

Impact of high-school neighborhood business environment in Public Education

Surendra Prajapat
March 28, 2019

1. Introduction

1.1. Background:

High-School is a major bridge to college Education and activities/engagement in high-school pretty much defines future of college going students. What goes inside the high-school is important, however it seems, what environment/business available around high-school also plays equally important role.

1.2. Business Problem: As part of the project, we would like to compare Highest Ranking High-School in two US states. Pick two US states by ensuring the economic data being same. Compare and analyze High-schools along following lines.

1. Find the top 10 venues and their type in 1-mile radius of the High-school.
2. Find the high-school enrollment and attendance rate.
3. Find the college enrollment percentage of such high-school.
4. Understand the relationship between types/nature of businesses and performance of the high-school on points 2 and 3 above.
5. Understand if the analysis is relevant and conclusive and if so, can it provide some insights and tips in improving public educations in general.

For the analysis, New Jersey and Ohio State are being picked as states to compare highest ranking high-schools. The states are picked by comparing the personal income and personal income rate change for US states, using data from Bureau of Economic Analysis (<https://www.bea.gov/system/files/2018-12/spi1218.pdf>).

2. Data Acquisition and cleaning:

2.1. School data. We look to utilize following data available for school stats

2.1.1. School ranking and report data

National Education Association - Public Schools Data from 2011-2018 as gathered from NEA website <http://www.nea.org/assets/docs/> for State of New Jersey and Ohio. The entire United States data is also capture of relative analysis. The is extracted from the pdf documents available at the NEA site and converted into the feature list (see below). I could only get data from 2010-11, 2014-15, 2016-17 and 2017-18.

State	TotalSchoolC	NationalRan	TotalFallEnr	EnrollmentN	AverageDailyAttd	AverageDailyAttdRank	HSGraduate	HSGraduateRank	StartYear	EndYear
New Jersey	708	8	1314857	11	1,330,045	11	94,520	11	2017	2018
New Jersey	708	8	1342685	11	1,332,360	11	95,400	11	2016	2017
New Jersey	590	8	1,347,166	11	1,333,576	11	100,350	10	2015	2016
New Jersey	590	8	1,352,000	11	1,474,923	10	99,407	9	2014	2015
New Jersey	591	8	1,366,067	11	1,431,418	10	98,437	9	2010	2011
Ohio	1041	2	1792382	6	1,640,778	8	120,948	7	2016	2017
Ohio	1026	3	1800329	6	1,636,327	7	121,000	6	2017	2018
Ohio	1,045	2	1,807,633	6	1,646,841	8	118,617	7	2015	2016
Ohio	1,016	3	1,854,880	6	1,639,380	7	123,168	7	2014	2015
Ohio	986	3	1,881,436	6	1,643,439	7	125,895	7	2010	2011
UnitedState	16316		49800148		46,457,525		3,238,440		2016	2017
UnitedState	16280		49753306		46,524,270		3,240,592		2017	2018
UnitedState	15,672		49,702,016		47,114,969		3,309,762		2015	2016
UnitedState	15,462		49,568,215		48,015,081		3,309,762		2014	2015
UnitedState	15,339		49,244,844		46,913,205		3,309,762		2010	2011

2.1.2. Best Public high-school in New Jersey (Process and conclude top high-ranking)

- State of New Jersey - Department of Education - <https://rc.doe.state.nj.us/SearchForSchool.aspx>
- US News – <https://www.usnews.com/education/best-high-schools/new-jersey>
Based on the US news, High Technology High School is Top Ranking school.
Processing the High-School data from New Jersey department of Education, we extracted following stats of the school
(<https://rc.doe.state.nj.us/runreport.aspx?type=school&school=010&district=3260&county=25&year=2017-2018>)

