



GA-DSIF2: Group 4

Trends in SAT & ACT 2017 - 2019 Analysis

Scope

1. Introduction - Problem Statement
2. Geographical Area
3. Data Cleaning
4. Observations
 - a. Northeast Region
 - b. Midwest Region
 - c. South Region
 - d. West Region
5. Final Recommendations
6. Conclusion
7. References

Introduction - Problem Statement

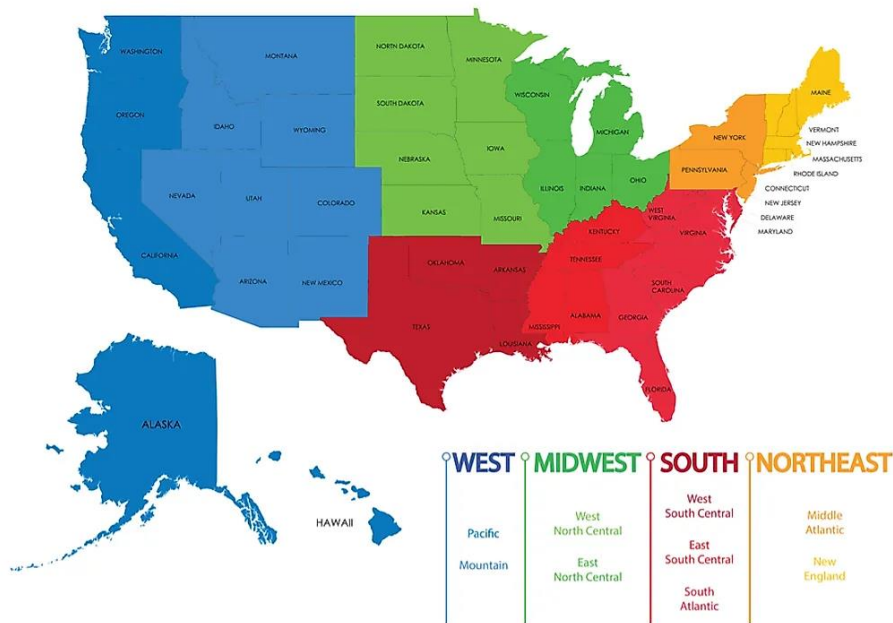
- As employees of the College Board, we are part of a team that tracks statewide participation and recommends where money will be best spent to improve SAT participation rates

Since the introduction of the new format of SAT released in March 2016, levels in multiple states have changed. This project aims to explore trends in SAT and ACT participation for the years 2017 - 2019 and seeks to identify:

- **A state that would be best recommended for College Board fund investment to boost SAT participation rates**
 - The analysis will be split into the **four relevant regions** in the USA (**Northeast, Midwest, South & West**) and conclude with an overall recommended state



Geographical Coverage



1

Northeast:

- Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania

2

Midwest:

- Ohio, Michigan, Indiana, Wisconsin, Illinois, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas

3

South:

- Delaware, Maryland, Virginia, West Virginia, Kentucky, North Carolina, South Carolina, Tennessee, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas, and Oklahoma

4

West:

- Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, California, Oregon, Washington, Alaska, and Hawaii

Data Cleaning

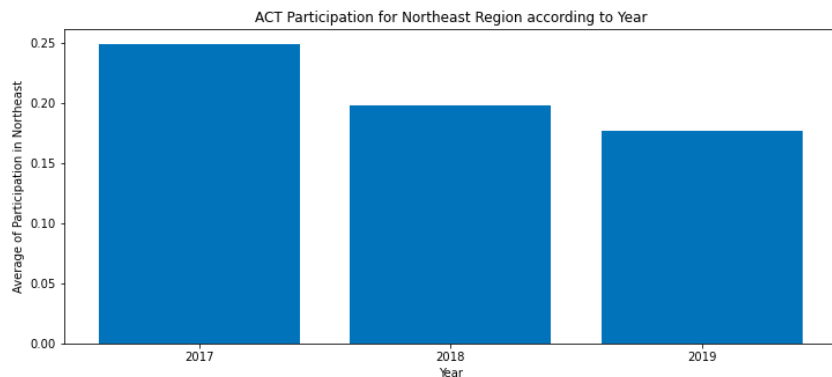
S/N	Action	Dataset	Remarks
1	Fix error in Composite Score, Wyoming to 20.2	act_2017.csv	Composite score = sum of all subjects / len(subjects)
2	Fix error in Science results, Maryland	act_2017.csv	Minimal score was 2.3 which does not reflect an accurate Composite score of 23.6
3	Drop state 'National' row	act_2017.csv act_2019.csv	'National' is not a state of America
4	Drop state 'Puerto Rico' and 'Virgin Islands' rows	sat_2019.csv	'Puerto Rico' and 'Virgin Islands' are not states of America
5	Drop duplicated row state 'Maine'	sat_2018.csv	Duplicated rows of Maine in Dataset
6	Fix error in Math results, Maryland	sat_2017.csv	Minimal score for subject is 200 but data indicates 52, Total - EBRW = Math score

