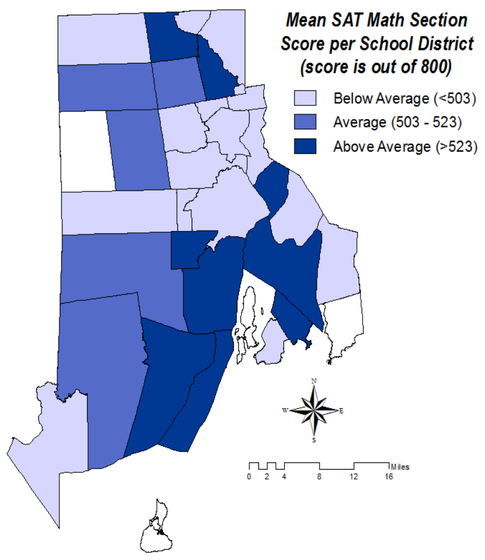
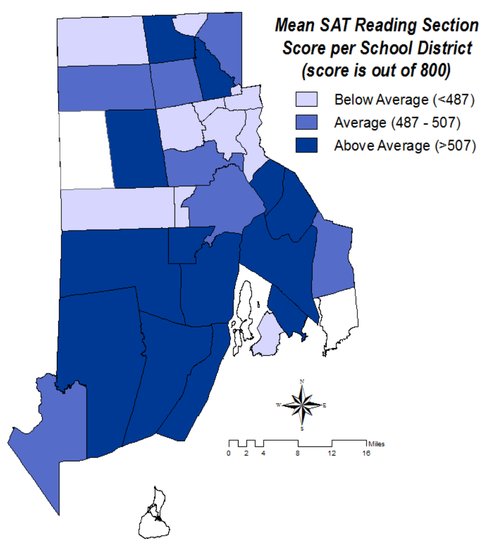
Quality Analysis of the RI Public Education System

Investigating current conditions of RI public high school districts in the context of student performance and family income

