Health Initiative and Federal Funding Assessment of Humboldt Park and Lincoln Park Schools

Mapping Alternatives for Neighborhood Group Organizations (MANGO)
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I. Stages of Project Completion

Stage 1: Needs Assessment

1.1 Background

This project is being done in the context of a larger study by the client on "food deserts," urban areas where grocery stores are not readily accessible. Instead, food sources in these areas, where they exist, are unhealthy fast food restaurants. The report "Examining the Impact of Food Deserts on Public Health in Chicago" was performed by Mari Gallagher Research & Consulting Group "to explore the health consequences of food deserts." The Chicago neighborhood of Humboldt Park, that we are looking at in our project, is a place where healthy food sources are not readily available. A previous study, "Spatial Relationships between economic inequity and access to nutritious foods," has already evaluated the retail sources of food in the area (http://gis.depaul.edu/shwang/CommunityOutreach/GEO242_Service_Learning_Project/GEO242_Aut0708_HBP_final_report.pdf). The Gallagher report supports the underlying assumption that our project is based on, that lack of access to healthy foods because of lack of access to grocery stores does produce negative health consequences like "cardiovascular disease, diabetes, and cancer deaths ... obesity, and hypertension" (Gallagher 5). Incidentally, this report had many visual representations of the data, which may be useful when deciding how to present the results of our project.

The article "Prevalence of Obesity Among Children in Six Chicago Communities" demonstrates clearly that even children experience the unhealthy impact of living in the neighborhood of Humboldt Park.

The literature was found through the clients. The case study looked at six Chicago neighborhoods and compared population data, racial data, household income data, education data, childhood poverty data, to obesity rates. The study establishes a link between neighborhood childhood obesity rates and their respective race and class. The data on childhood obesity was collected by the Sinai Health System in Chicago in September 2002 to April 2003. The clients' project is based in Humboldt Park, and this survey uses Humboldt Park as a studied neighborhood. Childhood obesity rates in Humboldt Park was 48 percent as the national average is 16.8. The predominantly white community, Norwood Park that is located on the north side has an 11.8 percent obesity rate. The tie to income, neighborhood vacancy rates, and race are stark when compared to the obesity rate. When looking at household income, the poorer the neighborhood the significantly more children who are going to be obese. The study sees white children in a league of their own with obesity rates, 7.7 percent of non-Hispanic children are obese, while African American and Puerto Rican children come out with 50 or greater percent of the childhood population that is obese. The case study also goes to imply that poor and children of color watch more television, eat more fast food and chips. The study's relation to group MANGO's client, Howard Rosing and CO-OP HP, is the data and implications to obesity and food conditions in Humboldt Park comparatively to Norwood Park. CO-OP Humboldt Park is a branch of the Puerto Rican Cultural Center centered on exposing the neighborhood's high obesity rate and the illnesses associated with obesity and poor food quality. Though the data is more

likely to be compared to Lincoln Park students the similarities to Norwood Park easily matched.

We know that children receive at least one of their daily meals, on weekdays during the school year, at school. One question motivating this research is what kind of food is available to children in schools in both Humboldt Park, a neighborhood that has been shown to be nutritionally unhealthy, and Lincoln Park, an affluent neighborhood with many sources of healthy food. Research has shown that participation in the National School Lunch Program decreases when low-fat lunches are offered, which suggests that higher fat options are in high demand for school lunches (Gleason, P.M. Participation in the National School Lunch Program and the School Breakfast Program, American Journal of Clinical Nutrition, Vol. 61, 213S-220S, 1995). The collection and the representation of the data we find will be put to use as to better understand these discrepancies. The specifics of our intentions are outlined below in the Goals and Objectives sections.

1.2 Goal

The main goal that our group has for this project is to compare and analyze any differences found in the availability of nutritious foods at schools in Humboldt Park and Lincoln Park, along with how many schools receive federal funding and how many students are eligible for meal plans. The Humboldt Park area represents communities or minorities while Lincoln Park is comprised mainly of affluent individuals, so there may be an apparent disparity. We and our client also wish to determine specifically the nutritional differences between foods served at schools in both community areas, looking at total fat content and total Calorie content. Unfortunately this goal proved to be unattainable due to data collection constraints. We also wished to take into account the cost and affordability of the food, but this also was unachievable. With this information we would hopefully be able to witness a correlation between the accessibility of healthy food and childhood obesity.