Northeast Region

2017 Northeast ACT Participation: 0.25

2018 Northeast ACT Participation: 0.20

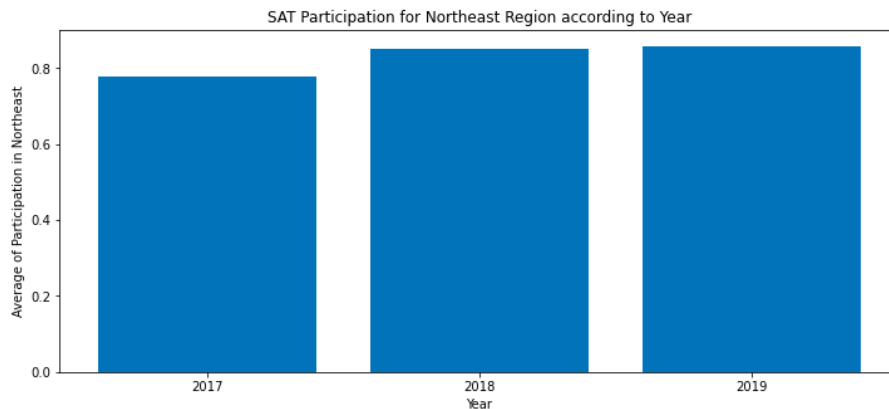
2019 Northeast ACT Participation: 0.18



2017 Northeast ACT Participation: 0.77

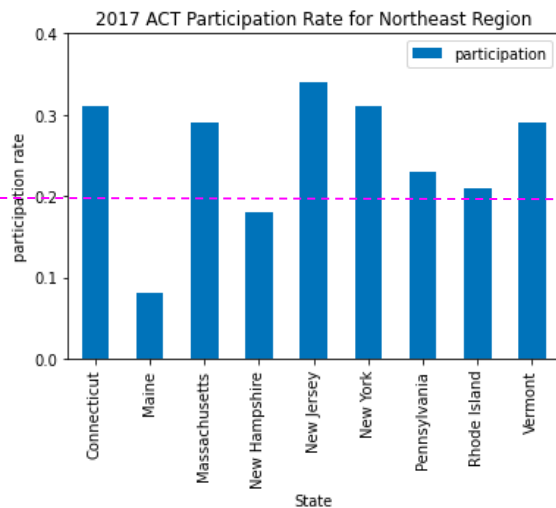
2018 Northeast ACT Participation: 0.85

2019 Northeast ACT Participation: 0.86

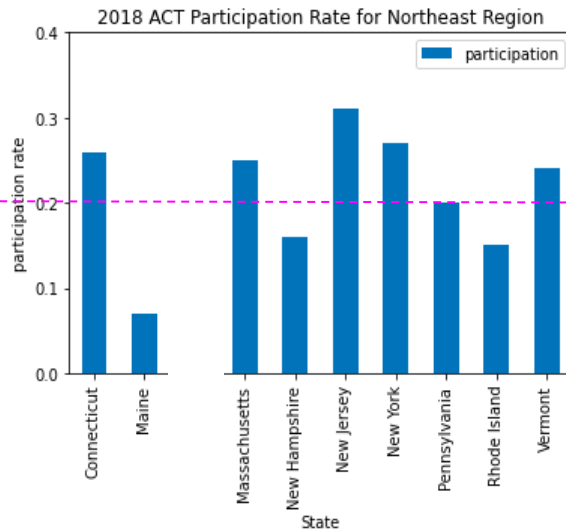


Northeast Region: ACT Participation (9 states)

