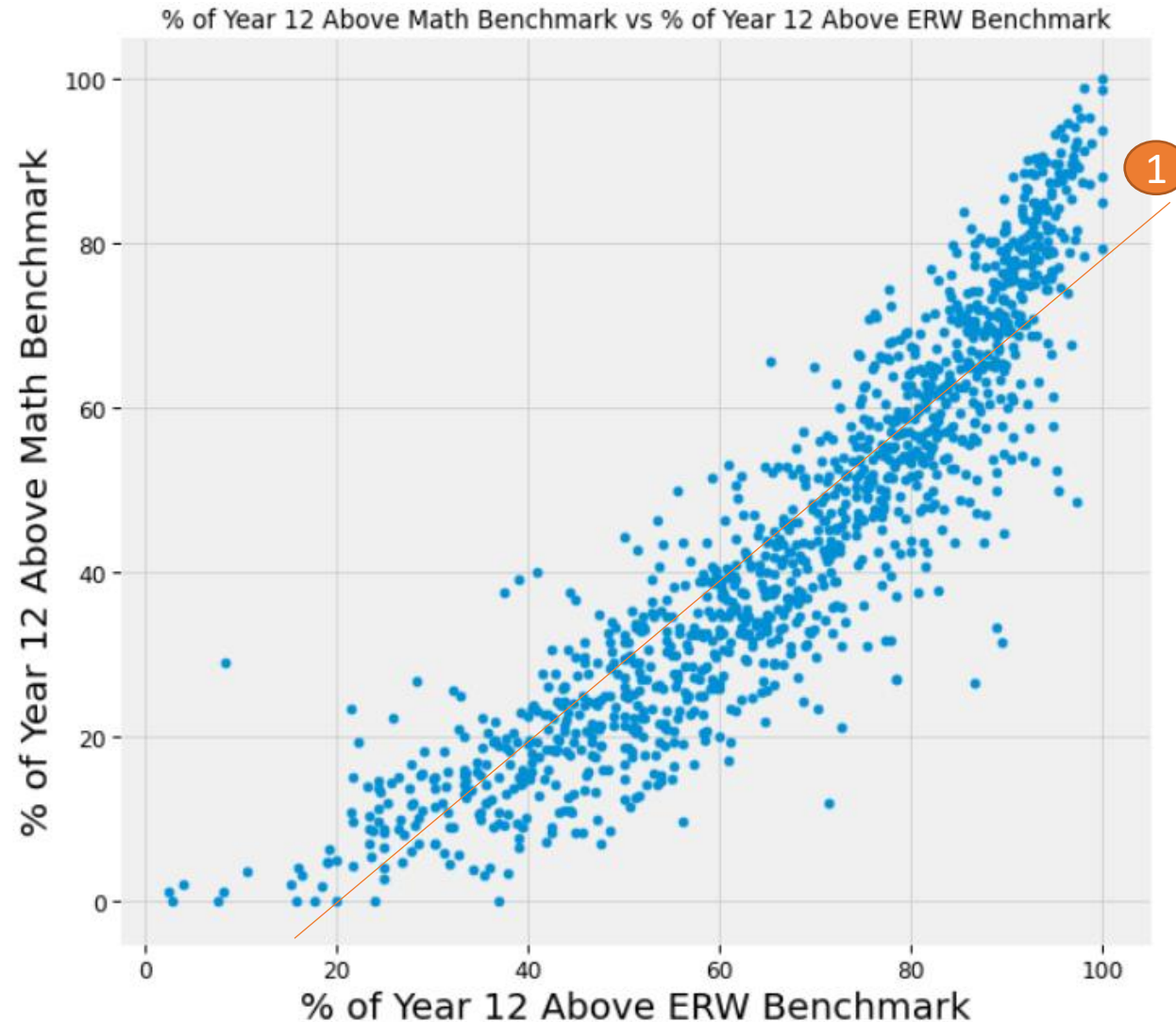
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- 2 % of Year 12 above benchmark for Math subject is always smaller than % of Year 12 above benchmark for ERW, suggesting that students are weaker in Math.