1.3 Objectives

In order to compare schools, we must first comprise a list of schools in our neighborhoods of interest. We will then need to perform geocoding in order to collect coordinate points of all schools for our mapping purposes. Certain characteristics of each school will be gathered and compiled into a spreadsheet, indicating the public/private nature of the school, the types of lunches provided, if the school has health initiatives, if the school receives federal funding, and how many students are eligible to receive meal plans. We will use this information to make a series of maps that depict how these attributes relate to the average household income of the community areas. When this has been completed it will be possible to make correlations or indentify patterns in the data.

Stage 2: System Requirements

2.1 Introduction

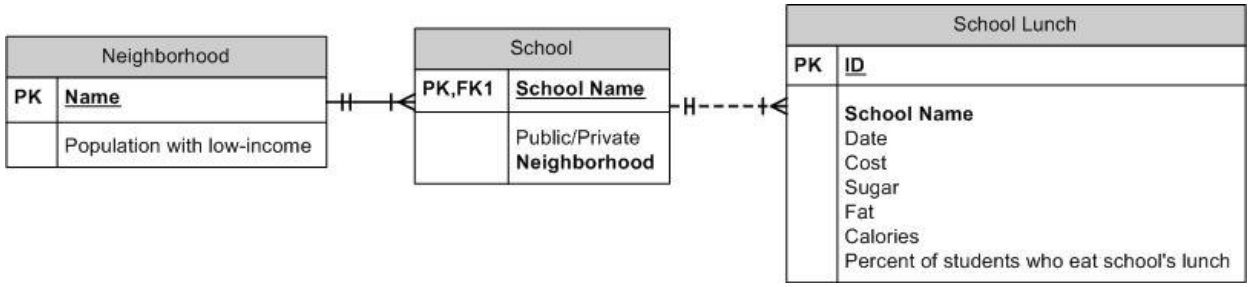
Our project is designed to evaluate the nutritional value of school meals in two Chicago neighborhoods. In order to accomplish this task, we needed to predict our data and software requirements and the relationship between the data we expect to receive. Most of our project questions relate to comparison between values, meaning that most of our questions require data from two or more entities. The process of data manipulation will account for most of our software requirements. Representation should involve a simple set of overlays of our results, for most questions.

2.2 Data Requirements

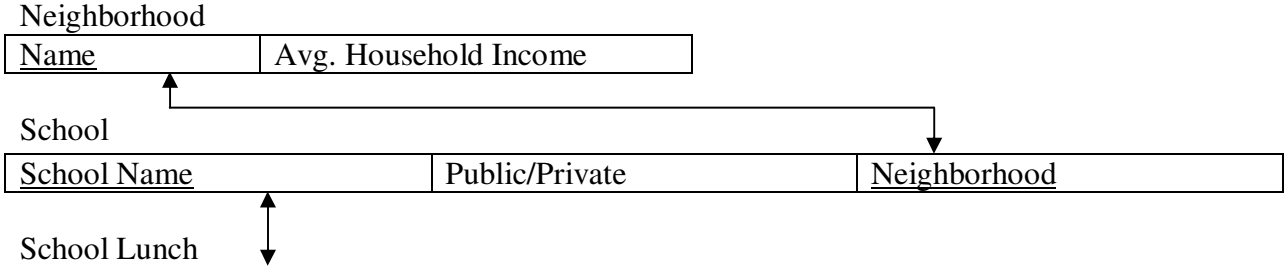
I. "need-to-know questions and entities" matrix

Entities / Need-to-know questions	Neighborhood	School	School lunch
How many schools are CPS, private, magnet, charter, small, or alternative in each neighborhood?	X	X	
How does the percentage of students eligible for meal plans relate to the income level of the neighborhood in which a school operates?	X	X	X
How many schools receive federal funds for lunch programs in relation to the income level of the neighborhood in which they operate?	X	X	X
Which schools have healthy food initiatives in each neighborhood?	X	X	X

II. Entity-relationship diagram



III. Relational schema



ID	SchoolName	Neighborhood	Provider	Lunch	Health Initiative	Special Diets	Food Funds	Federal Lunch

