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Education Equity Landscape: King County, WA

1. Introduction

Displaying this research is a necessary expression of awareness on how differing populations receive beneficial assistance over others. There are several ways to present this information, what is called opportunity mapping and this research will utilize five individualized measures, combine these data points into a composite index and display juxtaposed data through a map of King County. This research will attempt to further enlighten its readers through visualization of education indicators based on census data from 2010 through 2012.

2. Opportunity Mapping

As our example, *Equity, Opportunity, and Sustainability in the Central Puget Sound Region* (2012) explains, potential can be provided through opportunity mapping as a tool to influence positive remedies. Section 3 of that article eloquently defines the social science behind opportunity mapping and I would lead heavily on their expertise to describe how marginalized communities are shaped through the lack of resource. While this example displays information represented over the entirety of the region, the maps displayed herein will represent only King County. Additionally, the data source for all five indicators are *Washington State Report Card* and the *Office of Superintendent of Public*

Instruction (OSPI). The five variable education indicators are as follows (Central Puget Sound Opportunity Indicators Metadata. 2012).

Education Indicator	Description	Methodology
School Reading Proficiency (EDU1) <i>See Figure 1.</i>	The school proficiency rate on the 4th -grade reading exam (WASL)	Each tract was assigned the average of the reading proficiency scores of the three elementary schools nearest the tract centroid. This process also considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.
School Math Proficiency (EDU2) <i>See Figure 2.</i>	The school proficiency rate on the 4th -grade mathematics exam (WASL)	Each tract was assigned the average of the mathematics proficiency scores of the three elementary schools nearest the tract centroid. This process also (cont.) considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.
Student Poverty Rates (EDU3) <i>See Figure 3.</i>	The percentage of elementary school students receiving free or reduced-price lunches	Each tract was assigned the student poverty rate of the three elementary schools nearest the tract centroid. This process also considered school district boundaries, so as to assign data to tracts only according to the district in which the tract resides.
Teacher Qualifications (EDU4) <i>See Figure 4.</i>	The percentage of teachers who have obtained a master's degree or more	Each tract was assigned the teacher master's achievement rate of the three elementary schools nearest the tract centroid. This process also considered school district boundaries, to assign data to tracts only according to the district in which the tract resides.
Graduation Rates (EDU5) <i>See Figure 5.</i>	The percentage of students who graduated from high school on time	Each tract was assigned the graduation rate of the three high schools nearest the tract centroid. This process also considered school district boundaries, to assign data to tracts only according to the district in which the tract resides.

3. Five Individualized Measures

The figures in the appendix show basic overall statistics for each category of raw data; School Reading Proficiency (EDU1), School Math Proficiency (EDU2), Student Poverty Rates (EDU3), Teacher Qualifications (EDU4) and Graduation Rates (EDU5). In creating a map for each category there was a composite score gathered for all five categories. This was done through the use of a “Z-score”, similar to *Equity, Opportunity, and Sustainability in the Central Puget Sound Region (2012)*, which is a “statistical measure that quantifies the distance (measured in standard deviations) a data point is from the mean of a data set.” A weighting scheme is also utilized due to the apparent gaps in analytics with some of the raw data. An example of why a weighting scheme is needed could be drawn from *Figure 4*. Notice how there is a significant gap in data between 0 and the next data collected. This is explained further in a later paragraph.

4. Composite Index Mapping

Based on our example, *Equity, Opportunity, and Sustainability in the Central Puget Sound Region (2012)*, there are “challenges facing marginalized communities...long-term, multifaceted, and interrelated, and the disparities facing marginalized communities have been widening.” While it is easy to agree with the former portion of that statement the latter is more difficult to agree with simply because this data is limited to only a short time frame. This raw data evidences the marginalization of communities, therefore the need to justly weight these statistics is described below.

As discussed earlier, *Figure 4* displays a large disparity between the number of census tracts that have teachers who do not possess a master’s degree or more and those that satisfy degree requirements. This called for something to even the bell curve

towards less disparaging data, because as you will notice from *Figure 6*, even with the weighting scheme, the areas that do not score high in Teacher Qualification still score well in the test categories. To avoid the 0's from tipping the scale, this research weights the data by multiplying by EDU4 by .58 (which is the mean for this category) to create a Z-score which offers a more realistic category of scoring teacher qualification.