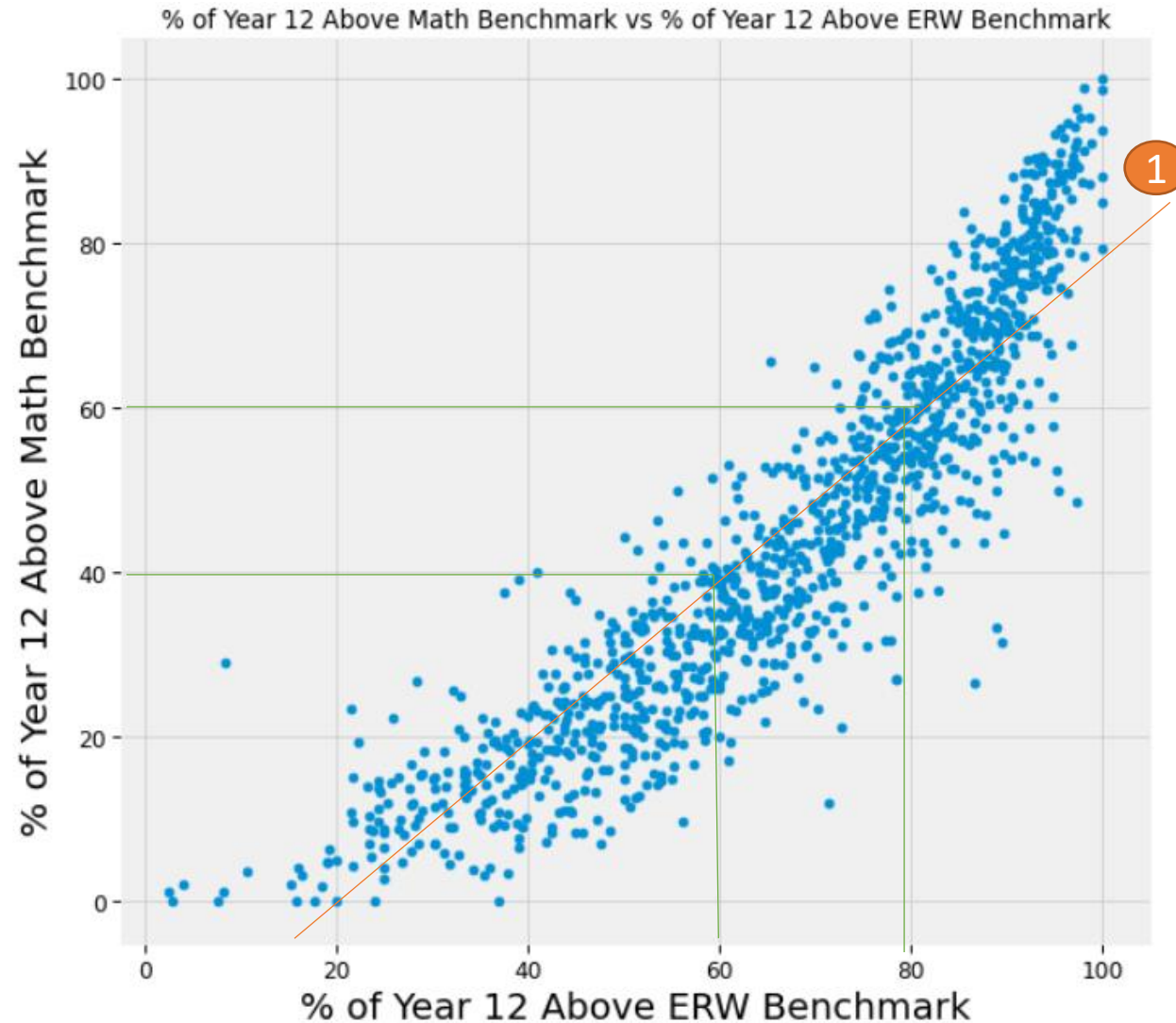
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