DSI Project

Standardized SAT Test Analysis

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Problem Statement

The goal of the project is to analyze nationwide SAT data and identify which states have the lowest participation rates, Math, and EBRW scores. The US Department of Education can identify whether there is a correlation between SAT participation rate and test scores, and then determine if an additional grant allocation should be recommended for programs to improve overall student SAT performance in underperforming states.

Statewide SAT Statistical Data for 2018 and 2019

The data below summarize mean, standard deviation, minimum and maximum values, and 25th, 50th, and 75th percentile score values for nationwide SAT scores for the years 2018 and 2019. The lower 25th percentile values for participation rate, EBRW scores, Math scores, and combined scores are highlighted.

Summary Statistics for SAT test scores

	parti_rate	ebrw	math	total
count	102.000000	104.000000	104.000000	104.000000
mean	0.474020	560.788462	552.278846	1113.144231
std	0.378855	47.383925	50.828563	97.462307
min	0.020000	480.000000	445.000000	935.000000
25%	0.050000	524.500000	518.250000	1031.500000
50%	0.530000	550.000000	544.500000	1097.000000
75%	0.807500	611.000000	595.250000	1202.500000
max	1.000000	643.000000	655.000000	1298.000000

States with SAT EBRW scores lower than the national 25th percentile in 2018 and 2019

From the previous page, we know the cutoff score for the lowest 25th percentile for the EBRW category is 525

Lowest 25th percentile for the EBRW

	state	parti_rate	ebrw	math	total	year
5	Colorado	1.00	518	506	1024	2019
7	Delaware	1.00	499	486	985	2019
8	District of Columbia	0.94	495	480	975	2019
9	Florida	1.00	516	483	999	2019
12	Idaho	1.00	505	488	993	2019
13	Illinois	1.00	509	504	1013	2019
19	Maine	0.99	512	502	1013	2019
22	Michigan	1.00	507	496	1003	2019
36	Oklahoma	0.22	490	472	963	2019
39	Puerto Rico	NaN	483	462	944	2019
40	Rhode Island	1.00	503	492	995	2019
44	Texas	0.68	515	507	1022	2019
47	Virgin Islands	NaN	490	445	935	2019
50	West Virginia	0.99	483	460	943	2019

States with SAT Math scores lower than the nationwide 25th percentile in 2018 and 2019

From page 3, we know the cutoff score for the lowest 25th percentile for the
Math category is 518

Lowest 25 percentile for the Math

	state	parti_rate	ebrw	math	total	year
5	Colorado	1.00	518	506	1024	2019
6	Connecticut	1.00	529	516	1046	2019
7	Delaware	1.00	499	486	985	2019
8	District of Columbia	0.94	495	480	975	2019
9	Florida	1.00	516	483	999	2019
12	Idaho	1.00	505	488	993	2019
13	Illinois	1.00	509	504	1013	2019
19	Maine	0.99	512	502	1013	2019
22	Michigan	1.00	507	496	1003	2019
36	Oklahoma	0.22	490	472	963	2019
39	Puerto Rico	NaN	483	462	944	2019
40	Rhode Island	1.00	503	492	995	2019
41	South Carolina	0.68	526	504	1030	2019
44	Texas	0.68	515	507	1022	2019
47	Virgin Islands	NaN	490	445	935	2019
50	West Virginia	0.99	483	460	943	2019

Review States with SAT participation rate less than 5% as highlighted

The data shows that there does not appear to be a correlation between participation rate and test score values, as the EBRW and Math scores for the states listed below are all above the 2019 nationwide mean values, with the exception of Utah.
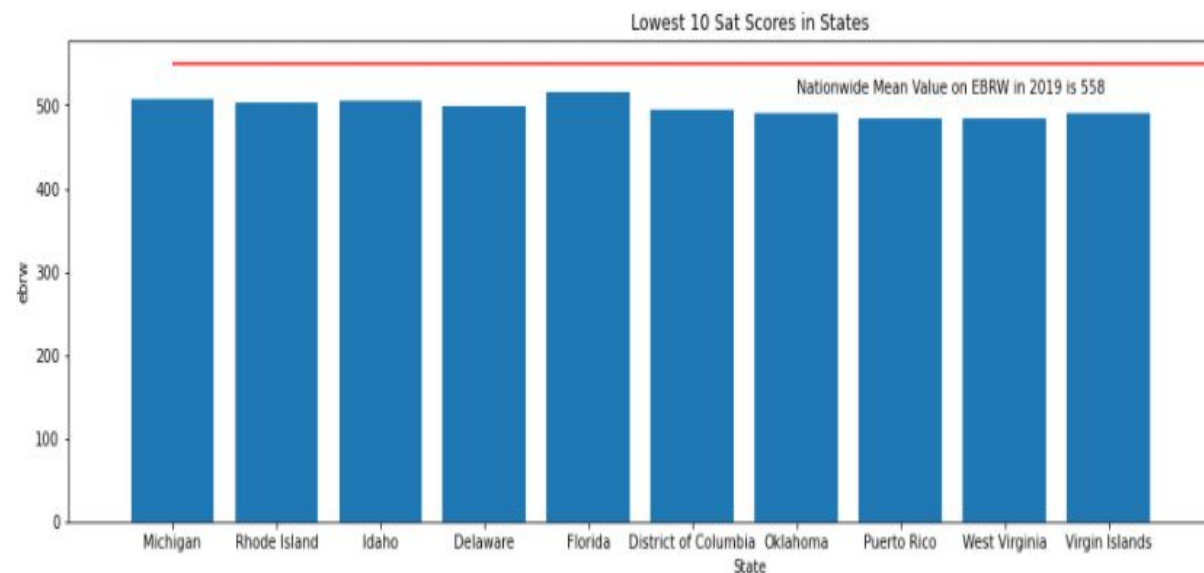
Lowest percentile for participante rate