Additionally, the raw data presents student poverty as having a positive impact.

Therefore, the EDU3 category is multiplied by -1 to represent the census tracts that are retaining this benefit as a negative. This was also corrected in the color sorting when creating the visualization for *Figure 6*, thus the high number of students in poverty equates to a low Z-score.

The ways in which we have come to socially categorize is quite astonishing, but it seems as though this occurs naturally, as well. Take for example the census tracts with the lowest composite scores and those with the highest. The first four lowest are all within the Burien/SeaTac areas and there is one dispersed further away, being the fifth in Duvall (see *Figure 6*). As for the highest scoring, they were dispersed a bit differently, but primarily in the northern area of the county, i.e. Kenmore, Shoreline, Redmond. Additionally, corollary research should be done to confirm, but further hypothesis this research offers is that there seems to be a higher level of opportunity towards the central most portion of the county, between the population dense cities and the rural areas of the mountains. This might be due to resources, quality of land, less outside presence, etc.

5. Conclusion w/ thesis

This research briefly described and displays, through visualization of education indicators, based on census data from 2010 through 2012 the importance of understanding disparities facing marginalized communities. The appendix of figures offer ample support for how opportunity mapping can be utilized by taking five individualized measures from a census tract, combine these data points into a composite index and display juxtaposed data through a map of an entire county. Displaying this research is a necessary expression of awareness on how differing populations receive beneficial assistance over others.

6. References

- a) Equity, Opportunity, and Sustainability in the Central Puget Sound Region. *Puget Sound Regional Council*, (2012, May).
- b) Central Puget Sound Opportunity Indicators Metadata (2005-2012).