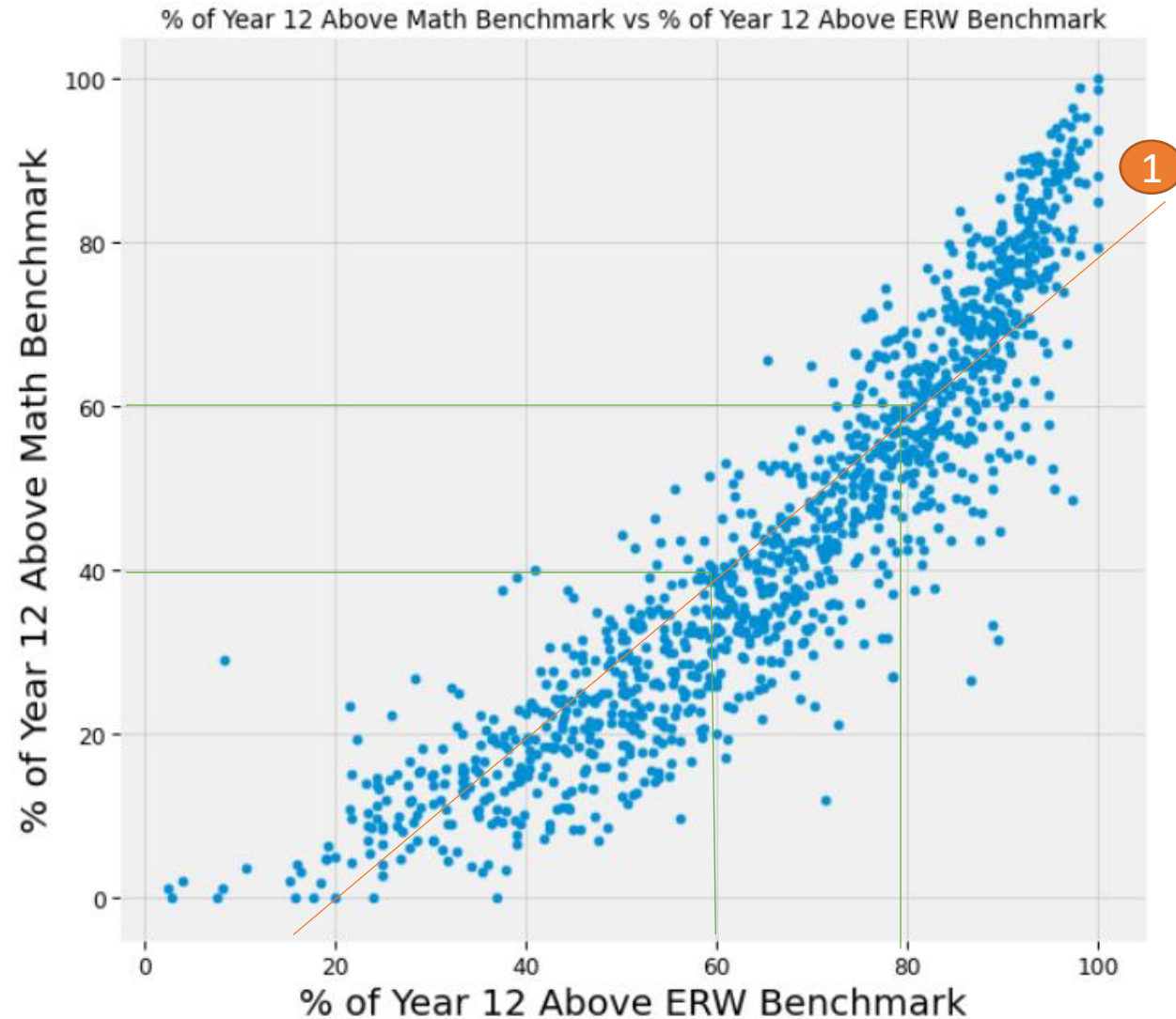
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ACT Test