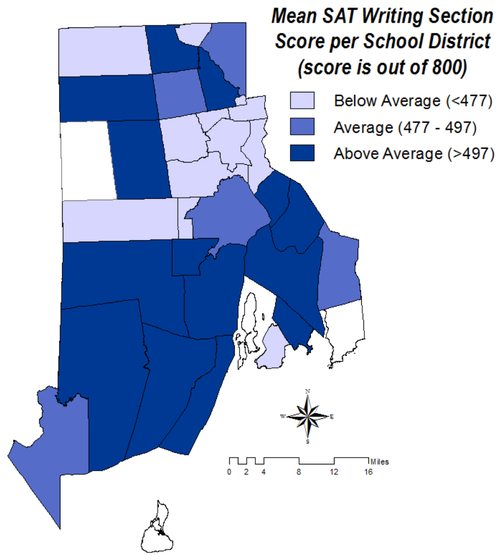
SAT Math Section Scores



SAT Reading Section Scores



SAT Writing Section Scores

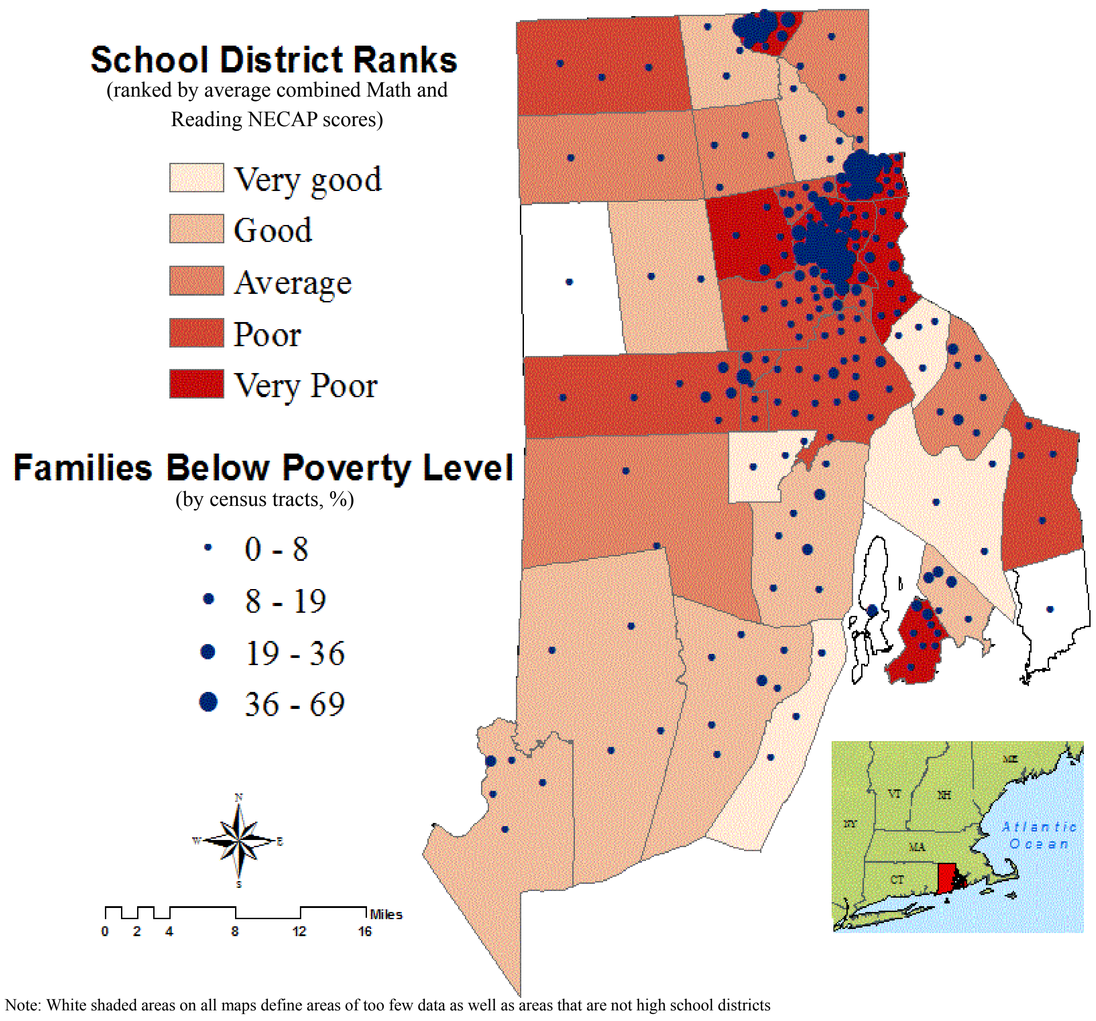


Introduction

Having been raised in the state of Rhode Island and more specifically in the capital city, Providence, I have had a first-hand experience with the RI public education system. This project was inspired by my senior year of high school when I decided to transfer from my Providence public high school to the public high school in North Providence. The difference in curriculum, academic programs, scholarship availability, extracurricular activities, and etcetera was unbelievable. Therefore, I decided that I wanted to further investigate and analyze these differences in a broader sense by examining all high schools in the RI public education system.

For this particular project, I examined the education system regarding high schools for the entire state of Rhode Island. As a public education system, the state of RI should be helping students learn helpful academic skills as well as preparing them for brighter futures in higher education for free. These two factors, academic skill level and college readiness were the main focus of this analysis. In order to examine the quantity at which each district provides these services, New England Common Assessment Program (NECAP) scores and SAT College Admission Exam scores were used. NECAP is a standardized test administered to numerous New England high schools. Students take this exam in the 11th grade and they are tested on Math, Reading, Writing, and Science but for the sake of this examination only Math and Reading scores were used. Along with test scores, Census data from the 2012 ACS 5-year estimate was used to provide information about student families by pinpointing areas of poverty within school districts as well as pinpointing the level of educational attainment parents have. These two attributes help to portray areas of need, where the public education system should be of the highest quality due to the fact that it administers to students with a lower amount of resources. In all, this project provides a spatial analysis of quality where observers can visually examine the differences between public high school districts and what is causing these differences as well as what areas should the RI education system be fortified or re-evaluated.