7. Appendix (Figures)

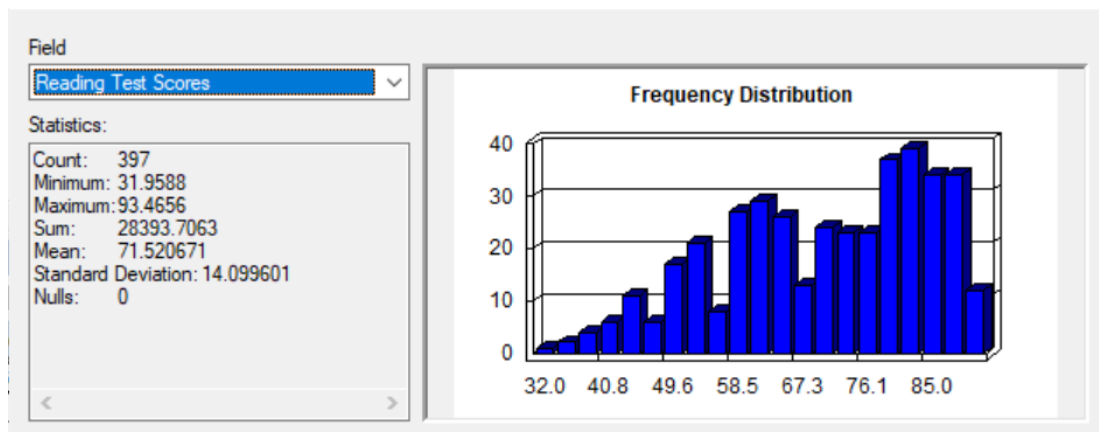


Figure 1: EDU1

7. Appendix (Figures) cont.

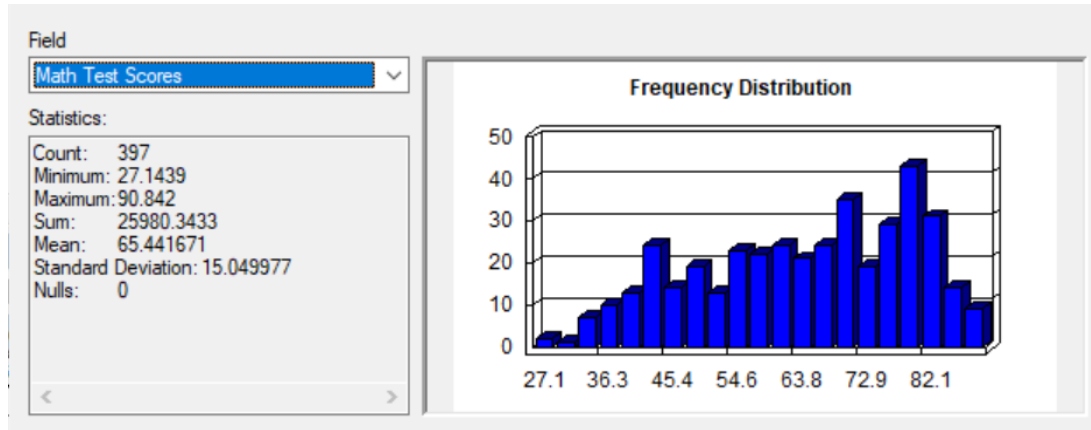


Figure 2: EDU2

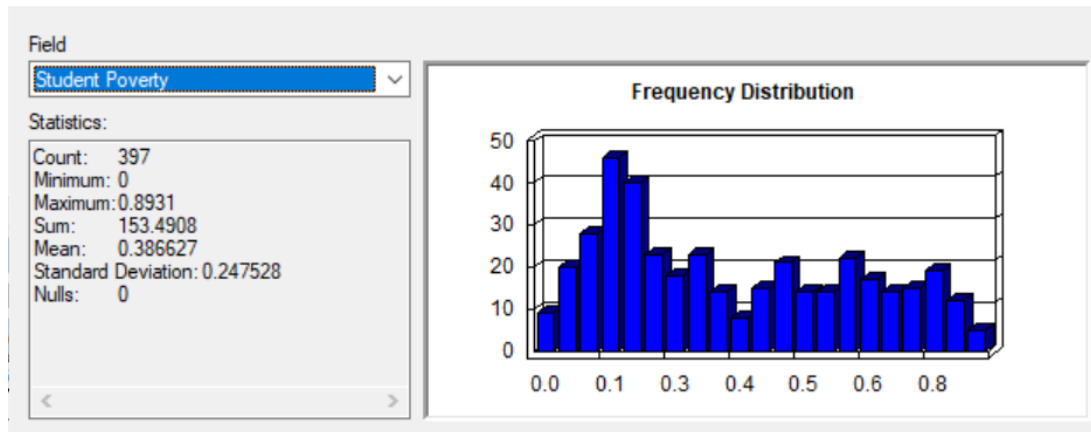


Figure 3: EDU3