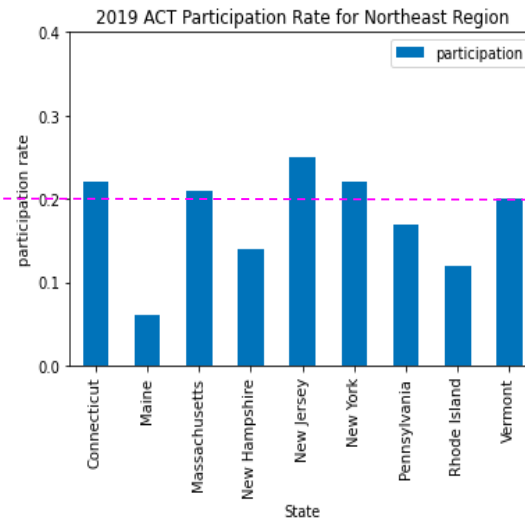
7 states



5 states

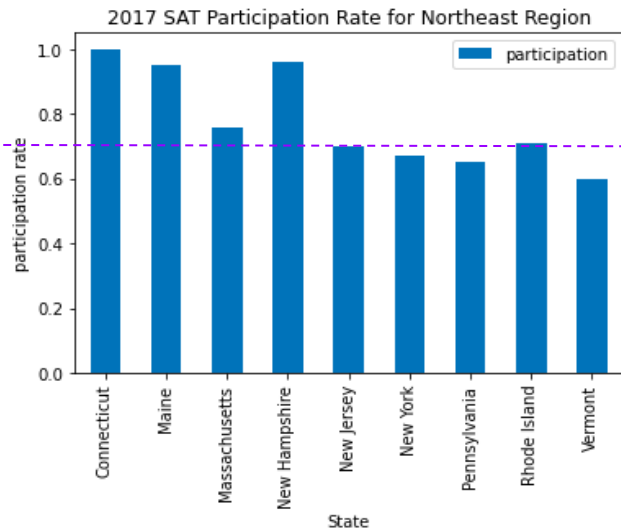


4 states

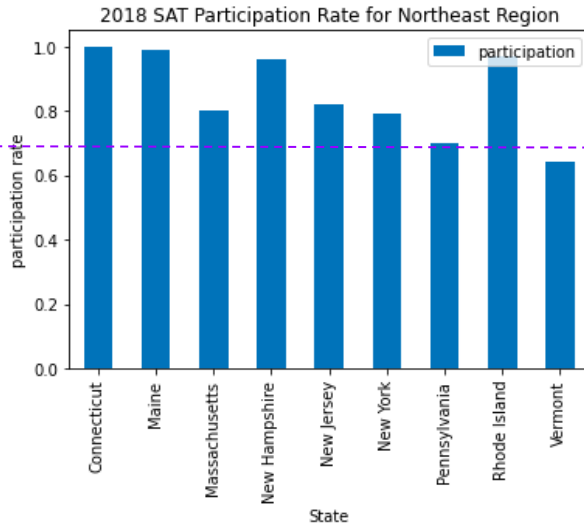


Northeast Region: SAT Participation (9 states)