Current Status of High School Districts and Poverty Levels in RI

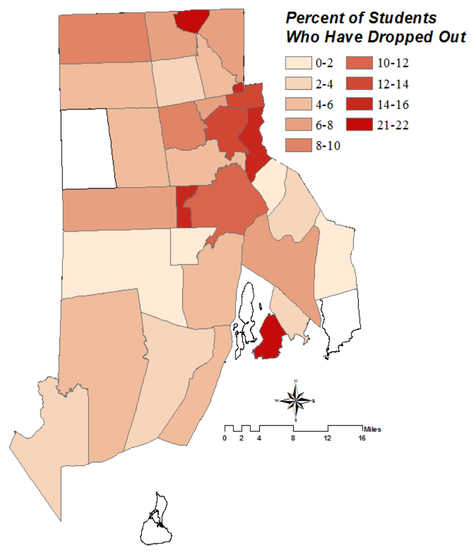


Note: White shaded areas on all maps define areas of too few data as well as areas that are not high school districts

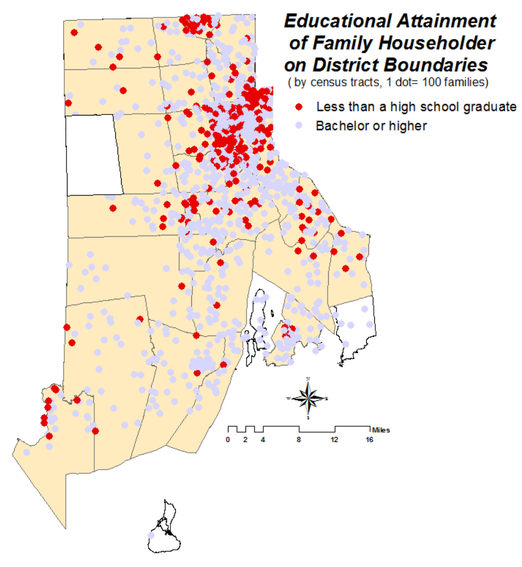
Additional Information on SAT scores:

- Poorest preforming district/school: Providence/ Mount Pleasant High School (average score of 340 per section)
- Best performing district/ school: East Greenwich/ East Greenwich High School (average score of 585 per section)

Percent of Drop Outs



Educational Attainment of Householder on District Boundaries



Public High School District Ranks

Name of High School District	Rank
Barrington School District	1
New Shoreham School District	2
East Greenwich School District	3
Narragansett School District	4
Portsmouth School District	5
Middletown School District	6
North Kingstown School District	7
North Smithfield School District	8
South Kingstown School District	9
Westerly School District	9
Scituate School District	9
Chariho Regional School District	10
Lincoln School District	10
Exeter-West Greenwich Regional School District	11
Foster-Glocester School District	12
Smithfield School District	13
Bristol-Warren Regional School District	14
Cumberland School District	15
Coventry School District	16
Burrillville School District	17
North Providence School District	17
Warwick School District	18
Tiverton School District	19
Cranston School District	20
West Warwick School District	20
East Providence School District	21
Johnston School District	22
Newport School District	22
Woonsocket School District	23
Pawtucket School District	24
Providence School District	25
Central Falls School District	26

Methods

1. Data Collection

Data was downloaded from several online databases and transferred to Microsoft Excel in order to prepare information for ArcMap data table joins. Data tables were either gathered from Census 2012 ACS 5-year estimate or InfoWorks and SchoolDigger, which were sites that presented the RI public education system report card. These sites included information on public high schools, middle schools, and elementary schools and so out of this mixture of grade levels and information linked to these grade levels, the data for high schools was selected and new tabular data sheets were made in order to compile and organize this information.

When searching for data, only the most recent tables of information were selected so that this project could embody the current state of the RI public education system. Tables downloaded included: Poverty status in the past 12 months of families from the Census 2012 ACS 5-year estimate, 2013-2014 Average scores for RI high schools, and 2012-2013 Percent of students that have dropped out.