7. Appendix (Figures) cont.

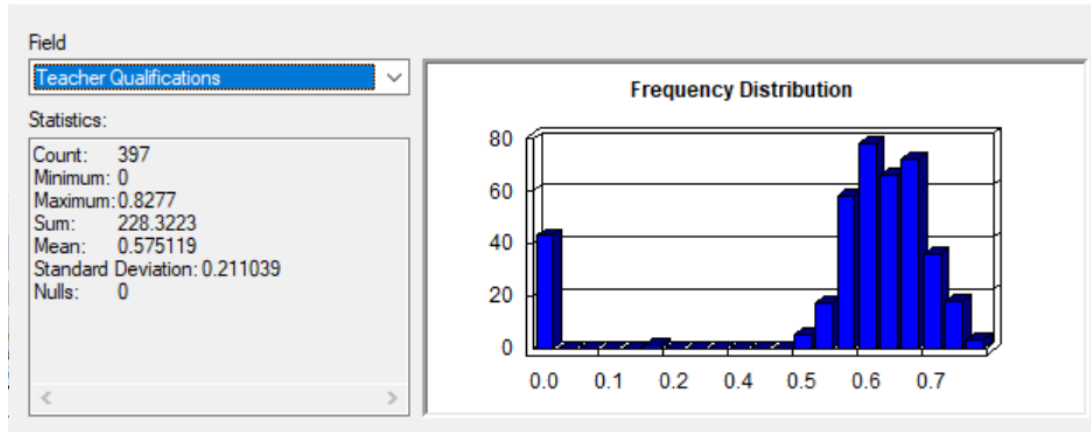


Figure 4: EDU4

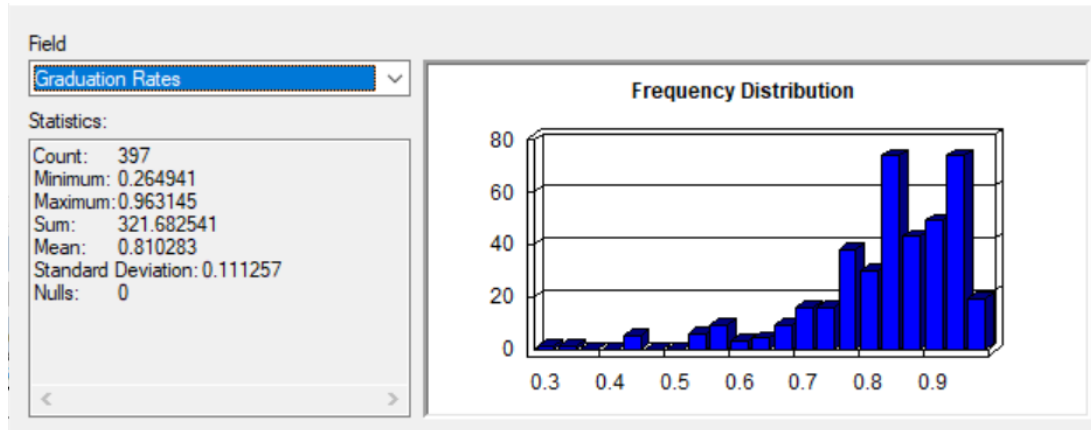
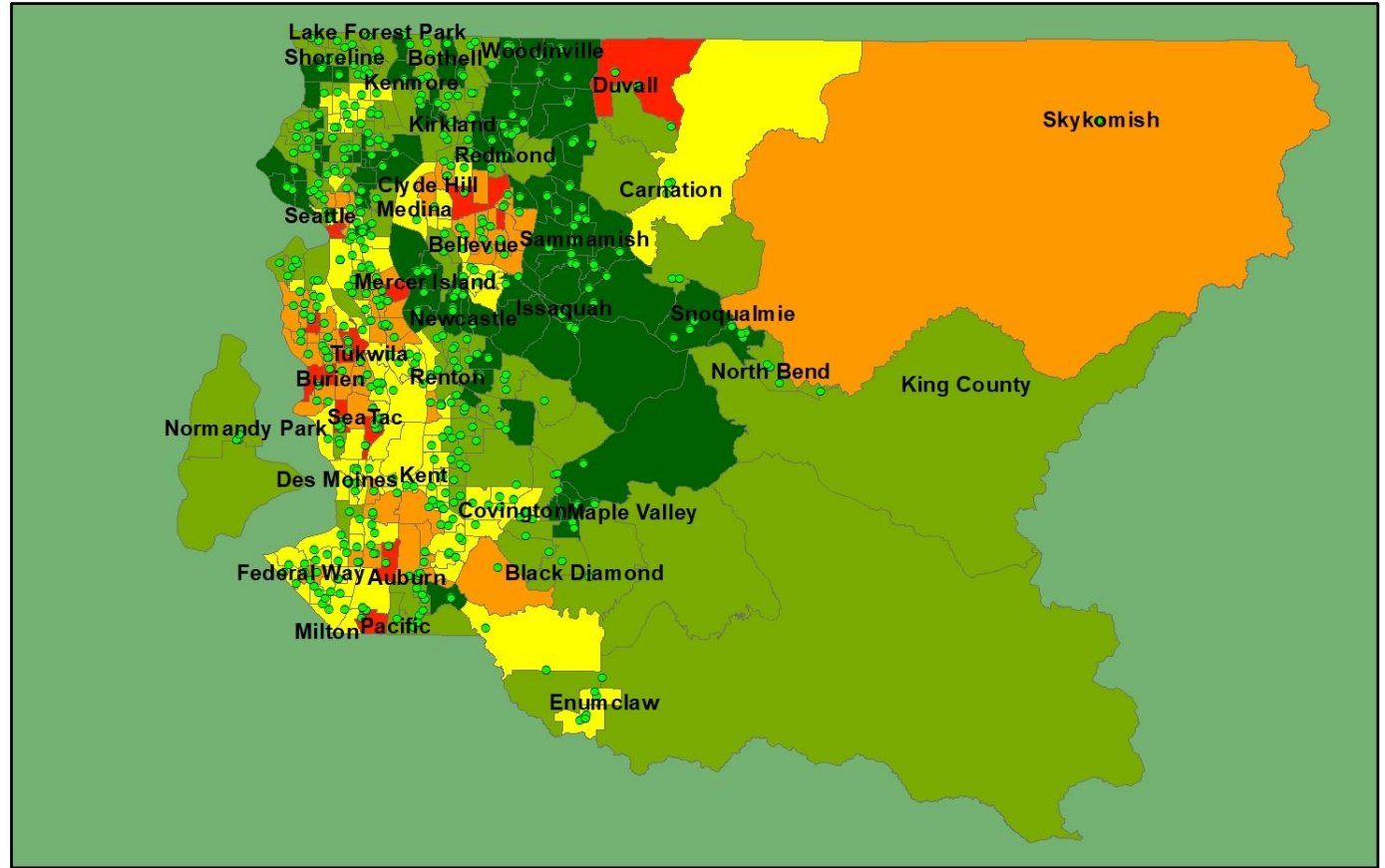
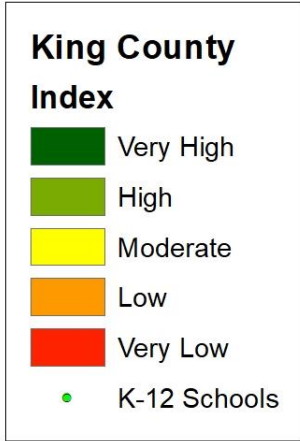
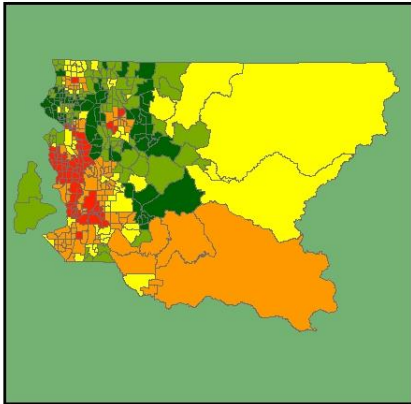