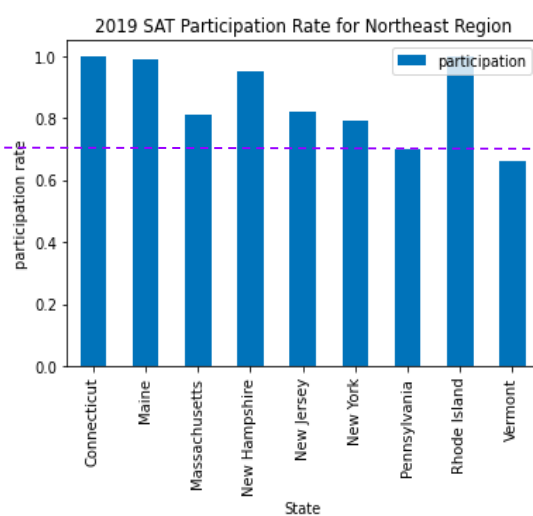
4 states



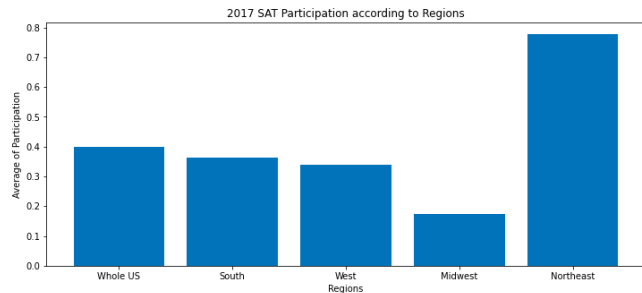
7 states



7 states



Northeast Region



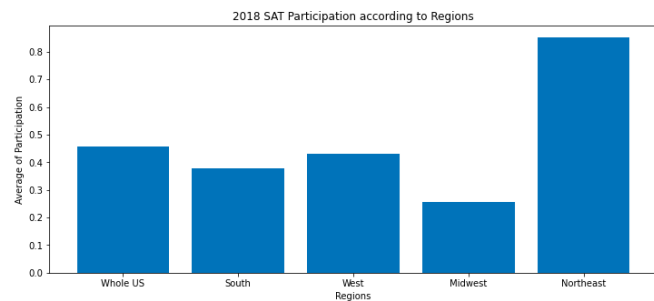
2017 SAT Participation: 0.40

South 2017 SAT Participation: 0.36

West 2017 SAT Participation: 0.34

Midwest 2017 SAT Participation: 0.17

Northeast 2017 Participation: 0.78



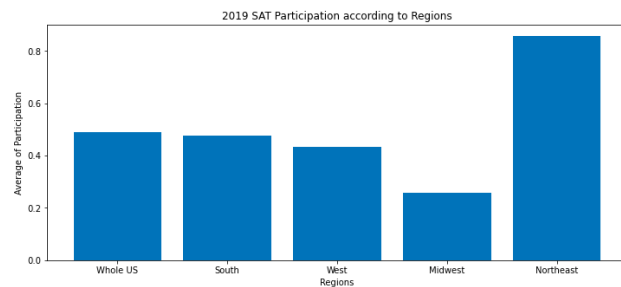
2018 SAT Participation: 0.46

South 2018 SAT Participation: 0.38

West 2018 SAT Participation: 0.43

Midwest 2018 SAT Participation: 0.26

Northeast 2018 Participation: 0.85



2019 SAT Participation: 0.49

South 2019 SAT Participation: 0.48

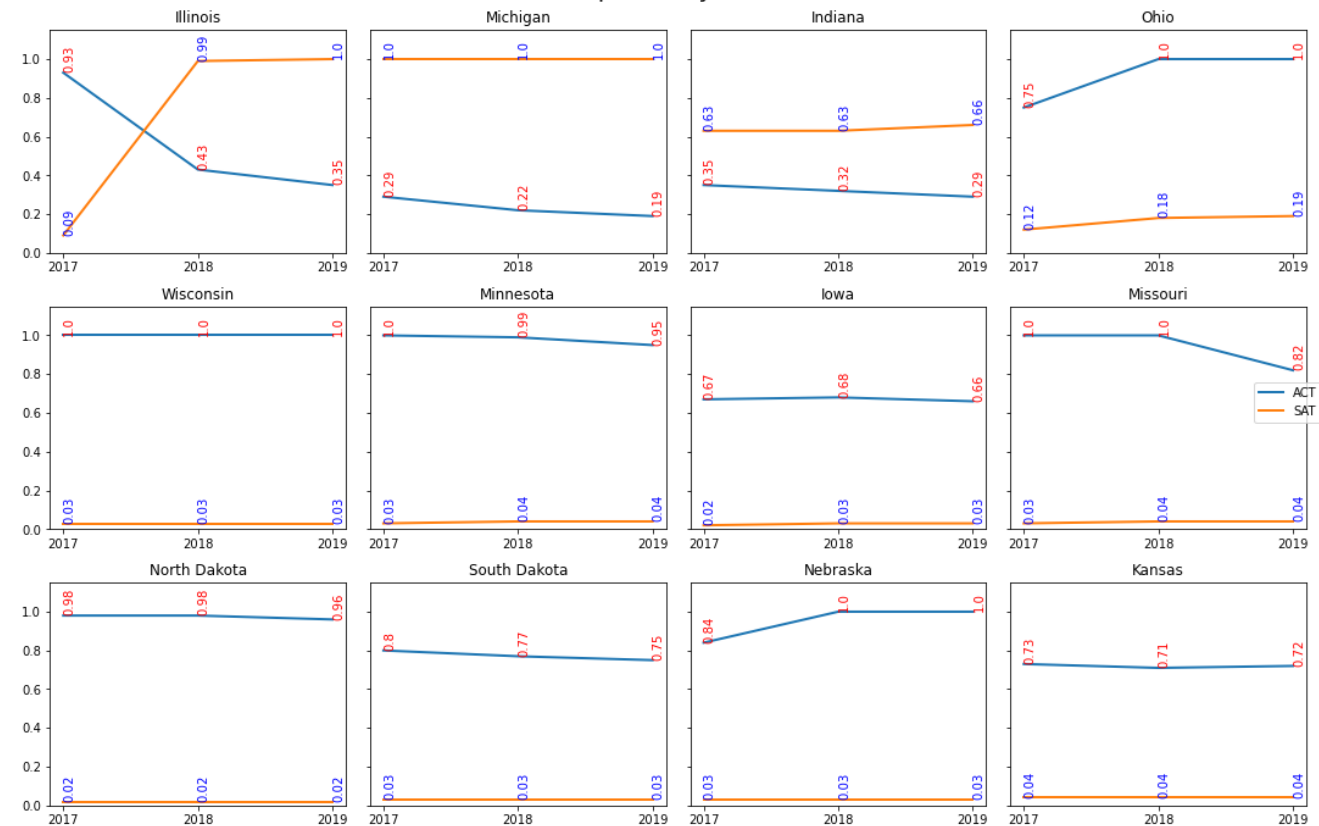