- There are 4 subjects to be taken in ACT Test^[1]:

Subjects	Score Range (corresponds to percentile that compares within test takers)	Composite Score
English	1 - 36	Average Score of these 4 subjects
Math	1 - 36	
Reading	1 - 36	
Science	1 - 36	

- **Composite score = 21** is at the **50th percentile** of all test takers.^[2]
- Meaning: For **students** having composite scores of ≥ 21 ,
=> indicating student belongs to 50th percentile & above in cohort, and is more ready for college,
and more likely be accepted into college.

For **county** with higher % of students have composite scores ≥ 21 ,
more students fairs better, and more students is likely to made it to college, and vice versa.

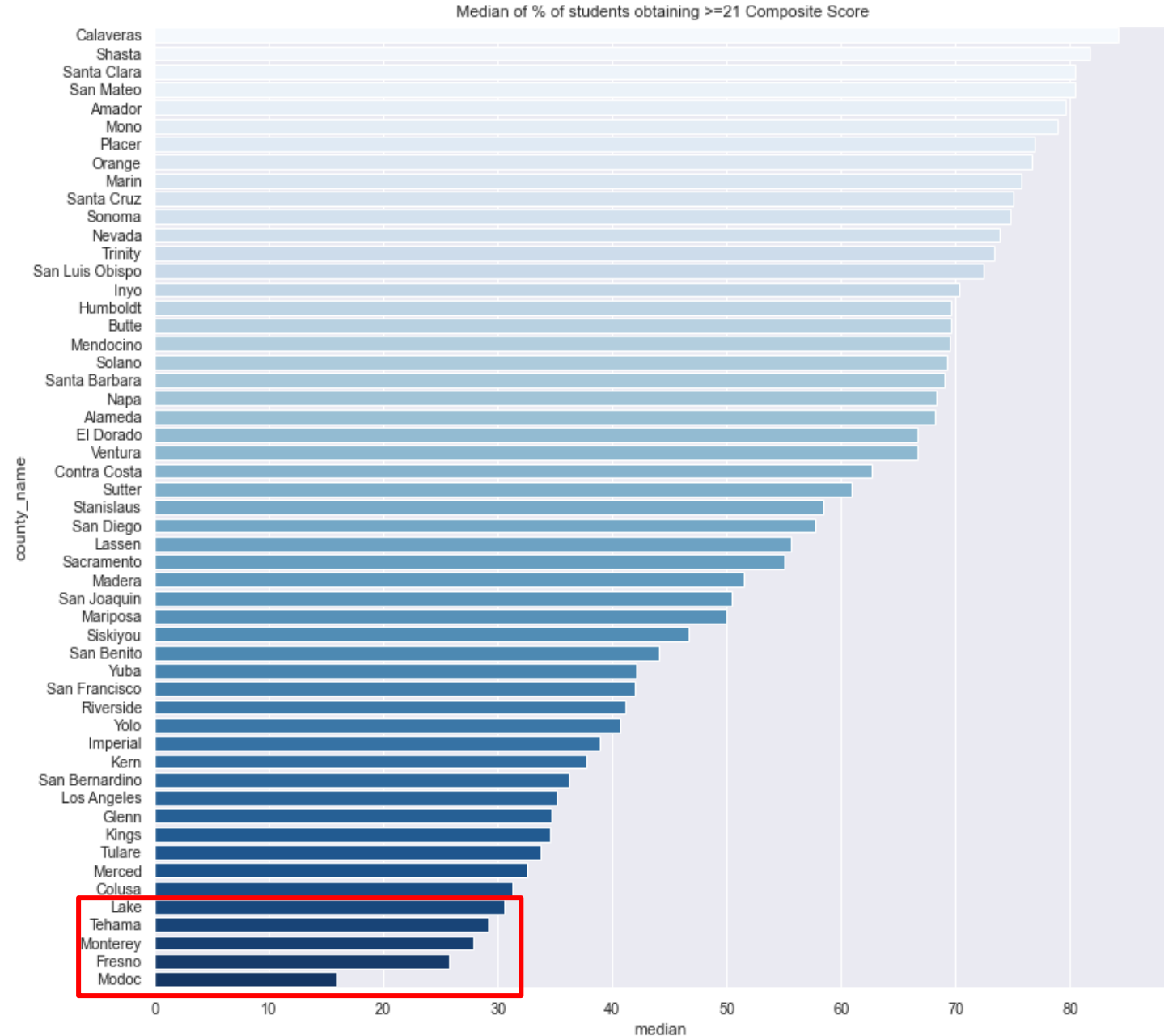
[1] ACT Understanding your scores <https://www.act.org/content/act/en/products-and-services/the-act/scores/understanding-your-scores.html>

[2] What is a good ACT score? A bad ACT score? An excellent ACT score? <https://blog.prepscholar.com/what-is-a-good-act-score-a-bad-act-score-an-excellent-act-score>

ACT Test (County Analysis)

- Among the 53 counties in California, the **bottom 5 counties** in terms of **median** % of students obtaining ≥ 21 composite scores:

- Modoc – 15.8%
- Fresno – 25.7%
- Monterey – 27.9%
- Tehama – 29.2%
- Lake – 30.6%



