Mapping Educational Opportunity for Children in King County

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Introduction

The following geographic study was conducted to provide insight into the educational opportunities of school students in King County, WA. This study was conducted at the census tract level, making use of five individual educational indicators, with origin data provided by the Puget Sound Regional Council and the Kirwin Institute (Martin and Parham, 2012). The indicators, School Reading Proficiency, School Math Proficiency, Student Poverty Rates, Teacher Qualifications, and Graduation Rates were used to provide insight into educational opportunities for students in the study area. The indicators were used to construct an opportunity index, which provides a general understanding of educational opportunity, based on a combination of all factors of educational opportunity.

Potential of Opportunity Mapping

Opportunity mapping is a multifaceted approach to determining opportunity within a subset of society. The Kirwan Institute and Puget Sound Regional Council (PSRC) report on Equity, Opportunity, And Sustainability In The Central Puget Sound Region indicates that "no single negative factor leads to the creation of a marginalized community" but "Rather, a range of factors" which act in total to indicate access to or lack of access to opportunities (Martin and Parham, 2012). Opportunity mapping offers individual and collective insights into communities, and how well served those communities are in various aspects of opportunity. Specific to this report, we focus on the assessing the Geography of Educational Equity in King County.

Structure of the Assessment

The geographic study of education opportunity in King County was primarily focused on assessing five indicators of educational opportunity. Listed below are the five indicators and a general description of how these indicators were measured the Kirwan Institute and PSRC:

- School Reading Proficiency: "The school proficiency rate on the 4th-grade reading exam" (Martin and Parham, 2012)
- School Math Proficiency: "The school proficiency rate on the 4th-grade mathematics exam" (Martin and Parham, 2012)

- Student Poverty Rates: “The percentage of elementary school students receiving free or reduced-price lunches” (Martin and Parham, 2012)
- Teacher Qualifications: “The percentage of teachers who have obtained a master’s degree or more” (Martin and Parham, 2012)
- Graduation Rates: “The percentage of students who graduated from high school on time” (Martin and Parham, 2012)

According to the Kirwan Institute and PSRC, the method for collecting data on these indicators related to measuring indicators from the three schools nearest each tract centroid, and also made considerations for school district boundaries, assigning data to tracts only according to the district which the tract resides within (Martin and Parham, 2012). Initial data collected for these indicators was further refined by converting variables to z-scores, which assisted in offering insights into where each tract measured along the mean, whether above or below the mean. The Student Poverty Rates z-score was calculated using a negative correlation, to indicate that positive student poverty rates are a negative indicator of opportunity. All other indicators were calculated under a normal correlation, where the instance of a positive z-score indicates high rates of opportunity. Results were then classified into quintiles which were then displayed on a map for each indicator, as well as the overall opportunity index map. Quintile classification is helpful in providing an even size comparison of opportunity within the study area.

Discussion of Results

The following discussion revolves around choropleth maps produced for each of the five indicators, which show a varying range of opportunities by census tract. These maps can be found in the Appendix, Figures 1-5. When looking at the five indicators, only two directly relate to test scoring, reading (Figure 1) and math (Figure 2) proficiency scores. The displayed results do not show significant variation in the location of opportunity between the two indicators. There is an indication that there is a lower overall opportunity when comparing reading scores by tract to math scores, where math scores are generally lower than reading scores. Very high and high student poverty rates (Figure 3) seem relegated

mostly within and adjacent to urban centers, while suburban and rural tracts seem to trend low and very low along the spectrum. It is interesting to note that there is a wide variation in rates of poverty by adjacent census tract in some areas, where very high rates of poverty are adjacent to very low rates of poverty.

When observing the relationship between teacher qualifications (Figure 4) and graduation rates (Figure 5), there seems to be a negative relationship between the two, where there are indications of highly qualified teachers in certain census tracts where graduation rates are low or very low. This relationship is peculiar as one would assume that tracts with highly qualified teachers should result in higher graduation rates. Additionally, it seems as if teaching qualification has no positive or negative effect on reading and math scores within tracts. It is important to note that the Kirnan Institute and PSRC measure teacher qualifications as "the percentage of teachers who have obtained a master's degree or more" (Martin and Parham, 2012). Given these results, future data collection should consider alternative methodology when determining teacher qualifications to attempt to determine a positive correlative relationship between teacher qualification and graduation rate, such as length of individual teacher experience.

