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

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 the Rhode Island public high school districts.

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. Two of these factors, academic skill level and college readiness were the main focus of this analysis. In order to examine the quality 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, and Writing but for the sake of this examination only Math and Reading scores were used. Also, SAT scores were 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.

1. Data Collection

Data was downloaded from several online databases and transferred to Microsoft Excel in order to prepare information for ArcMap data 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 cards. 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 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.

Methods

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.

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 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 report by College Board, the private company that 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 information on the future of students and what kind of education programs they might look forward to pursuing. The SAT scores are especially important because they are 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 indicators 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.