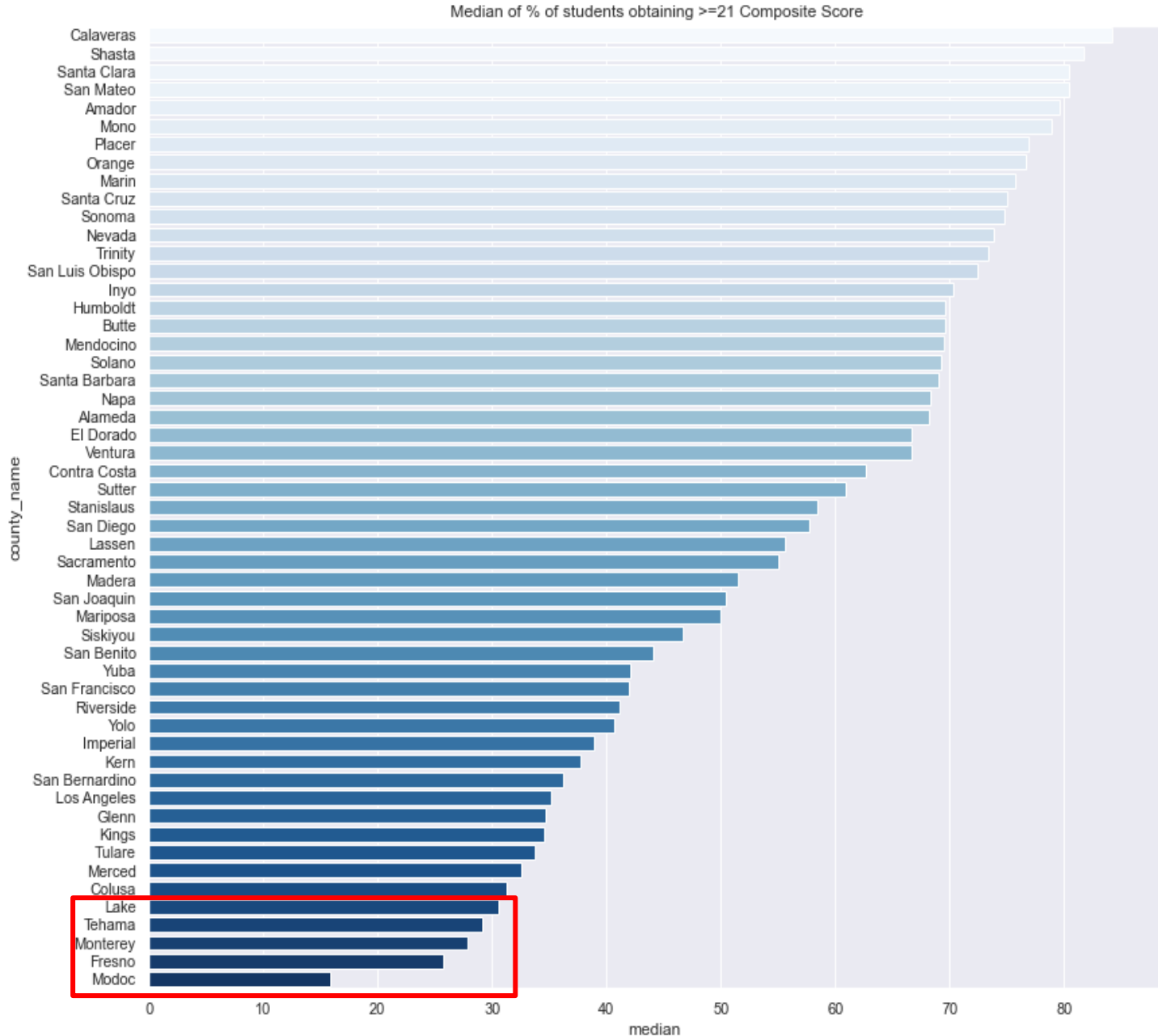
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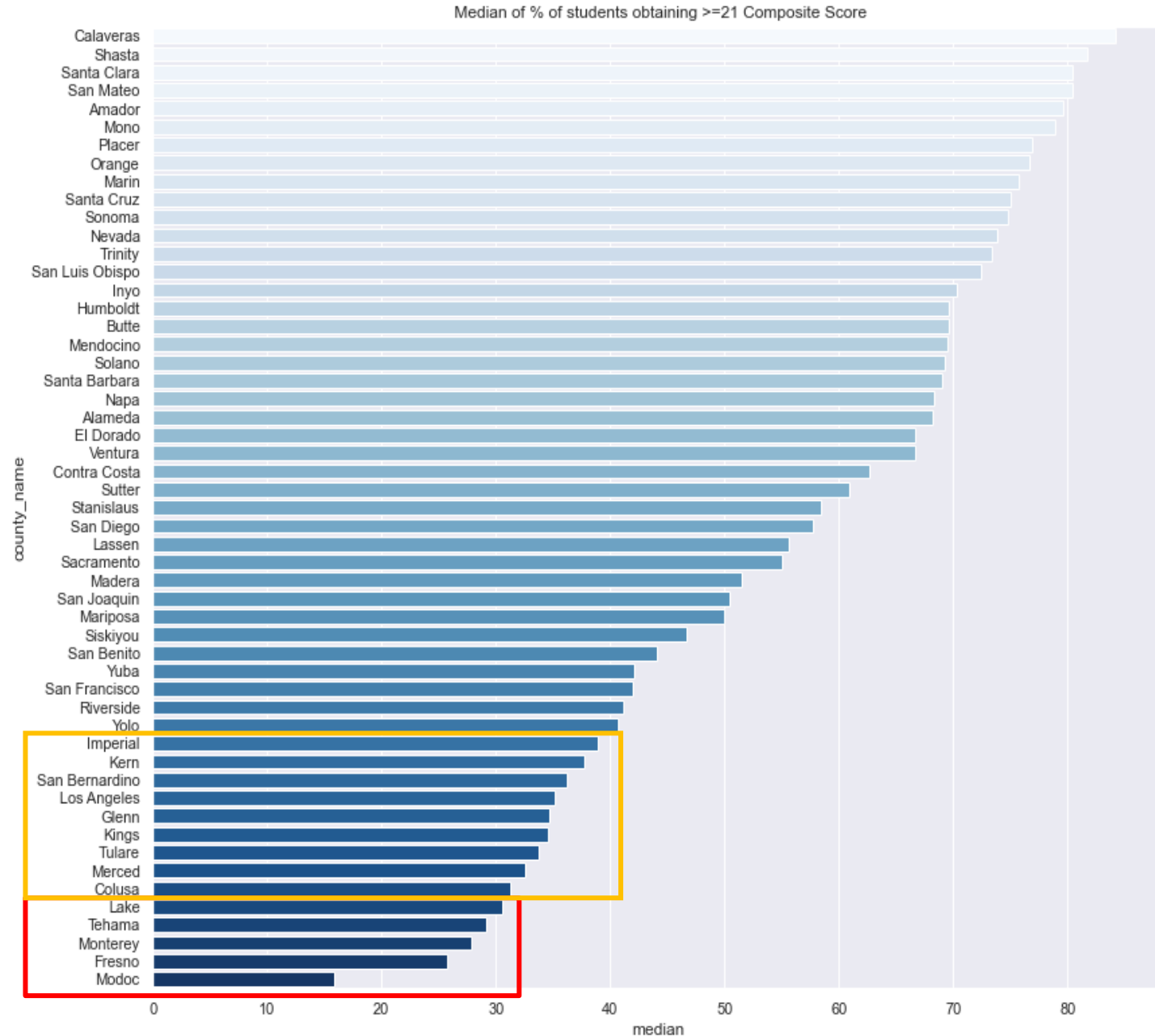
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