School	Address	State	ELAPe rcent	MathPe rcent	4YrColl egeEnr ollmen tPerce nt	PSAT_ RW	PSAT_ M	SAT_R W	SAT_M	ACT_R	ACT_E	ACT_S	ACT_M	Absenteeism Percent	AP_IB_Perc ent	StudentTea cherRatio	IncidentsPer 100Student
High Technology High School	765 NEWMAN SPRINGS ROAD, LINCROFT, NJ 07738-0119	New Jersey	98	96.8	89.6	679	704	726	766	32	33	32	34	2.1	89.1	12	0

District level data for all the schools that share the same Monmouth county as top high school <https://rc.doe.state.nj.us/ZipCode.aspx?zip=07738&year=2017-2018>

2.1.3. Best Public high-school in Ohio

- Ohio Department of Education - http://education.ohio.gov/lists_and_rankings
- US news - <https://www.usnews.com/education/best-high-schools/ohio>
Based on the US news, Walnut Hills High School is Top Ranking school.
Processing the High-School data from Ohio department of Education(
<http://education.ohio.gov/Topics/Data/Report-Card-Resources> ,
<http://education.ohio.gov/getattachment/Topics/Data/Report-Card-Resources/Prepared-for-Success-Component/Technical-Documentation-Prep-for-Success.pdf.aspx?lang=en-US>),
we extracted following stats of the school.
(<https://reportcard.education.ohio.gov/download>).
<https://reportcard.education.ohio.gov/school/prepared/039073>

School	Address	State	ELAPe rcent	MathPe rcent	4YrColl egeEnr ollmen tPerce nt	PSAT_ RW	PSAT_ M	SAT_R W	SAT_M	ACT_R	ACT_E	ACT_S	ACT_M	Absenteeism Percent	AP_IB_Perc ent	StudentTea cherRatio	IncidentsPer 100Student
Walnut Hills High School	3250 Victory Pkwy, Cincinnati, Ohio 45207	Ohio	96	88.5	89	NA	NA	480	530	22	18	21	22	11.7	81.2	21	0

District level data for all the schools that share the same Hamilton county as top high school https://reportcardstorage.education.ohio.gov/data-download-2018/17-18_Achievement_District.xlsx

2.2. Location data – Foursquare API to find top 10 venues in 1-mile radius of the Top-High school for state of New Jersey and Ohio.

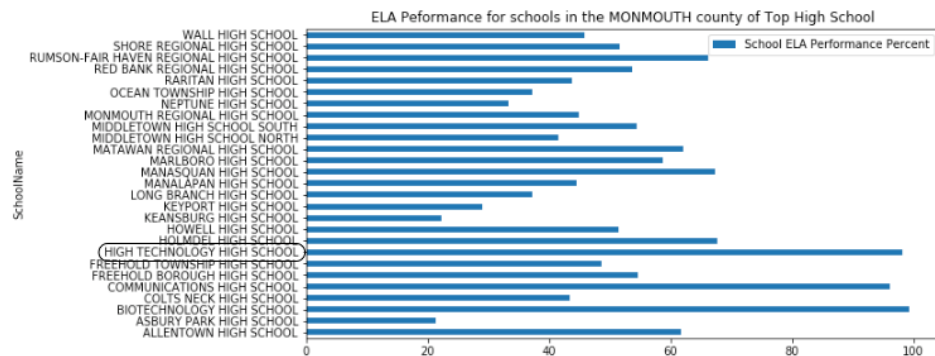
3. Methodology

After school's report data acquired and processed from various sources from Department of Education in New Jersey and Ohio, I wanted to validate why a school in state was qualified as the Top School. I took the county in which Top school was located and compared all schools in that country on 4 distinct points namely:

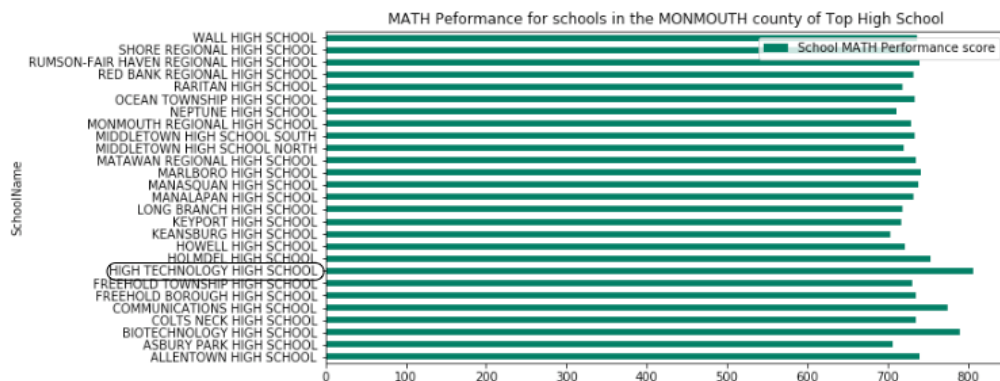
- ELA Performance
- Math Performance
- Absenteeism

3.1 Analysis for New Jersey, MONMOUTH county, where the Top High School “High Technology High School” is located

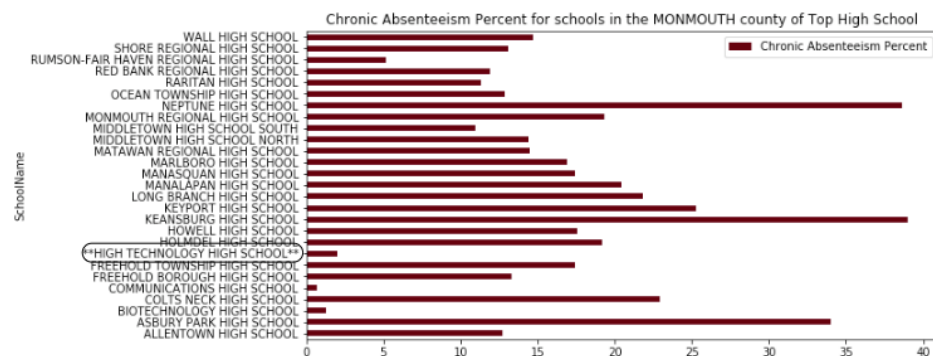
ELA Performance:



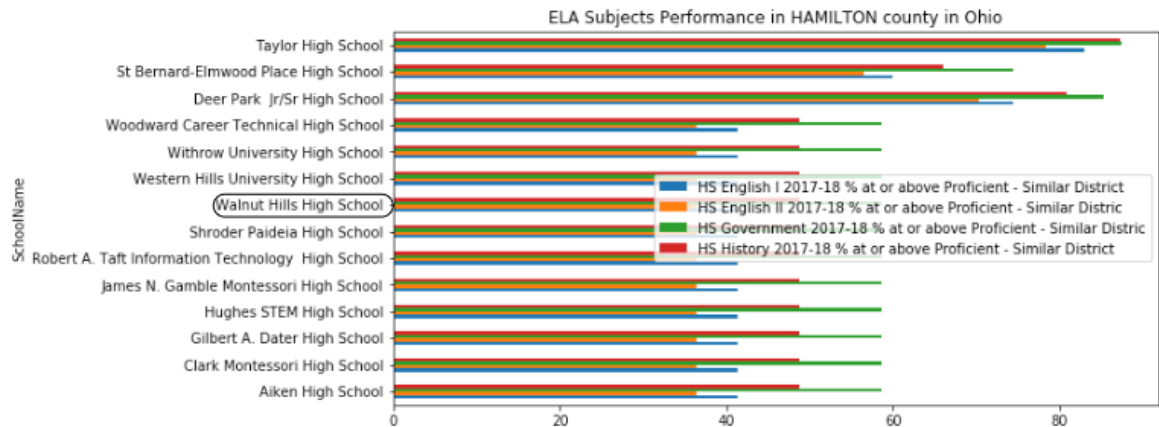
Math Performance:



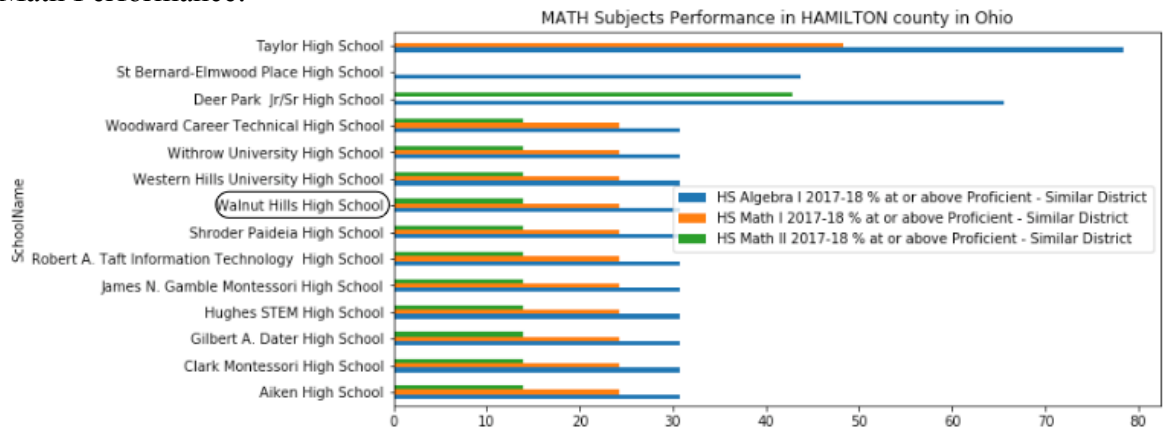
Absenteeism:



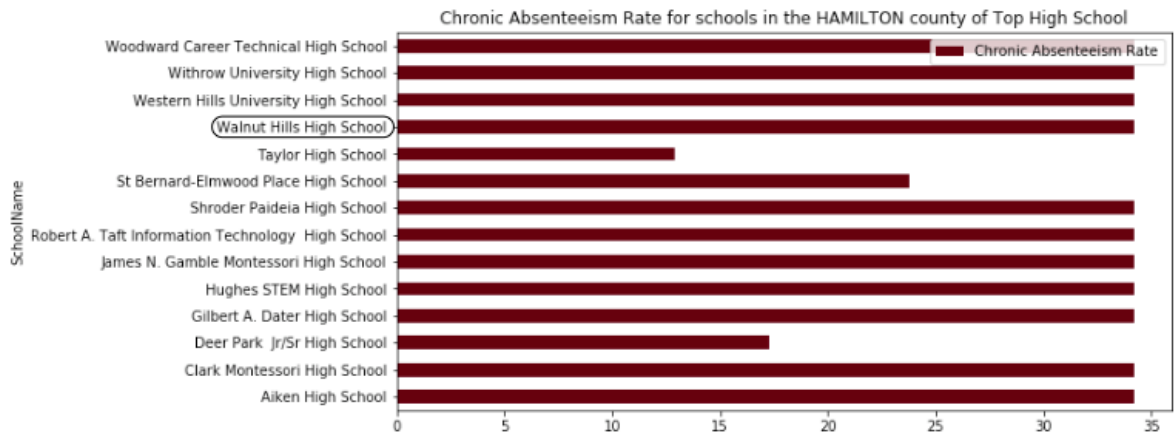
3.2 Analysis for Top School “Walnut Hills High School” in Hamilton county in Ohio ELA Performance:



Math Performance:



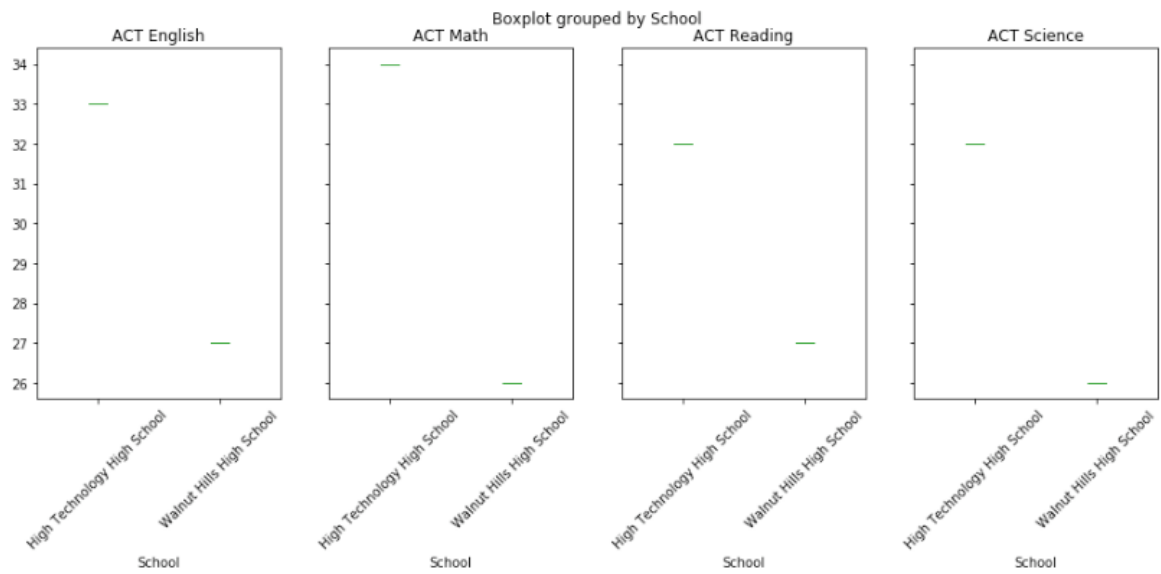
Absenteeism:



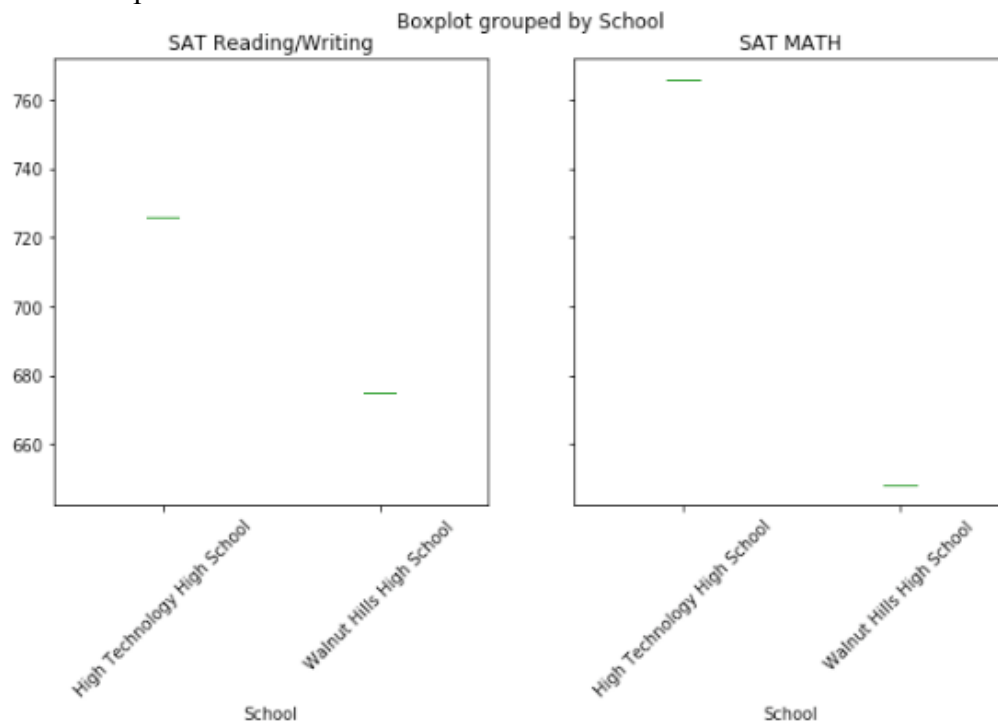
4. Comparing the TOP High School in New Jersey and Ohio