West 2019 SAT Participation: 0.43

Midwest 2019 SAT Participation: 0.26

Northeast 2019 Participation: 0.86

Midwest Region

ACT & SAT Participation by Midwestern States



Highest Participation (Mean 2017 - 2019)

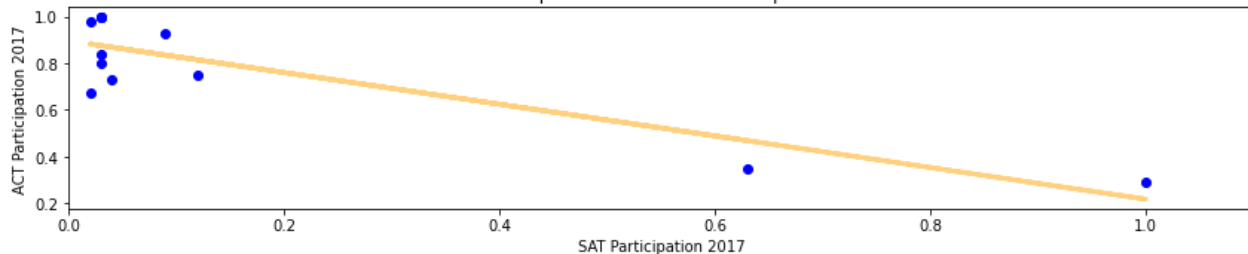
ACT	SAT
1. Wisconsin (100%)	1. Michigan (100%)
2. Minnesota (98%)	2. Illinois (69%)
3. N. Dakota (97%)	3. Indiana (64%)
4. Nebraska (95%)	4. Ohio (16%)
5. Missouri (94%)	5. Kansas (4%)

Lowest Participation (Mean 2017 - 2019)

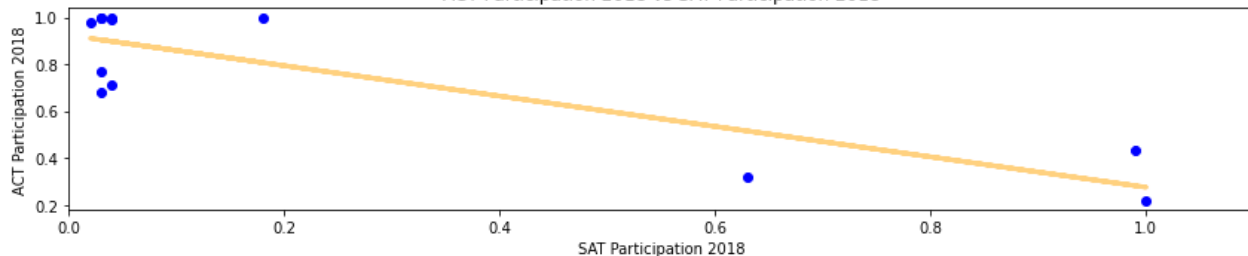
ACT	SAT
1. Michigan (23%)	1. N. Dakota (2%)
2. Indiana (32%)	2. Iowa (3%)
3. Illinois (57%)	3. Nebraska (3%)
4. Iowa (67%)	4. S. Dakota (3%)
5. Kansas (72%)	5. Wisconsin (3%)