Composite Educational Opportunity Index

After calculating z-score for each individual educational indicator, a composite educational index was created by averaging all variables. This was further transformed by applying a weighting scheme to create a weighted educational opportunity index, in which it was determined that teacher qualification should be considered at half the rate of all other variables. This reasoning was decided by evaluating all other educational indicators, and recognizing that test scoring, poverty, and graduation rates were relatively direct indicators of student opportunities, with direct measures of access to opportunity. This in contrast to teacher qualification rates, where measures of opportunity were more indirect and specific to degree attainment of teachers within the tracts. Given the individual results of teacher qualification and other indicators, it was determined that considering teacher

qualification less than other indicators would provide a more accurate display of educational opportunity in the study area.

The weighted educational opportunity index was mapped in similar fashion as the individual indicators to create a mapped Educational Opportunity Index for King County (Figure 6). Overall, this opportunity index does well at displaying the overarching themes of the individual indicators in Figures 1-5, where we can generally see less opportunity in urban areas, and conversely, more opportunity in suburban and rural regions. Additionally, the index does display a wide variation in opportunity of adjacent tracts along the urban/suburban transition, where very low opportunity tracts are adjacent to tracts of very high opportunity. It should be noted that all indicators align well with the overall opportunity index with the exception of teaching qualifications. Teaching qualifications vary widely, with no apparent pattern between areas of very high to very low qualification, whereas we can see clear trends in other indicators, as well as the opportunity index.

Conclusion

The overall index presents a study area where educational opportunities for children vary greatly, whether they live in an urban or suburban/rural setting, or even based on which side of the street they live on relative to other children. This presents a very complex reality of educational opportunity within the study area. Areas of very low to low opportunity within mostly urban settings generally score well below the average on standardized tests, are brought up in households of poverty, and may be delayed or prohibited from completing their secondary education based on these conditions. Conversely, students located in mostly suburban and rural tracts with high to very high opportunity generally score above average on standardized tests, are from affluent families, and have a high rate of timely graduation. It cannot be understated that any focus on improving access to educational opportunity and movement toward educational equity should focus on mainly urban centers where children lack access to high quality education and familial opportunity to ensure stability for children to excel in their educational journey.

Bibliography

Martin, Matthew, and Tim Parham. Rep. Equity, Opportunity, And Sustainability In The Central Puget Sound Region Geography Of Opportunity In The Central Puget Sound Region. Seattle, WA: Puget Sound Regional Council, 2012.

Appendix

Reading Test Scores by Census Tract

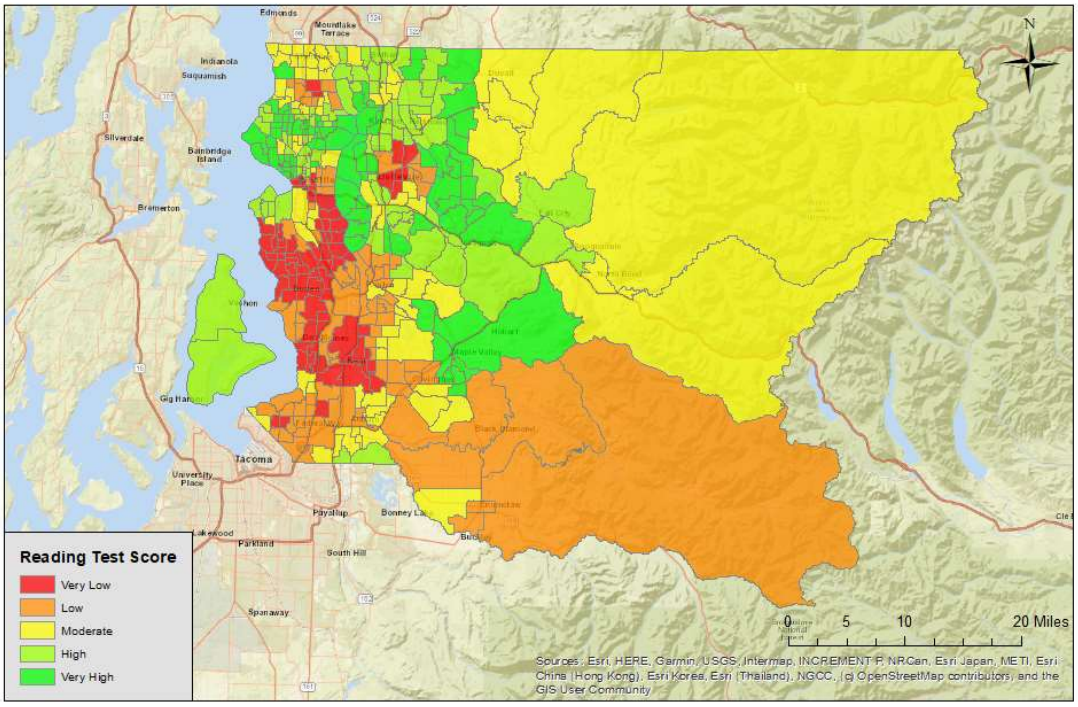

Figure 1 Reading Test Scores by Census tract (Martin and Parham, 2012)