4.1. College Preparedness – ACT participation

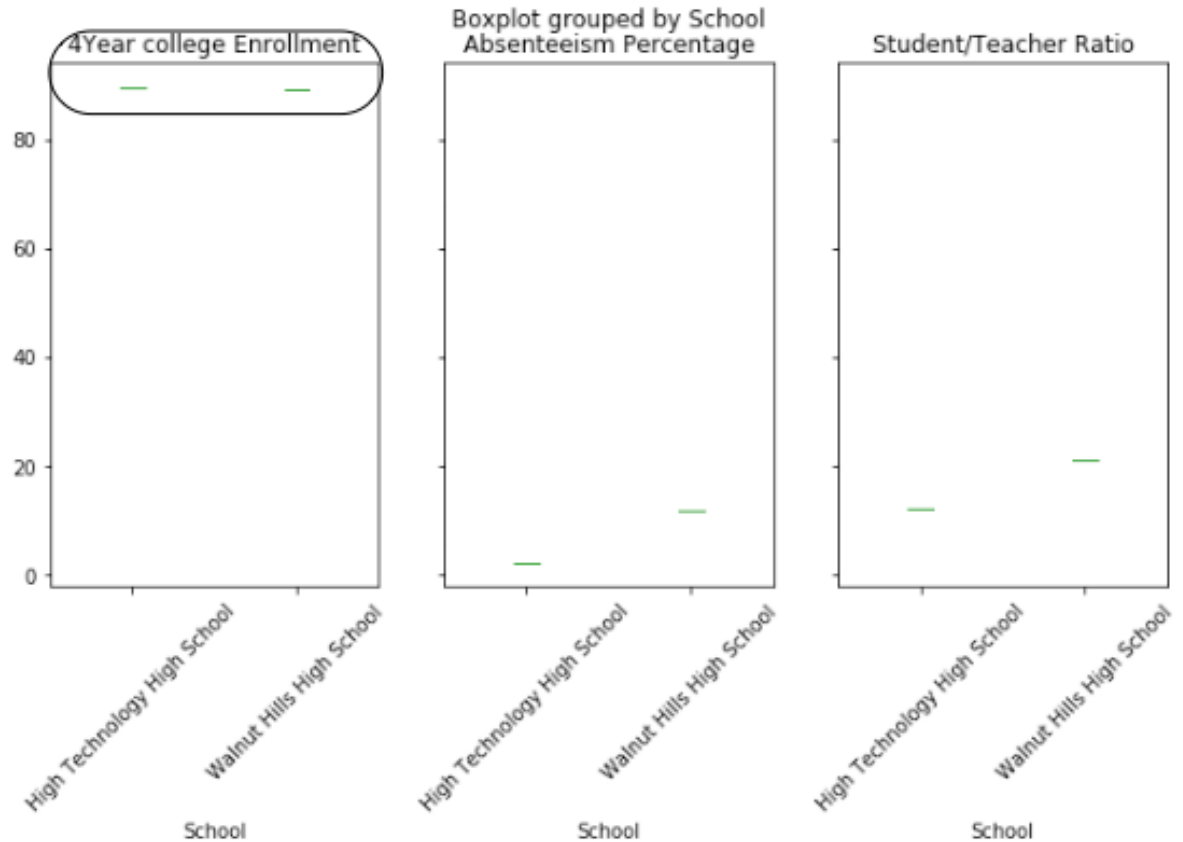
Student in New Jersey Top High School got better ACT/SAT scores as compared to Top High School in Ohio. However, despite the low ACT/SAT scores and high absenteeism, Ohio school student's 4-year college enrollment is comparable to the New Jersey. This points to the fact that Ohio state universities were less competitive in giving admission to their state students.