2. Data Preparation

While in Excel the downloaded data sets, which came in various formats, were edited. The tables were altered in order to focus on certain features of interest. Because data for specific features of interest were linked to RI public high schools instead of RI high school districts, averages were taken and general information was re-distributed as data for districts instead of schools, due to the fact that certain districts included numerous high schools. For instance, because there were multiple high schools in the Providence public high school district, the NECAP scores for all of the high schools were averaged in order to find the district rank. A new data set was then synthesized in order to pair each district with its position in the ranking system, which was made using information from the NECAP scores that were averaged per district. The SAT scores that pertained to each Providence public high school were also averaged in order to find the mean Math, Reading, and Writing scores for the district. Tables were then appropriately formatted so that when relocated to ArcMap, tables would join to the districts shapefile correctly.

3. Mapping Process

Before the actual mapping began, data quality was analyzed and attribute information for each layer was examined for completeness. In order to ensure that data layer completeness for school districts was satisfied, the data management append tool was used to merge attribute data from two school district shapefiles in order to produce a full layer of the public high school district boundaries.

Census data tables were then joined to the RI census tracts shapefile and so all portrayed census data, such as educational attainment of householder and percent of families below the poverty level, was mapped using census tracts. Other edited tables were joined to the districts shapefile, these tables included average SAT scores, averaged NECAP scores, and percent of students who have dropped out. Multiple data layers, such as the district rank and the 2012 Census ACS 5-year estimate below poverty level layer, were then overlaid on a single layout in order to provide a sense of comparison.

Graduated symbols, unique values, and dot density were used to display data layers of one or more attributes. For this particular part, data concerning each district was grouped in order to show a more general pattern. Groupings, especially when referring to averaged NECAP scores, were categorized based on 2013 national averages for each section reported by College Board, the private company that composes and administers the SAT exam. The national average for the 2013 SAT Math section was 513, and so districts who had average scores below this were placed in the “below average” group.

Results & Conclusions

The analysis of NECAP and SAT average district scores was very crucial to defining the status or quality of each school district. This is because NECAP scores represent the current performance of students and therefore provides insight on the academic skills that students have compiled over three years of high school. On the other hand, SAT scores provide insight on the future of students and what kinds of colleges or educational programs they might look forward to pursuing. The SAT scores are especially important because they were only taken by students who were willing to put in the effort to take the test and not by all of the students from each high school, unlike NECAP scores. This means that SAT score results show students who are considering a higher education. Therefore, there is an obvious pattern of difference among school districts and their college preparatory program quality when observing the SAT score maps. If this analysis displayed public high schools instead of general school districts, the results and specifically, the differences in scores, would be even more shocking. Overall, there is a generally trend of below average districts and above average districts and when this data is compared to the school district ranking table, it is very well correlated.

This spatial analysis of quality resulted in showing specific school districts of need which were districts with the highest percent of families below poverty level as well as areas where the highest level of education was below a high school graduate. These areas of need are close in proximity, specifically the north east region of RI, and it appears that the highest levels of these two factors stem from the capital city, Providence. To be exact, school districts that should be fortified or re-evaluated include the four worst ranking districts which are: the Woonsocket, Pawtucket, Providence, and Central Falls school districts. These four districts should be placed in a recovery period in order to enhance their condition and rise in the ranks especially because they administer to students who depend on the RI public education system the most. Meaning, these four districts fall into areas where the poverty is the most severe. These districts all maintain the highest percent of drop outs, the lowest SAT scores, and the lowest NECAP scores.

Tufts University | School of Arts and Sciences

Cartographer: Leslie-Anne Flego, December 2014

Data Sources: Rhode Island GIS Online Data Catalog, 2013-2014 School Digger online database, Census 2012 ACS 5-year estimates, Census 2013 TIGER/Line Shapefiles, 2013-2014 and 2012-2013 InfoWorks online database, 2013 College Board

Projection: NAD_1983_StatePlane_Rhode_Island_FIPS_3800_Feet