2.3 Software Requirements

Functions / Need-to-know questions	Data collection	Data management	Data manipulation	Analysis	Visualization
How many schools are CPS, private, magnet, charter, small, or alternative in each neighborhood?	Data transfer	Data storage	Quality assessment, geocoding	Overlay	Thematic map & bar graph
How does the percentage of students eligible for meal plans relate to the income level of the neighborhood in which a school operates?	Data transfer	Data storage	Quality assessment, geocoding	Overlay	Graduated symbol thematic map
How many schools receive federal funds for lunch programs in relation to the income level of the neighborhood in which they operate?	Data transfer	Data storage	Quality assessment, geocoding	Overlay, query	Thematic map
Which schools have healthy food initiatives in each neighborhood?	Data transfer	Data storage	Quality assessment, geocoding	Overlay	Thematic map

Stage 3: Data Acquisition

3.1 Introduction

The goal of team MANGO is to evaluate the health and nutritional value of elementary school meals in two Chicago neighborhoods, Lincoln Park and Humboldt Park. On the course of this project, we already have predicted the type of data that we will attain and the software requirements that we need to interpret it. In this report, we've identified the data sets that we need for our project, in this case, there are three: Neighborhood, School, and School Lunch. Having explored our data received from the Steans Center, we have discovered constraints that will alter our analysis of the data in our final project. Below we have outlined the aforementioned data sets, as well as determined their fitness for use in achieving our client's goals.

3.2 Data Dictionary

Neighborhood
Source of the data: Chicago community area shapefile, '00 Census tract income data
Processing steps: 1) Add community area layer, 2) Adjust symbology of layer to represent Humboldt Park and Lincoln Park income information, 3) Join Census tract data, 4)Create choropleth map with income levels.
Spatial object: polygon

Attributes:	Field Name	Description
	Name	The colloquial name of the neighborhood
	AveInc	The average income of each neighborhood

Data format: database file, shapefile

School
Source of the data: Steans Center, Howard Rosing
Processing steps: Converting location from address to latitude/longitude
Spatial Object type: point
Attributes:

Field name	Description
ID	School identification number
Name	Name of School
Type	Type of school (public, private, etc.)
Latitude	Latitude in decimal degree, NAD83
Longitude	Longitude in decimal degree, NAD83

Date format: geocoded shapefile file

School Lunch
Source of data: Steans Center, Howard Rosing
Processing steps: 1) Data provided by psychology students in Word document, 2) Reenter data into Excel spreadsheet and convert to .csv format, 3) Join to school data in ArcGis.
Spacial Object type: Point
Attributes:

Field name	Description
ID	School lunch identification number
School_Name	Name of the school where it's served
Neighorhood	Neighborhood where school is located
FoodProvider	Name of food provider for school lunch
Lunch	Foods provided by schools
Health_Initiative	Is there a health initiative? Yes/No
SpecialDiets	Yes/No
FoodFunds	Percentage of students receiving food funds
FedLunch	Yes/No: participation in Federal Lunch Programs

Data format: .csv file

3.3 Fitness for Use

Data Set Name: Neighborhood

This data set provides information on income for the community areas of Humboldt Park and Lincoln Park. The name of the community is measured nominally, while income is measured on a ratio scale. As Census Data, it accurately describes the average income levels in both neighborhoods in terms of attribute and position. It also provides complete information for each neighborhood. However, the data is from 2000. Because these data were not collected in 2009 like our other data sets, this is a limitation to using this data set, yet it is the most recent Census information available for use in our analysis. Another limitation to this data is that it does not represent precise income information within each neighborhood because it only provides the average.

Data Set Name: Humboldt Park and Lincoln Park Schools by street address

This data set provides the names of schools, as well as in which neighborhood they are located and their exact address. The attributes in the data set (school name, phone, address, neighborhood, latitude, and longitude) are all measured on a nominal scale. It terms of attribute accuracy and completeness, all entries are for all schools currently in operation for both desired neighborhoods. Information on whether schools are public, private, etc. is included. We found this data to be logically consistent with schools that are currently in operation in these community areas.

