BACKGROUND

Louis Kahn, one of the last great American modernist architects, lamented the crumbling of American institutions that once held significant meaning to the public. Forty years ago, he stated: “I see a situation where the physical make-up of our communities, I believe that Waterbury and small cities like it are in a favorable position to uncover neighborhoods from the luxury of their comfort and to improve them for the middle class. And if they do this, we are no longer at the center of neighborhood life. Beauty is not possible in a place where people live in ignorance of the physical environment around them.”

A Place-Based GIS Approach to Identifying Educational Opportunity Zones

City for Thought seeks to extend beyond the limitations of school parcels by taking into account where other physical layers might also exist. Thus identifying educational opportunity zones as potential community centers.

WHAT IS SOD?

School oriented development, much like transit oriented development (TOD), has been proposed in urban suburban districts where grabbing public primary and secondary schools layers were summed to arrive at a final raster with unique values. These unique values demonstrate regions of both educational opportunity and moderate household income level.

METHODOLOGY

1. Building an Educational Opportunity Index using Network Analyst

City for Thought identifies two unique thought factors in order to derive an educational opportunity index. A thought factor is defined as a physical space, community resource, or network that facilitates an educational learning environment. These thought factors include public primary schools, public secondary schools, colleges, private schools, public library locations, third places, cultural institutions, open space, and physical access. With the exception of physical access, each of these layers began as a set of geocoded points. In the case of open space, points were derived using the Production Create Points at Bufferpoints tool. This tool created points where open space polygons intersect streets, thereby creating potential points for access. Network analyst was used to derive a walkshed polygon for each point layer, which was then converted to a raster with values calculated as either 0 (regions outside of the walkshed) or 1 (regions within the walkshed). The raster’s analysis distances is set as 0.1 mile or 0.1 mile, depending on the thought factor.

Physical access is a separate thought factor summed from two distinct factors: 1. a walkshed of 0.1 mile distance for regional bus stops calculated using network analyst and 2. a sidewalk kernel density raster derived from a residential density zone. These two distinct raster layers were added and reclassified so as to create a final physical access layer with values 0 (regions that do not benefit from physical access factors) and 1 (regions that do benefit from physical access factors).

Each of the nine layers were assigned weights determined by the level of influence that the factors wield in creating a comprehensive learning environment. These layers were summed using map algebra in order to arrive at a final educational opportunity index. The opportunity index was reclassified into a density map, which after reclassification became the final educational opportunity zones.

APPLICATIONS

School oriented development provides smaller districts opportunities for meaningful residential density. Smaller cities that do not have mass transit relies beyond flexible bus routes might use school oriented development to establish new neighborhood centers and density existing zones. School oriented development also offers opportunities for public-private partnerships, where municipalities have control over land and tracks of underserved space within city-owned school parcels. City for Thought seeks to extend beyond the limitations of school parcels by taking into account where other physical layers might also exist. Thus identifying educational opportunity zones as potential community centers.

LIMITATIONS

City for Thought is not a study of people or of vulnerable populations. Additional qualitative research through hands-on collaboration with community members is necessary in order to adequately address the needs of neighborhoods. Within the analysis itself, the zones mapped are undoubtedly affected by a number of inaccuracies. While deriving the walkshed with network analyst it be accepted that large city data sets can be prone to error and roads caused impression in the shape of the resulting polygons. It should also be understood that the opportunity index calculated is arbitrary. The arbitrary nature of the index also provides an opportunity where community members might “weigh-in” on the final equation used to derive the opportunity index. Another limitation of the study is truly a rough estimation of residential density, given the unavailability of exact unit counts for all residential parcels. While the limitations are many, the concept of City for Thought presents a lens through which more questions surrounding place-based educational opportunity networks and School Oriented Development might be asked.

WHERE IN THE WORLD?

The Opportunity Index and Median Household Income Level rasters were summed using map algebra to create a final raster with unique values. These unique values demonstrate regions of both educational opportunity and moderate household income level.

2. Analyzing Access within Educational Opportunity Zones

Residential density is mapped as a useful tool for school oriented development availability. By directly comparing relative opportunity zones to residential density, planners gain useful information about the areas in which people live.

City for Thought analyses present an alternative place-based approach to identifying potential neighborhood centers. Planners might use this method to identify regions appropriate for growth and development, based on community needs and to ask important questions. How, for example, can we grant more access to low-income populations to Waterbury an overview of existing educational opportunity zones and to encourage growth within these zones.

3. Comparing Opportunity Zones to Residential Density

City for Thought utilizes nine unique thought factors in order to derive an educational opportunity index. A thought factor is defined as a physical space, community resource, or network that facilitates an educational learning environment. These thought factors include public primary schools, public secondary schools, colleges, private schools, public library locations, third places, cultural institutions, open space, and physical access.

While a number of applications are conceivable, one example utilizes the final opportunity and residential density map. This allows planners to identify regions that are neighborhoods do not indicate real access to educational opportunity zones as potential community centers.