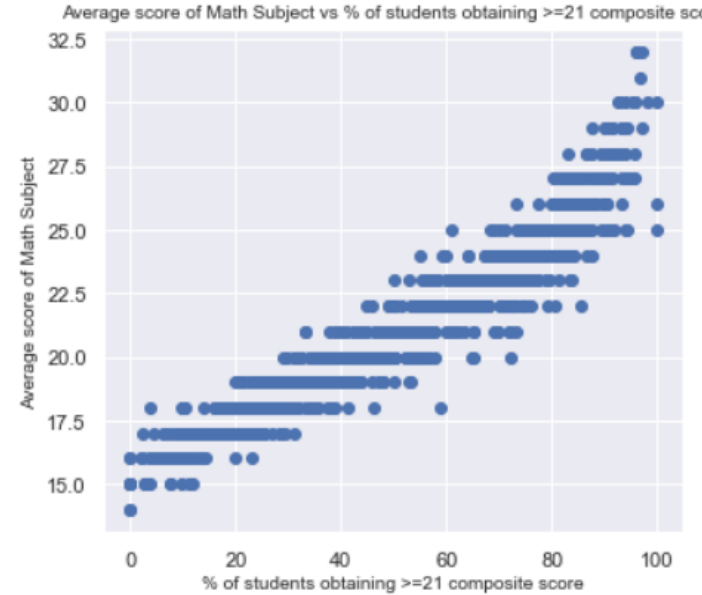
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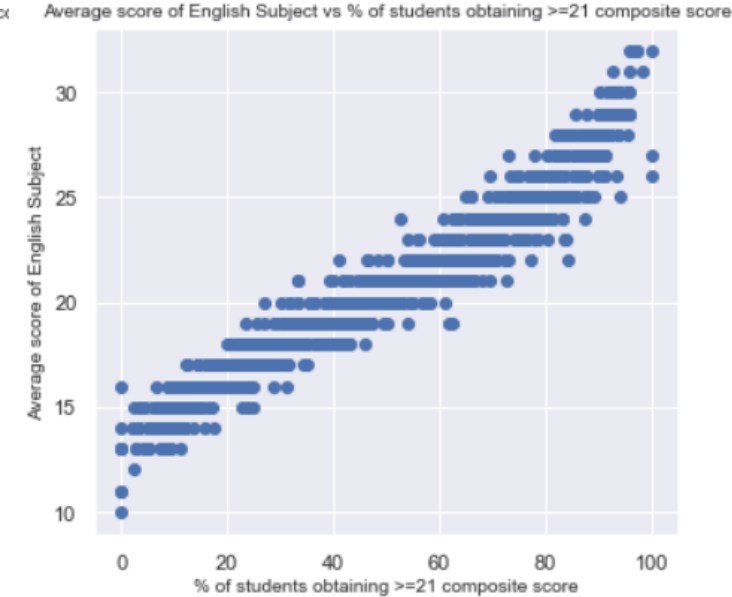
ACT Test (Subject Analysis)