Midwest Region

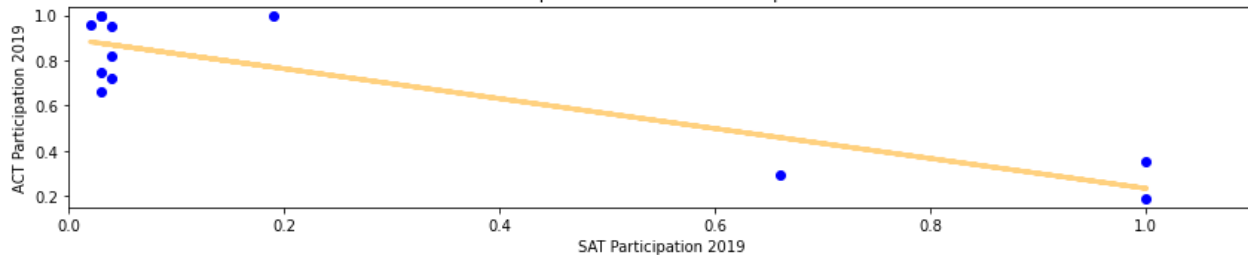
ACT Participation 2017 vs SAT Participation 2017



ACT Participation 2018 vs SAT Participation 2018



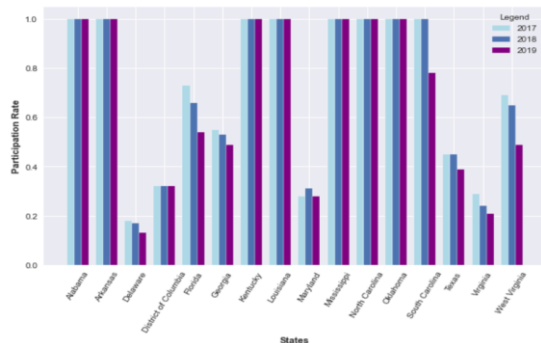
ACT Participation 2019 vs SAT Participation 2019



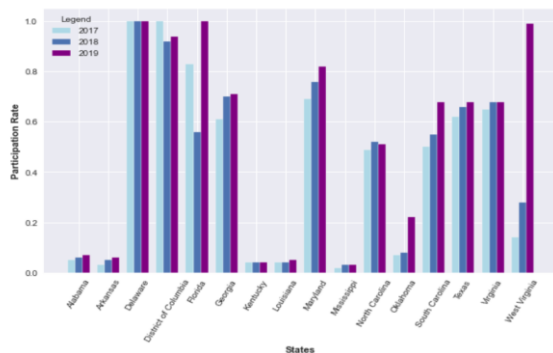
- Illinois made the switch from ACT to **SAT** as state-wide test
- Nebraska, North Dakota & Wisconsin has state requirement for **ACT** as their state-wide testing regimens
- Michigan requires students to participate in **SAT**
- Ohio & Minnesota requires students to participate in **ACT** OR **SAT**
- There is general negative correlation between SAT Participation and ACT Participation (Ohio is the exception)

South Region

ACT Participant Rates from 2017 to 2019



SAT Participant Rates from 2017 to 2019



- Consistent full participation rates are evident in Delaware, Alabama, Arkansas, Kentucky, Louisiana, Mississippi, North Carolina and Oklahoma : state policy testing driven



Lowest State Participation SAT & ACT

Virginia
ACT: 21%
SAT: 68%

Lowest Participation

ACT

Delaware
18%, 14%, 13%

SAT

Mississippi
2017: 2%, 2019: 3%
Arkansas 2018: 3%

> 50

More Than 50% participation for SAT/ACT from 2017 to 2019

Florida

- Significant shifts in participation rates from ACT to SAT for West Virginia (state test requirement policy) and Florida, SAT school day.



Significant Changes

Increase

ACT

Nil

SAT

West Virginia 85%

Decrease

ACT

South Carolina -22%

SAT

District of Columbia - 6%



Highest Participation

ACT

- Alabama
- Arkansas
- Kentucky
- Louisiana
- Mississippi
- North Carolina
- Oklahoma
- South Carolina (17,18)

SAT

- | | |
|-------------|-------------------------|
| 2017 | 1. Delaware |
| | 2. District of Columbia |
| 2018 | |
| | 1. Delaware |
| 2019 | |
| | 1. Delaware |
| | 2. Florida |

More Than 50% participation for SAT and ACT

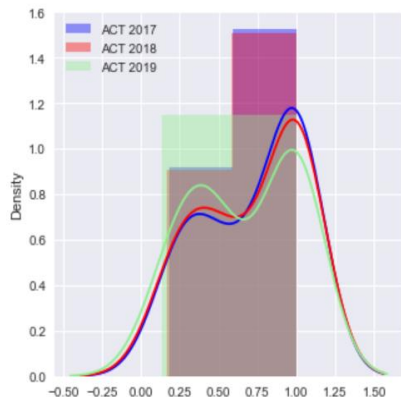
2017
Florida, Georgia

2018
Florida, Georgia, North Carolina, South Carolina

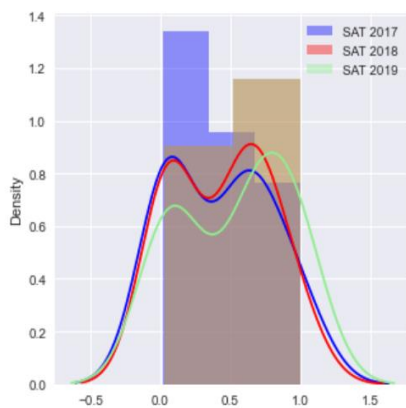
2019
Florida, North Carolina, South Carolina