Math Test Scores by Census Tract

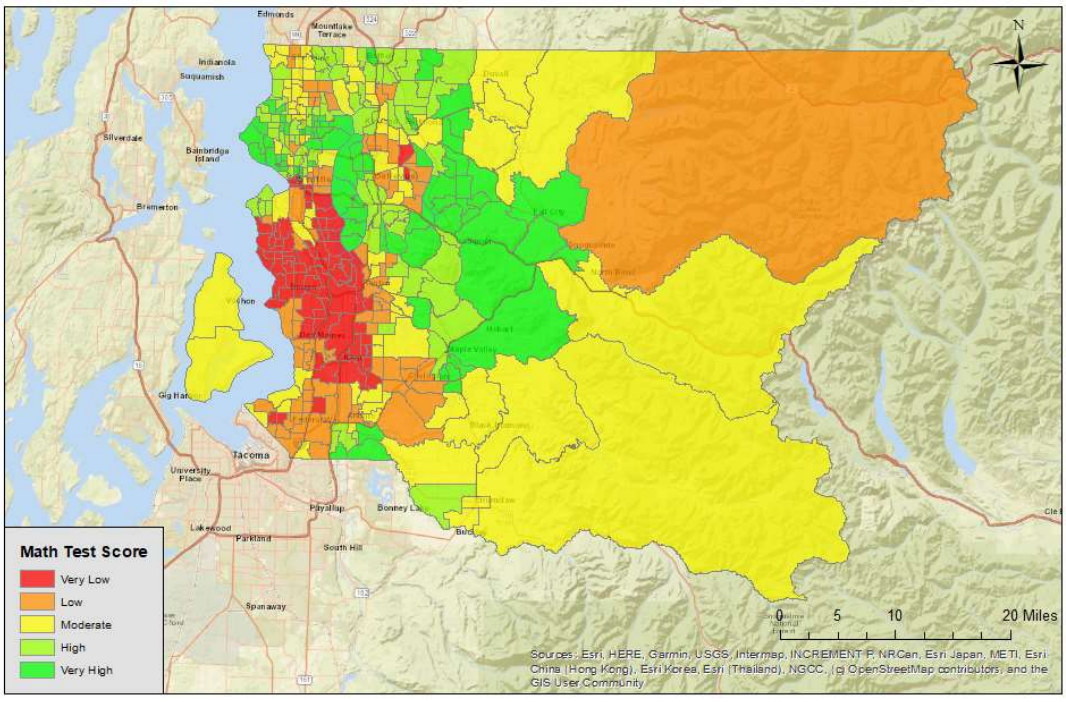

Figure 2 Math Test Scores by Census Tract (Martin and Parham, 2012)