Data Set Name: School Lunch

This data set provides all of the information concerning the lunch served at the school, as well as information as to whether the school receives federal funding for its lunch programs and how many students are eligible for meal plans. A large portion of attribute fields were left incomplete upon receiving this data set; missing fields were relatively inconsistent across schools. Lunch nutrition information was not sufficient in this data set, so it was excluded from our analysis. The most reliable and plentiful data were used for this project concern the presence of health initiatives (measured nominally: yes/no), whether schools receive federal funding or not (measured nominally: yes/no), and how many students are eligible for meal plans (ratio measurement). Unfortunately, being in such an incomplete state, this data does not fulfill our desires or those of the client. While we had intentions of mapping nutritional quality of lunches at schools, we are limited to mapping the most complete attributes rather than all of the data in the data set.

3.4 Data Acquisition Constraints

There were some data that our group had planned on acquiring, but due to certain constraints, were never collected. For example, we had planned on collecting specific nutrition information (i.e. calories, sugar and fat content) about the foods served in the schools. However, due to time constraints, we may not be able to pick apart each component of every meal served at the school. Also, we have a field in our school data set concerning whether or not there is a health initiative. The presence of a health initiative does not necessarily mean that it is fully functional. Having that said, the data may make it seem as if a school has a plan when really they may only have one or two signs posted, misleading the viewer of the data.

Stage 4: Data Analysis and Visualization

4.1 Introduction

The goal of team MANGO is to evaluate the health and nutritional value of elementary school meals in two Chicago neighborhoods, Lincoln Park and Humboldt Park, as well as assess government funding of lunch programs in these areas. Five need-to-know questions were derived in the beginning stages of this project: How does the nutritional value of the school lunch relate to the public or private nature of the school, how does the cost of the lunch relate to the income level of the neighborhood the school is in, how does the cost of the school lunch relate to the nutritional value of the meal, how does the nutritional value of a school lunch differ between schools, and what is the relationship between the income of each neighborhood and the nutritional value of the school lunches in the neighborhood's school?

Over the course of time we had to completely revise our research questions. These are the questions we are going to focus on in our analysis: How many schools are CPS, private, magnet, charter, small, or alternative in each neighborhood, how does the percentage of students eligible for meal plans relate to the income level of the neighborhood in which a school operates, how many schools receive federal funds for lunch programs in relation to the income level of the neighborhood in which they operate, and what percentage of schools have healthy food initiatives in each neighborhood?

Our project has changed since the initial planning stages due to data constraints. At first we believed that we would perform analyses based primarily on nutritional quality of school lunches, such as Calorie, fat, and sugar content. Our project now has more of a government funding related focus, with emphasis on the public/private nature of the schools, as well as the average income of each neighborhood area. Not all of the data provided to us were suitable for the analyses we planned to perform, resulting in modifications to our need to know questions. For instance, there was no information telling us the costs of school lunches in each school, so we removed that question and had to alter another.

4.2 Information Products

How many schools are CPS, private, magnet, charter, small, or alternative in each neighborhood: Thematic Map