South Region

ACT participation from 2017 to 2019



SAT participation from 2017 to 2019



- State Participation for ACT is decreasing
- State Participation for SAT is increasing

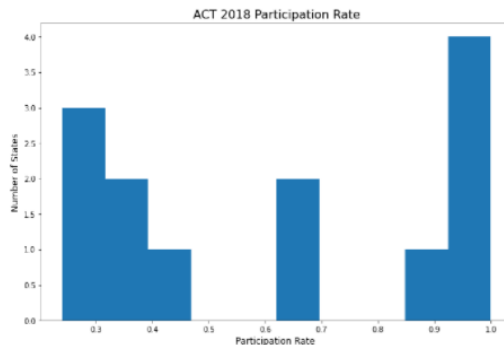
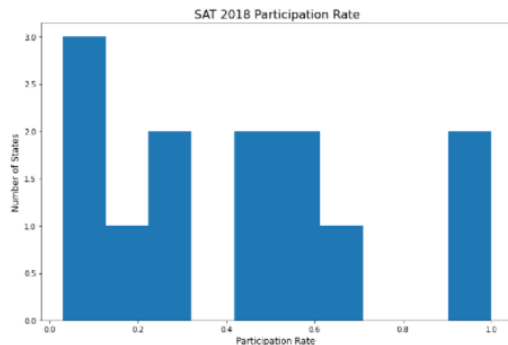
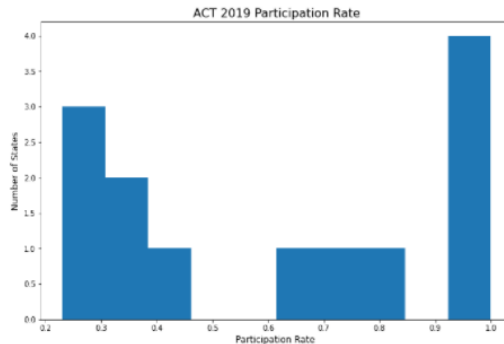
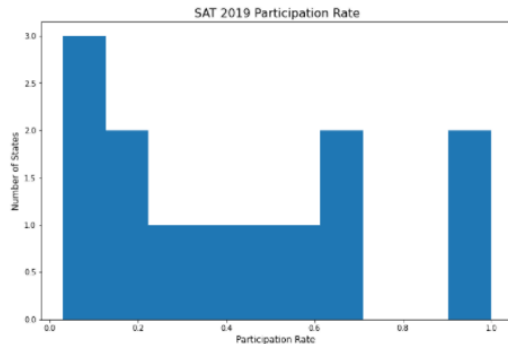
ACT Participation



SAT Participation



West Region - SAT/ACT Participation Rates 2018/2019



- 1 Four histograms depicting 2018/2019 SAT and ACT examinations
- 2 It is evident that the distributions for SAT and ACT Participation Rates have not changed dramatically between 2018-2019
- 3 It is clear however, that there are large groups of states showing very low-end participation rates for the SATs (< 20%) and high end for ACTs (> 75%)
- 4 With that being said, it is necessary for us to remove states with:
 - High SAT Participation Rates (> 75%);
 - Medium-high ACT Participation Rates (> 50%); and
 - Find the differences of SAT scores between 2017-2019

West Region - Filtering Relevant States & Recommendation

Filtered States for West Region of USA 2019

State	ACT Participation	SAT Participation	SAT Difference 2017 - 2019
Alaska	0.38	0.41	17
California	0.23	0.63	10
Oregon	0.42	0.51	4
Washington	0.24	0.70	-1

Student Populations for SAT 2019 - Alaska & California

State	SAT Takers	High School Graduates	SAT Participation
Alaska	3,212	7,758	41%
California	272,892	431,009	63%

1

Results after Removing:

1. High SAT Participation:
(> 0.75)
2. Med-High ACT Participation:
(> 0.5)
1. Calculating SAT difference 2017 - 2019

2

The two most suitable candidates from this analysis would be Alaska or California