Student Poverty Level by Census Tract

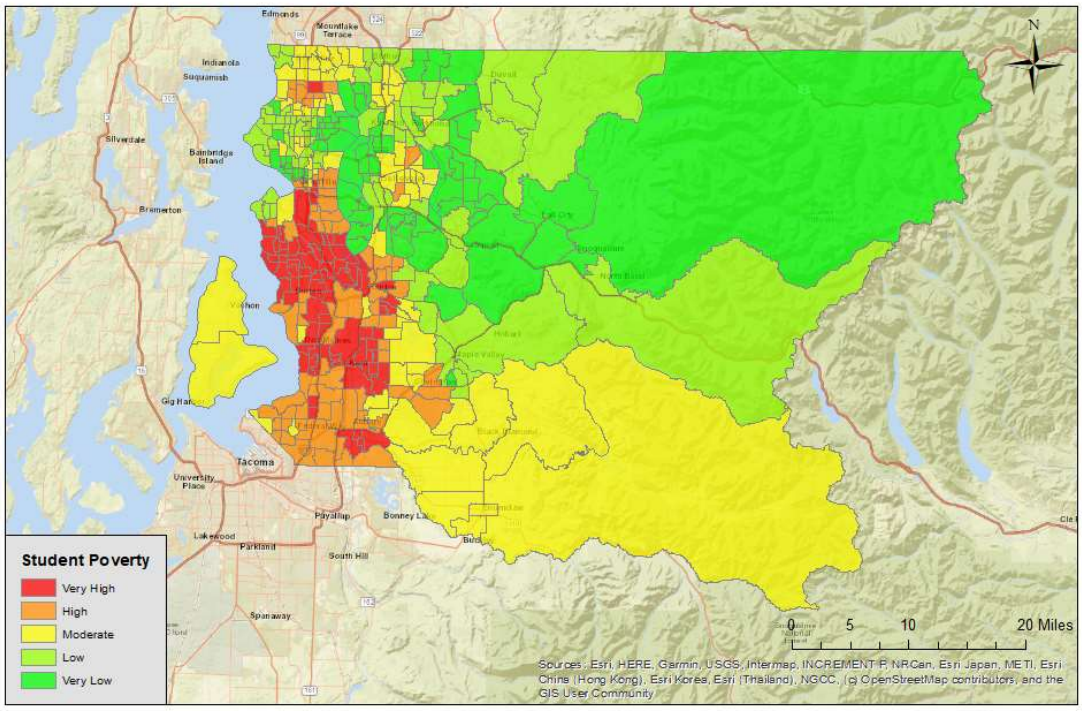

Figure 3 Student Poverty Level by Census Tract (Martin and Parham, 2012)

Teacher Qualifications by Census Tract

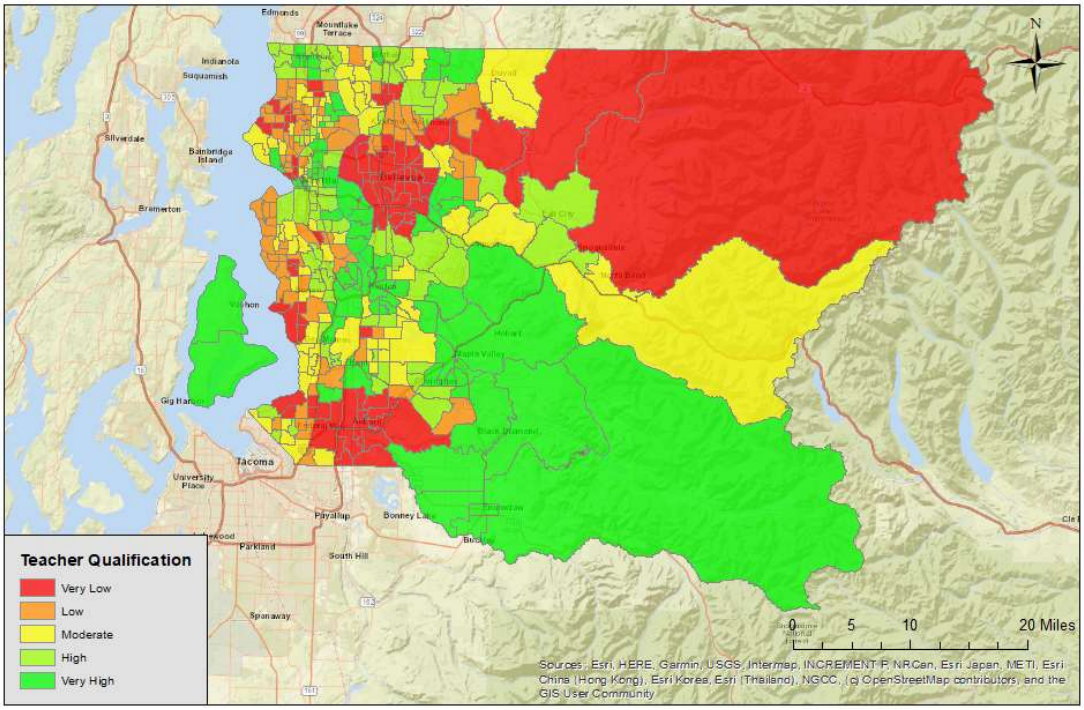

Figure 4 Teacher Qualifications by Census Tract (Martin and Parham, 2012)