SAT Participation:



Other Factors:



5. Results:

5.1. Top-10 venues at each Top High School

5.1.1. New Jersey – Top High School “High Technology High School”. Top 10 venues. Notice that in top 10 venues in the 1-mile radius, for food, **there is no Bar or Brewery**. Only one restaurant and other 2 fast-food kind of restaurant.

	name	categories	lat	lng
0	Thompson Park	Park	40.333067	-74.138918
1	Brookdale Performing Arts Center	Theater	40.326948	-74.133983
2	Monmouth Museum	Museum	40.326607	-74.134910
3	Lincroft Little League	Baseball Field	40.329799	-74.127698
4	Luigi's Famous Pizza	Pizza Place	40.331883	-74.120554
5	Queso Mexican Grill & Salad Bar	Mexican Restaurant	40.331768	-74.120388
6	Joyce's Subs & Pizza	Deli / Bodega	40.330924	-74.119404
7	Thompson Park Dog Park	Dog Run	40.334823	-74.144219
8	Retro Fitness	Gym / Fitness Center	40.331909	-74.122992
9	Dunkin' Donuts	Donut Shop	40.330695	-74.119434

5.1.2. Ohio – Top High School “Walnut Hills High School”. Top 10 venues.

Notice that in top 10 venues in the 1-mile radius, for food, there are **3 Brewery/Bar**, **3 Restaurants**, **2 fast-food places**. Comparing to New Jersey High School, it has too much distractions. Taking a note on Absenteeism and low score on STEM courses, these distractions seems to have influence.

	name	categories	lat	lng
0	Walnut Hills High School	High School	39.140967	-84.479361
1	Listermann Brewing Co.	Brewery	39.146470	-84.472237
2	O Pie O	American Restaurant	39.129663	-84.477546
3	The Woodburn Brewery & Taproom	Beer Bar	39.129030	-84.476892
4	Delicio Coal Fired Pizza (University Station)	Pizza Place	39.146588	-84.467892
5	Cintas Center	College Basketball Court	39.150433	-84.471833
6	Brew House	American Restaurant	39.125547	-84.486126
7	Suzie Wong's On Madison	Asian Restaurant	39.129795	-84.476955
8	Skyline Chili	Hot Dog Joint	39.125855	-84.483707
9	The Growler House	Bar	39.129763	-84.477778

Based on the details of Top 10 venues near each school in comparison, seems that too many bar/restaurants in very close vicinity of the school seems to impact the student's performance as well as absenteeism. The environment around the high school seems to impact the student performances.

6. Discussion:

The states (New Jersey and Ohio) were picked by comparing the personal income and personal income rate change for US states, using data from Bureau of Economic Analysis. So, having the economic factor removed from the equation, comparing the student performance from the Top High School from each state, the analysis seems to indicate the environment around the high school seems to impact the student performances.

Even though the over-all impact on the 4-year enrollment is not much between the two schools, it will be interesting to study on what is the college drop-out rate in these students. This can be a subject of further analysis, that given the STEM performance of these student, how that impacts the future success of these students in their undergraduate studies.

7. Conclusion:

Having seen my kids finishing high-schools and hearing their stories as how some students are not motivated enough, the environment around the school was always in my background. I have chosen a 1-mile radius as that is most accessible area by walking. After doing this project and the results I got, that theory has some bearing now.

If we do the same comparison across all US states and compare Top schools and their vicinity, this can even prove more fruitful and further reinforce this theory. If the same analysis is coming true for other states, communities around the High schools can be more responsible and city can be more selective when giving business permits in the close vicinity of the school.