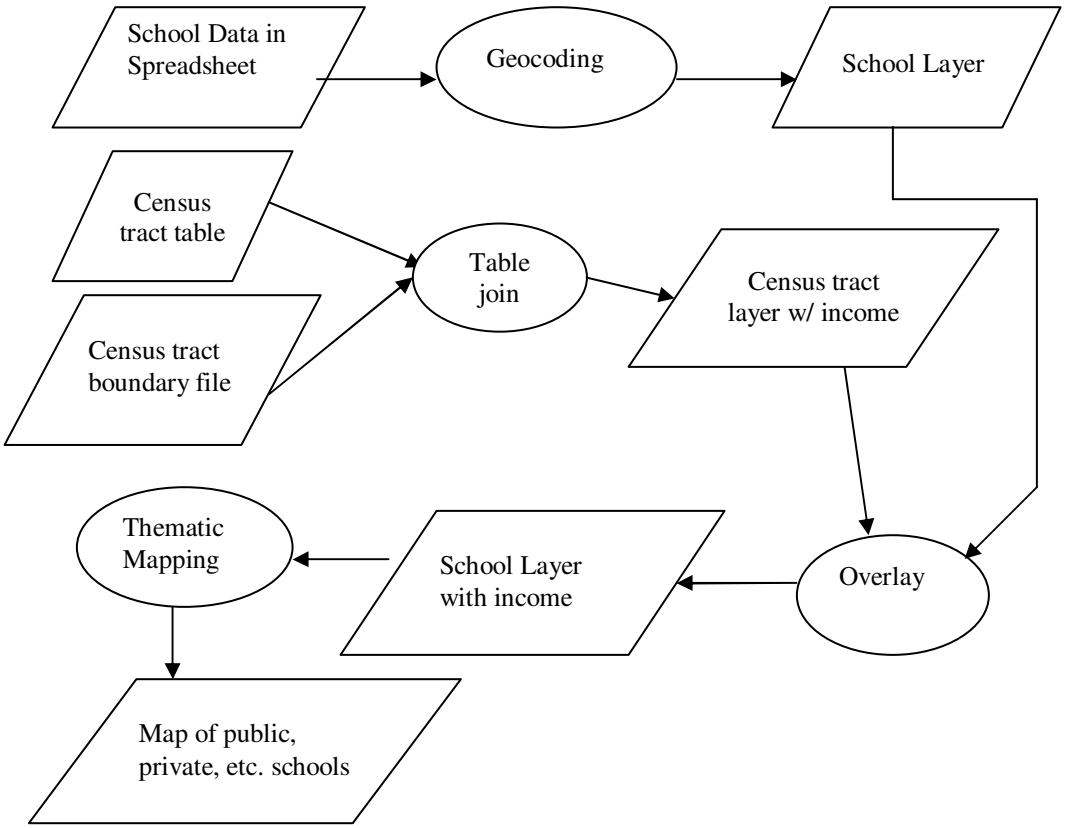
How does the percentage of students eligible for meal plans relate to the income level of the neighborhood in which a school operates: Thematic Map.

How many schools receive federal funds for lunch programs in relation to the income level of the neighborhood in which they operate: Thematic Map.

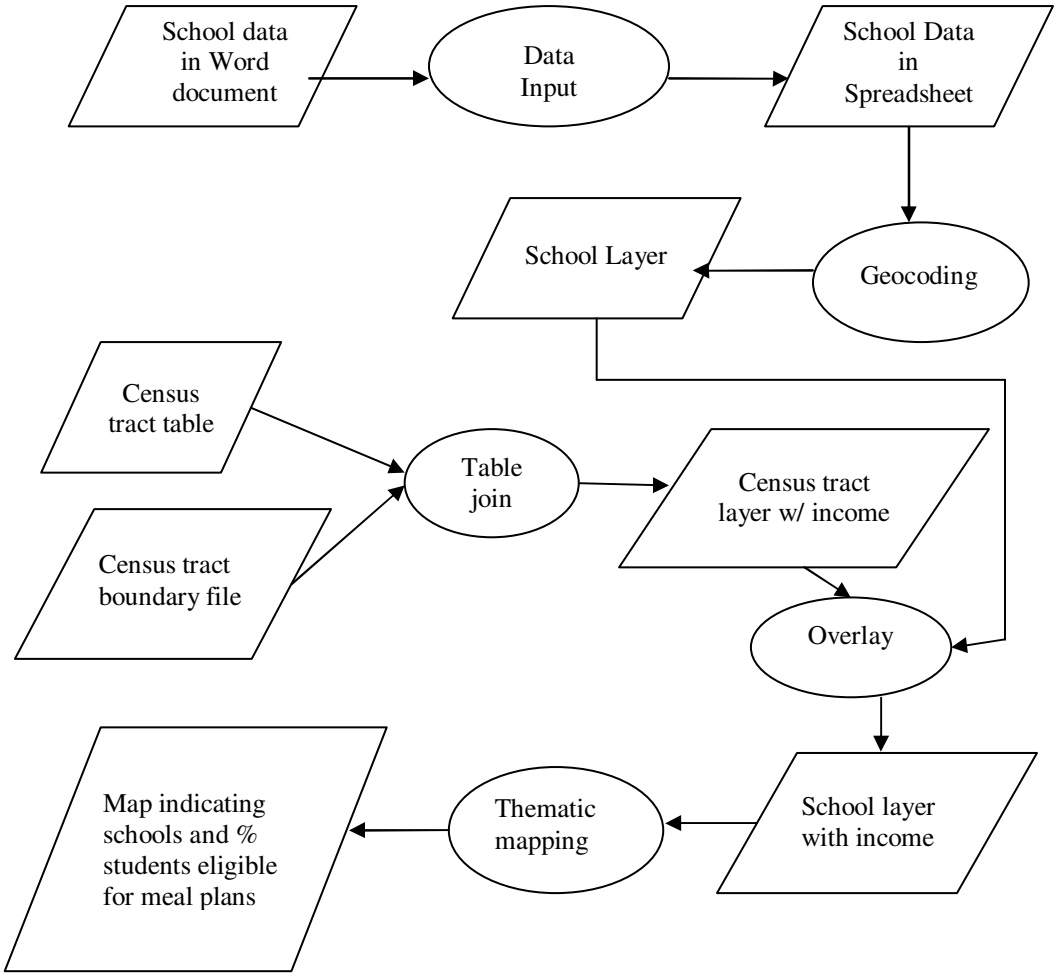
Which schools have healthy food initiatives in each neighborhood: Thematic Map.