Graduation Rates by Census Tract

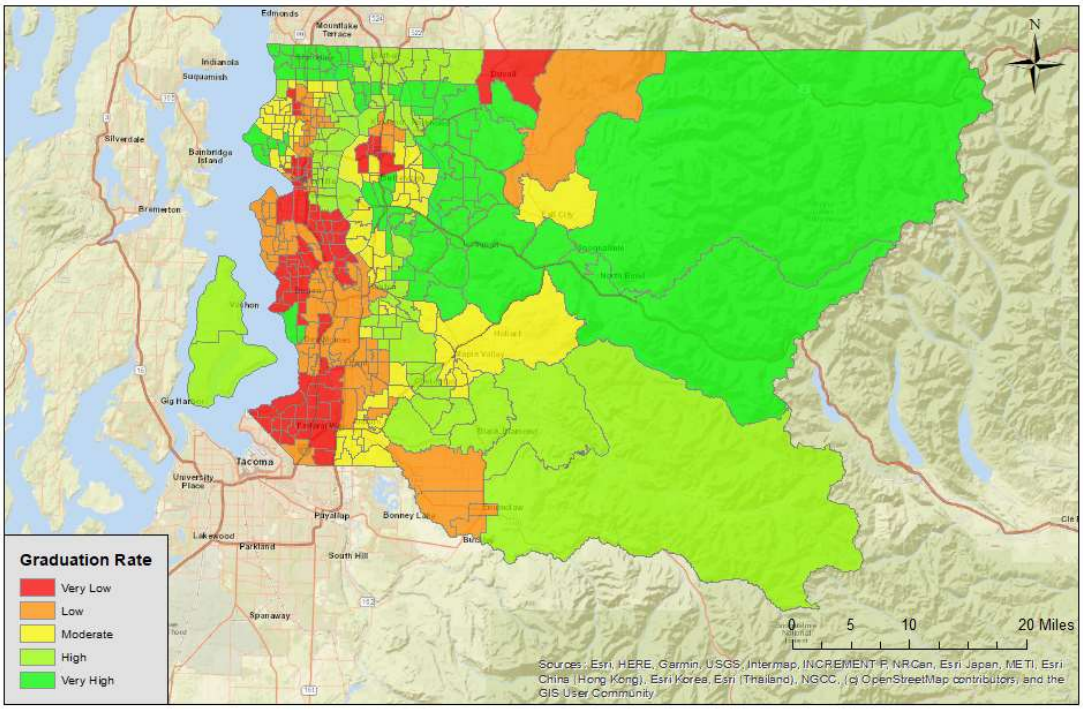

Figure 5 Graduation Rates by Census Tract (Martin and Parham, 2012)

Educational Opportunity Index for King County

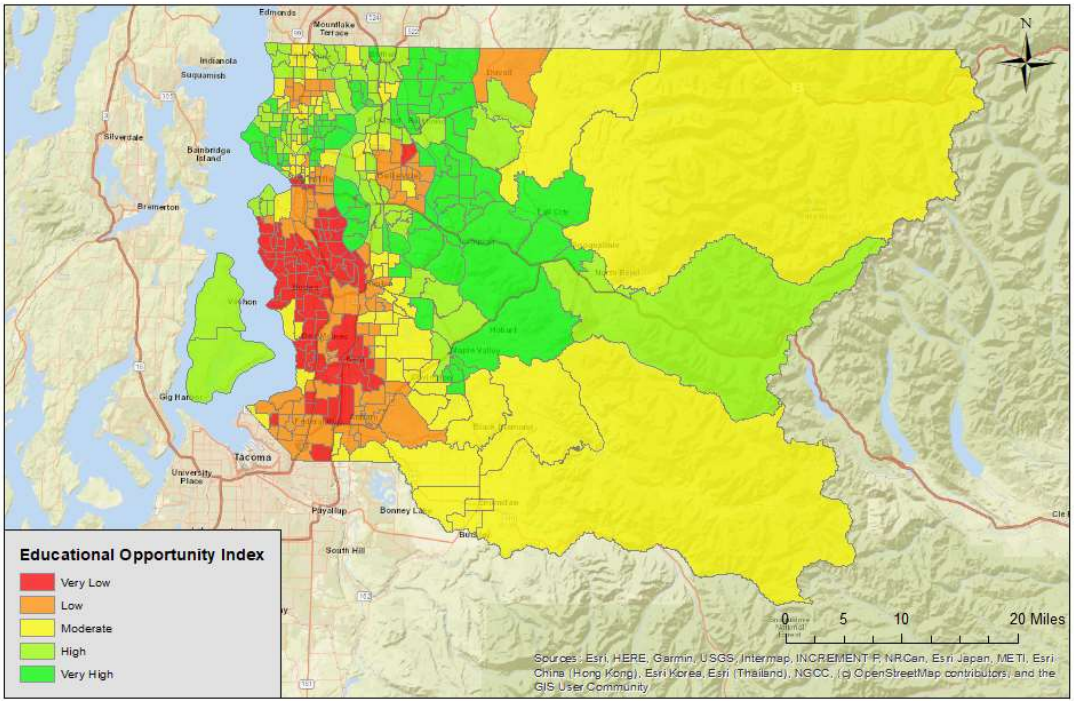

Figure 6 Overall Educational Opportunity Index for King County. This index is a weighted composite of five indicators in the previous figures. Red denotes lowest educational opportunity ranging to highest opportunity in bright green. (Martin and Parham, 2012)