- The charts on the right are relationship of each subject's average score with the % of students obtaining ≥ 21 composite score.
- All 4 subjects shows strong +ve linear correlation to % of students obtaining ≥ 21 composite score, suggesting that to increase the % of students obtaining ≥ 21 composite scores, all the 4 subjects are equally important.

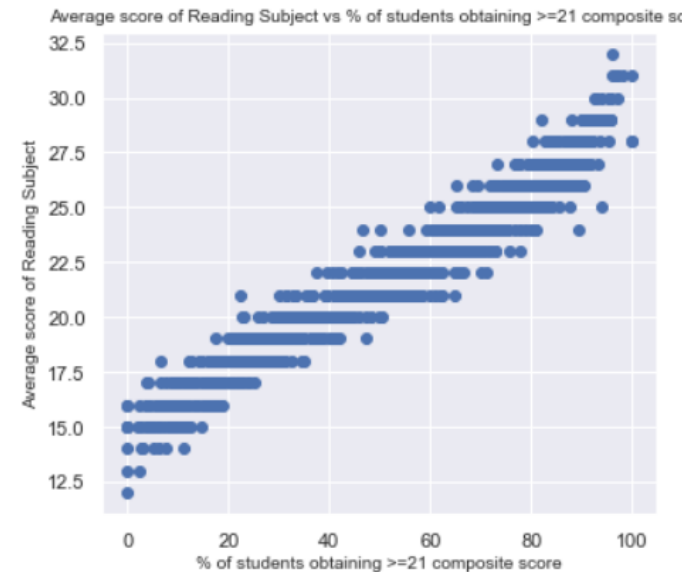
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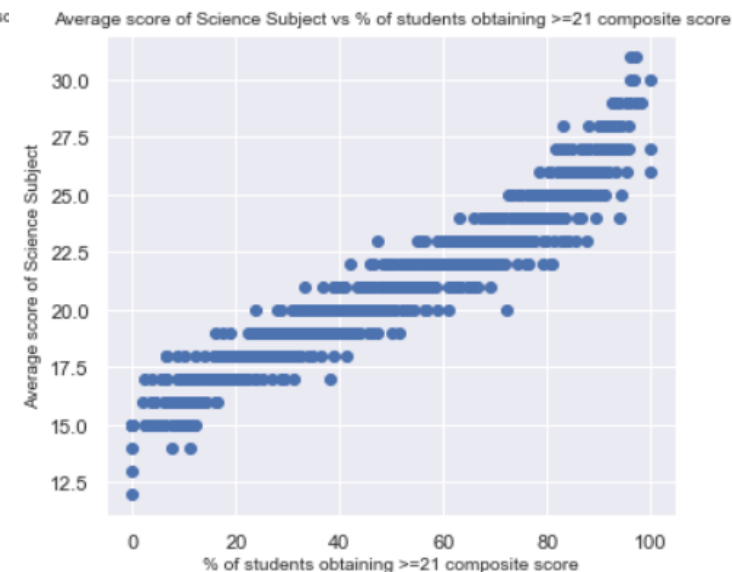
English