3

In order to decide between the two states, additional data has to be considered and in this case it would be the total student population that took the SATs in these two states

4

The reason we take student population into account is because of the assumption that the budget we receive is limited and therefore, the lower the student population, the larger the commitment per student

Recommendation: Therefore, the recommended state would be Alaska for the West Region of the USA

Final Recommendations

Filtered States for USA 2019 - Final Recommendation

State	Region	ACT Participation	SAT Participation	SAT Difference 2017 - 2019
Alaska	West	0.38	0.41	17
Virginia	South	0.21	0.68	17
Indiana	Midwest	0.29	0.66	6
Vermont	Northeast	0.20	0.66	-8

Student Populations for SAT 2019 - Final Recommendation

State	SAT Takers	High School Graduates	SAT Participation
Alaska	3,212	7,758	41%
Virginia	61,182	90,213	68%
Indiana	49,565	75,014	66%
Vermont	4,373	6,676	66%

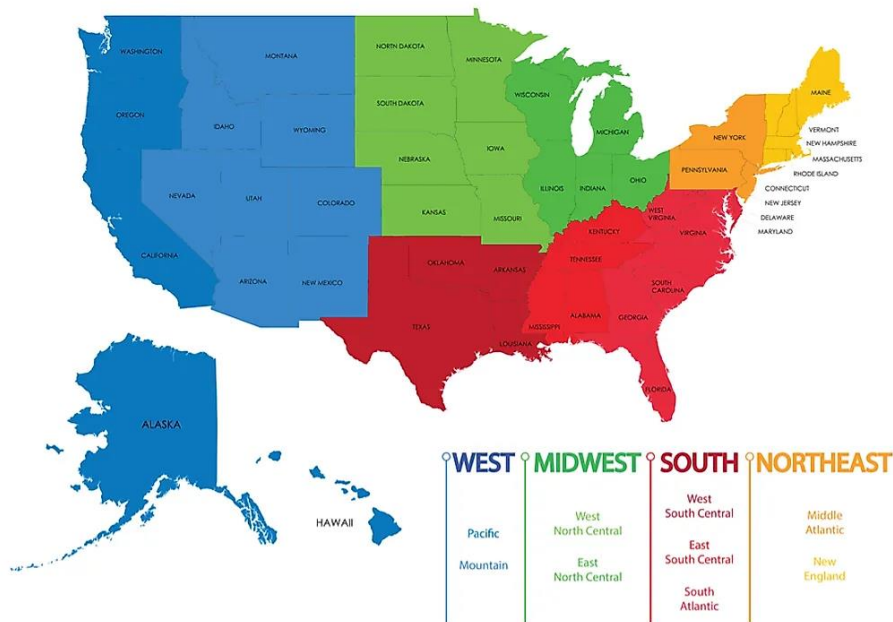
1 Taking into account the four regions, we now have the final 4 recommended states per region

2 Amongst the four states, Alaska has the lowest SAT Participation Rates (41%) with the joint highest SAT difference between 2019 and 2017 (17)

3 Moving on to Student Populations, it would seem that Vermont has the lowest student population and therefore, the investment assumption holds true that it would benefit each student more in Vermont than any other state

4 However, Vermont also saw an 8 point deduction in SAT scores from 2017 to 2019. Coupled with the higher SAT Participation Rate, this analysis concludes that Alaska would be the best state to invest in on a balance of issues

Conclusion



- 1 The ACT and SAT participation distributions tend to mirror each other across the USA, with states preferring one test over the other
- 2 ACT and SAT scores are inversely correlated with their respective participation rates likely due to selection bias
- 3 There are strong indications that Coastal Regions such as the Northeast tend to favour the SAT whilst Midwestern states tend to favor the ACT
- 4 To conclude this analysis, this group firmly believes that the College Board should take into consideration an opportunity to invest in the state of Alaska to boost participation rates as we believe there is room for participation rates to grow

References

1. <https://reports.collegeboard.org/pdf/2019-alaska-sat-suite-assessments-annual-report.pdf>
2. <https://reports.collegeboard.org/pdf/2019-virginia-sat-suite-assessments-annual-report.pdf>
3. <https://reports.collegeboard.org/pdf/2019-indiana-sat-suite-assessments-annual-report.pdf>
4. <https://reports.collegeboard.org/pdf/2019-vermont-sat-suite-assessments-annual-report.pdf>
5. <https://www.edweek.org/teaching-learning/what-tests-does-each-state-require>