	state	parti_rate	ebrw	math	total	year
15	Iowa	0.03	622	622	1244	2019
16	Kansas	0.04	618	623	1241	2019
17	Kentucky	0.04	620	612	1232	2019
23	Minnesota	0.04	636	648	1284	2019
24	Mississippi	0.03	628	608	1237	2019
25	Missouri	0.04	622	615	1236	2019
27	Nebraska	0.03	628	631	1260	2019
34	North Dakota	0.02	627	636	1263	2019
42	South Dakota	0.03	633	635	1268	2019
45	Utah	0.04	614	615	1230	2019
51	Wisconsin	0.03	635	648	1283	2019
52	Wyoming	0.03	623	615	1238	2019

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Nationwide Mean Values 2019

parti_rate        0.490588
ebrw            558.000000
math            548.471698
total          1106.528302
year           2019.000000
dtype: float64
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States Percentile compared with nationwide mean value for EBRW

This bar graph shows the 10 states with the lowest average SAT EBRW scores which are below the nationwide 25th percentile value of 525 for 2018 and 2019 and below the nationwide mean value of 558 for 2019
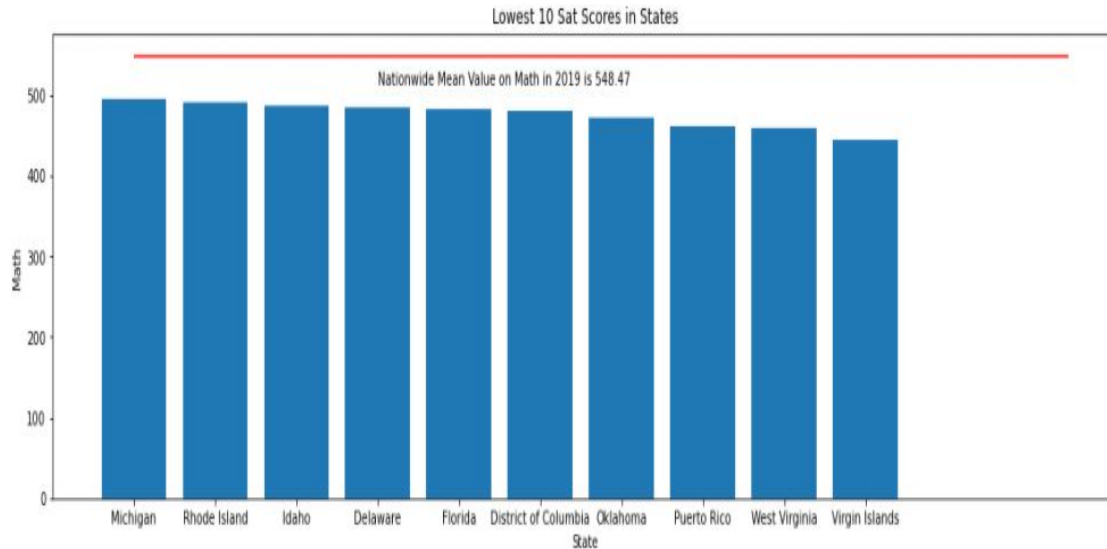

Lowest 10 Sat Scores in States

Nationwide Mean Value on EBRW in 2019 is 558

Nationwide Mean Values 2019

parti_rate	0.490588
ebrw	558.000000
math	548.471698
total	1106.528302
year	2019.000000
dtype: float64	

States Percentile compared with nationwide mean value for Math

This bar graph shows the 10 states with the lowest average SAT Math scores which are below the nationwide 25th percentile value of 518 for 2018 and 2019 and below the nationwide mean value of 548 for 2019

Lowest 10 Sat Scores in States

Nationwide Mean Value on Math in 2019 is 548.47

Nationwide Mean Values 2019

parti_rate	0.490588
ebrw	558.000000
math	548.471698
total	1106.528302
year	2019.000000
dtype: float64	

Conclusions

Based on SAT score averages for the years 2018 and 2019, we recommend additional funding grants for test score improvement be allocated to those states where the EBRW and Math scores were below the nationwide lower 25th percentile values of 525 and 518 respectively. However, we do not recommend funding grants to increase SAT participation rates, because there does not appear to be a direct correlation between participation rate and test scores.