Reading



Science



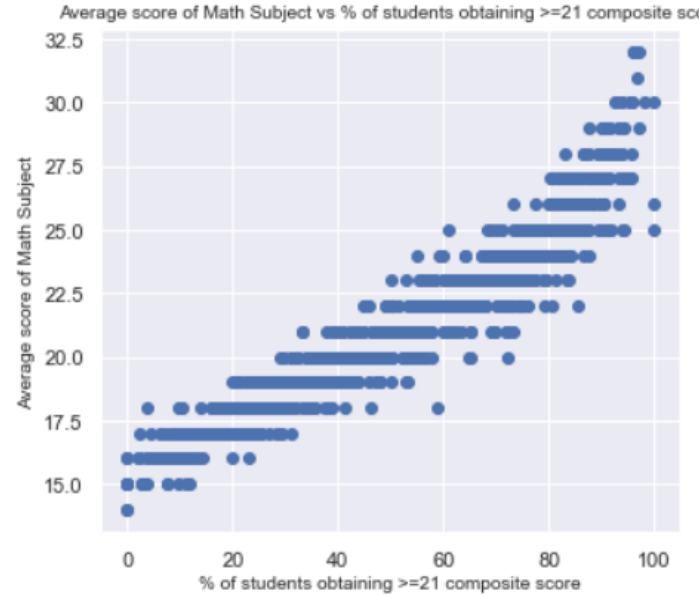
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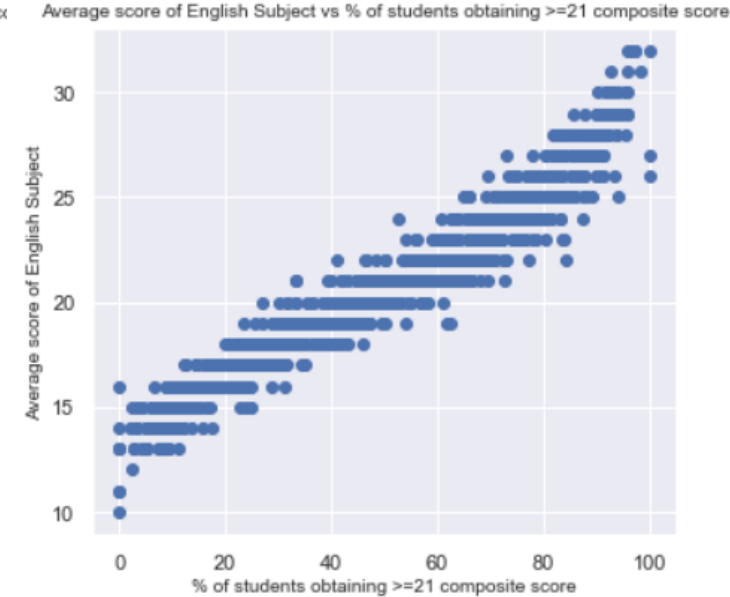
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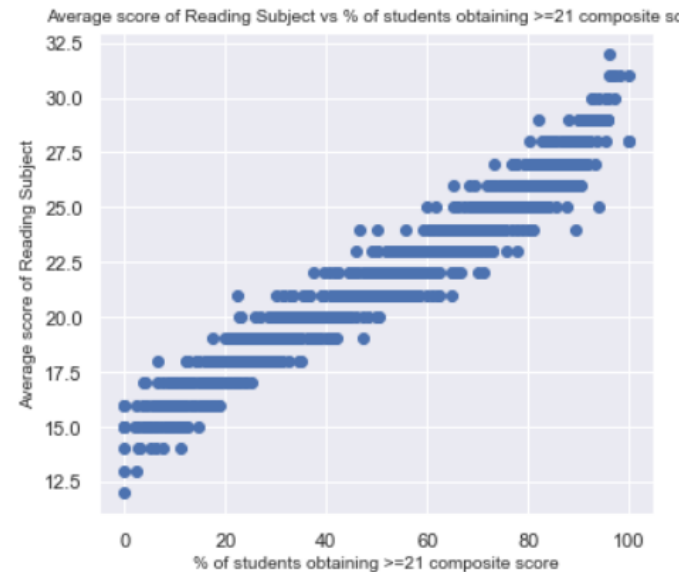
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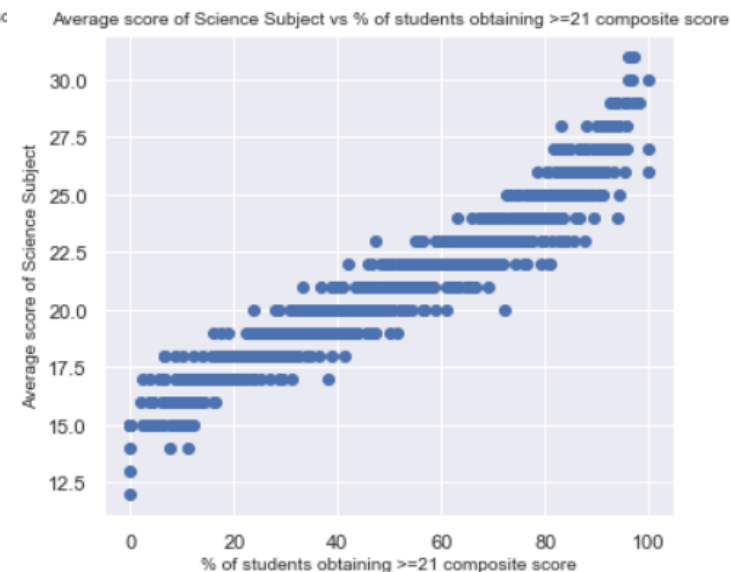
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Reading



Science



Conclusion & Recommendations

To improve college enrollment rate in California:

- Can improve the college admission test results of students.

SAT Test

1. Government can focus on allocating more and higher quality teaching resources to the bottom 5 counties in SAT performance, namely Colusa, Glenn, Fresno, Los Angeles and Monterey.
2. For students in need, the state will need to provide additional or higher quality teaching resources for both Math and ERW subjects.
3. Throughout the state, government need to improve quality of current teaching resources in Math.

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2. For students in need, the state will need to provide additional or higher quality teaching resources for all 4 subjects (Math, English, Reading, Science).

Thank you!