Figure 5: EDU5

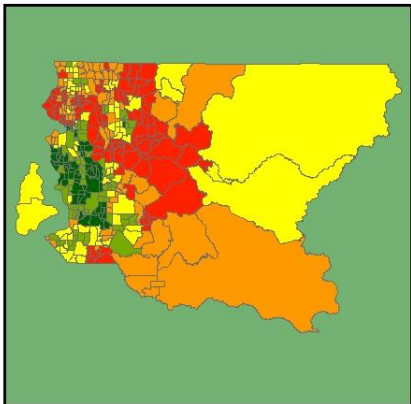
Education Equity Landscape



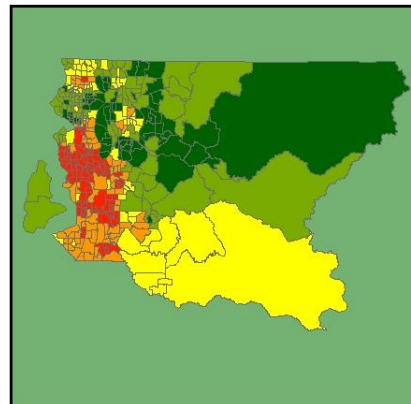
Reading Test Scores



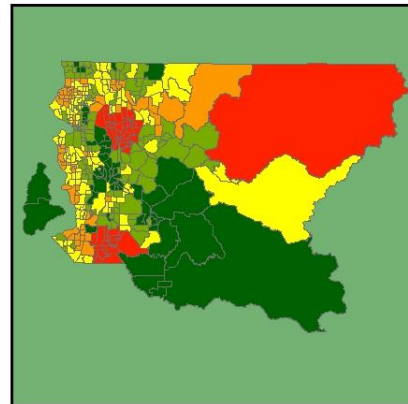
Math Test Scores



Student Poverty



Teacher Qualifications



Graduation Rates

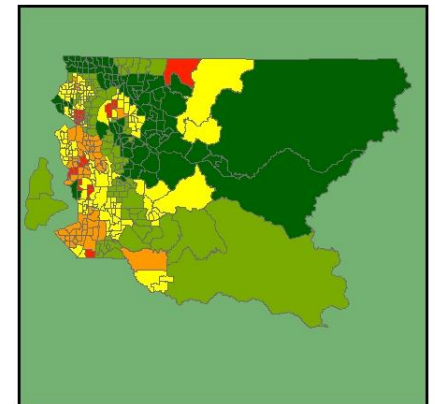


Figure 6: Composite Index