4.3 Data Analysis

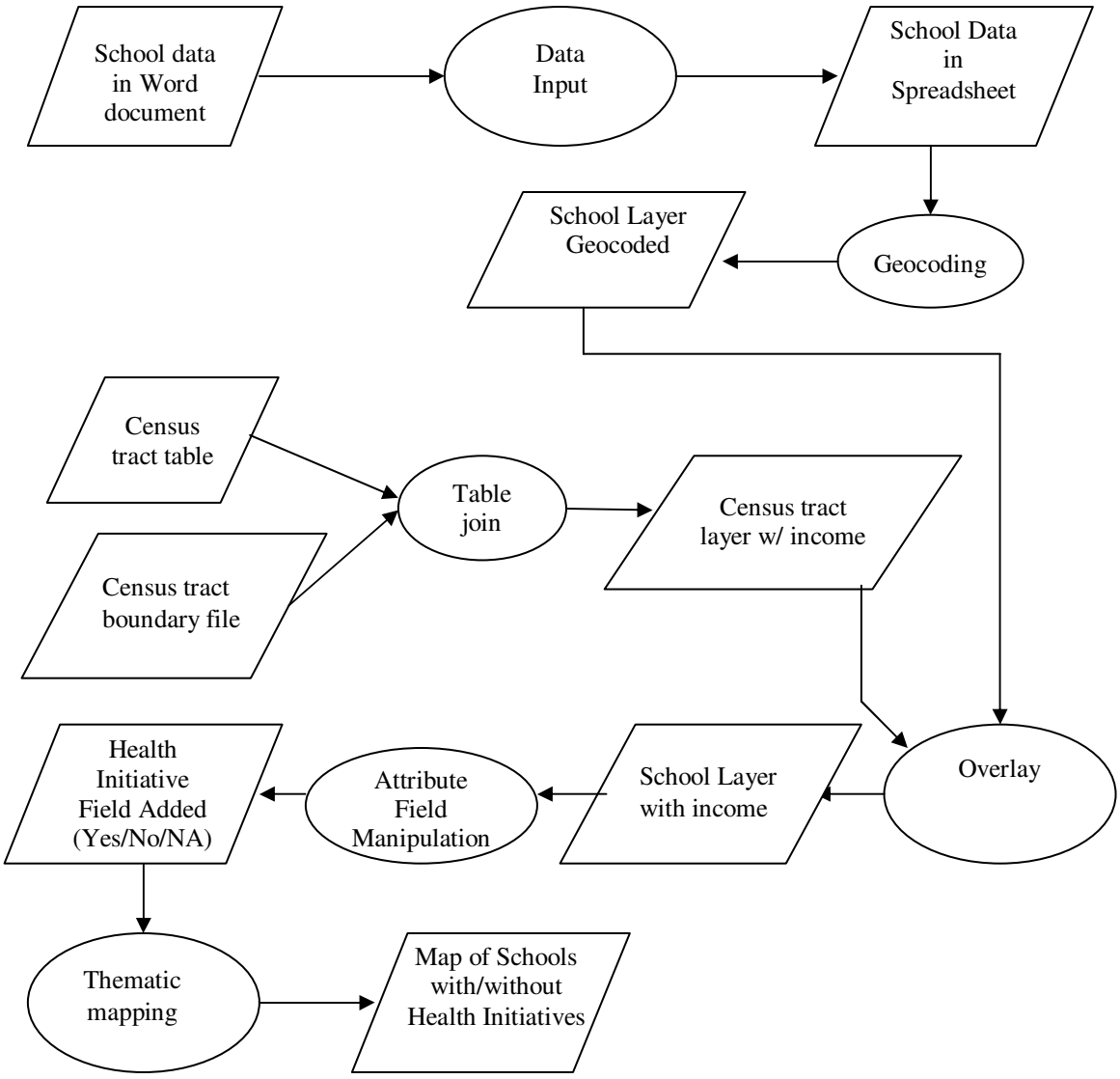
How many schools are CPS, private, magnet, charter, small, or alternative in each neighborhood:



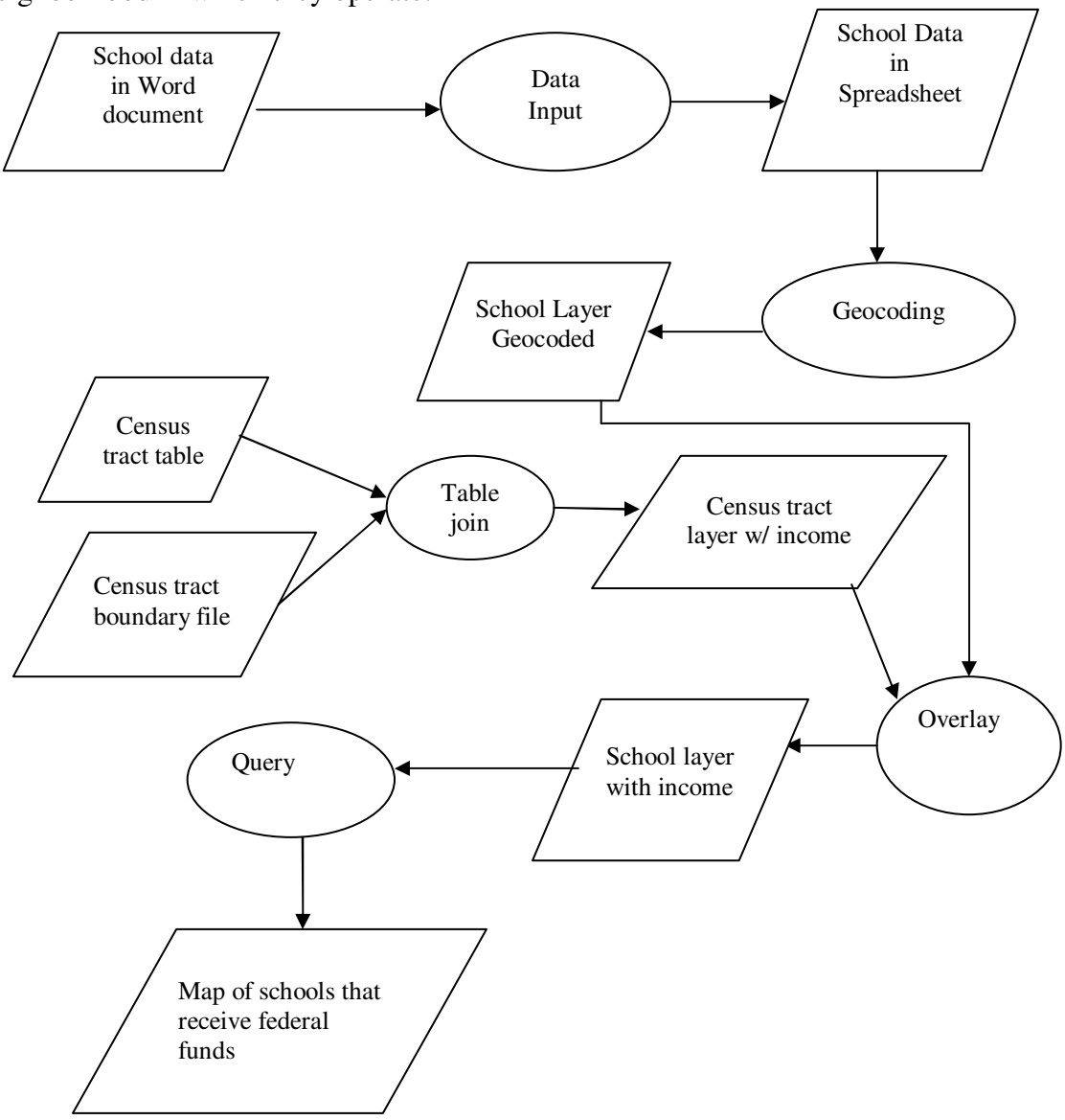
How does the percentage of students eligible for meal plans relate to the income level of the neighborhood in which a school operates:



Which schools have healthy food initiatives in each neighborhood:



How many schools receive federal funds for lunch programs in relation to the income level of the neighborhood in which they operate:



4.4 Data Visualization

Three of our information products for our need-to-know questions are combined into one thematic map. First we pulled up a shapefile of Chicago's communities and clipped the shapefile to show just the neighborhoods relevant to our data analysis, as well as bordering neighborhoods. After geocoding school addresses into latitude/longitude coordinates, spatial overlay was performed with a Census tract income layer to show difference in average household income among community areas. School information was then added to the map in the form of a table. Schools that reported no information were not represented at all, and schools that reported that they did not use funding were expressed with the color white. We used different color values to

express what percent of students are on meal plans at each school. This information does not indicate how much each school receives in federal funding, just the students eligible. We classified this data using an equal interval classification scheme. Next was to mark the schools that openly expressed they did not have a health initiative for their lunch program. In the table the schools were marked down for a "yes" or "no" and when brought to represent this we choose to only represent "no". We choose an "X" to mark schools that do not have health initiatives. Making sure that all details were easy to see for the client, we made sure that the health initiative was imposed on top with the schools underneath and the community income levels beneath the rest. Community areas were then labeled to provide viewers a better reference point of the areas being analyzed.

We went through a similar process producing a second map that illustrates which schools are public, private, etc. in both neighborhoods. Again, after geocoding school addresses into latitude/longitude coordinates, spatial overlay was performed with a Census tract income layer to show difference in average household income among community areas. We then used thematic mapping to produce points with different color values indicating if a school is public, private, etc. Using Excel, we also produced a bar graph that provides another interpretation of the number of different schools in each community area.

The information product described above was not all the client meant to represent, but it makes reasonable use of the data provided. Due to data constraint and logical inconsistencies we could only map these research questions because the data received was not suitable. The client's third party research team did not give us complete or compatible information. Our representation of the data used was to make the information jump out at a user or client.

II. Conclusions and Recommendations

1. Conclusions

Both maps project a lot of information, allowing us to draw several conclusions. First of all, the number of Chicago Public Schools operating in the Humboldt Park community area outweighs the number of Chicago Public Schools in the Lincoln Park area. Specifically, there are only two Chicago Public Schools in Lincoln Park compared to eighteen in the Humboldt Park area. This reflects the affluence of the Lincoln Park area- there is less need for public schools and parents have the funds to send their children to a private school.
The other map that was produced plots schools with graduated colors depending on their percentage of students receiving federal lunch funding against the income level of the neighborhood. This map shows that most schools that receive federal funding are located in the Humboldt Park area. However, there are some schools in the Humboldt Park area that receive little or no federal funding. Also, the map places a red X on top of the schools that do not have a health initiative. We defined having a health initiative as any method the school uses to promote healthy eating. Our group discovered the trend that all of the schools that lack health initiatives are situated in the Humboldt Park area and none occur in Lincoln Park schools. Further more, we have identified three Humboldt Park schools that lack both a health initiative and federal lunch funding: Maternity BVM School, Stowe Elementary School, and Erie Elementary Charter

School. This may suggest that children going to these schools have unhealthy diets or simply do not eat lunch at all.
Out of the schools that are federally funded in Humboldt Park, there are some that lack health initiatives. This may suggest that the federal funding programs are failing to make an effort in these schools to promote healthy eating. In other words, these schools receive a lot of funds, but very little of the funds are used to prepare nutritious foods for the students.

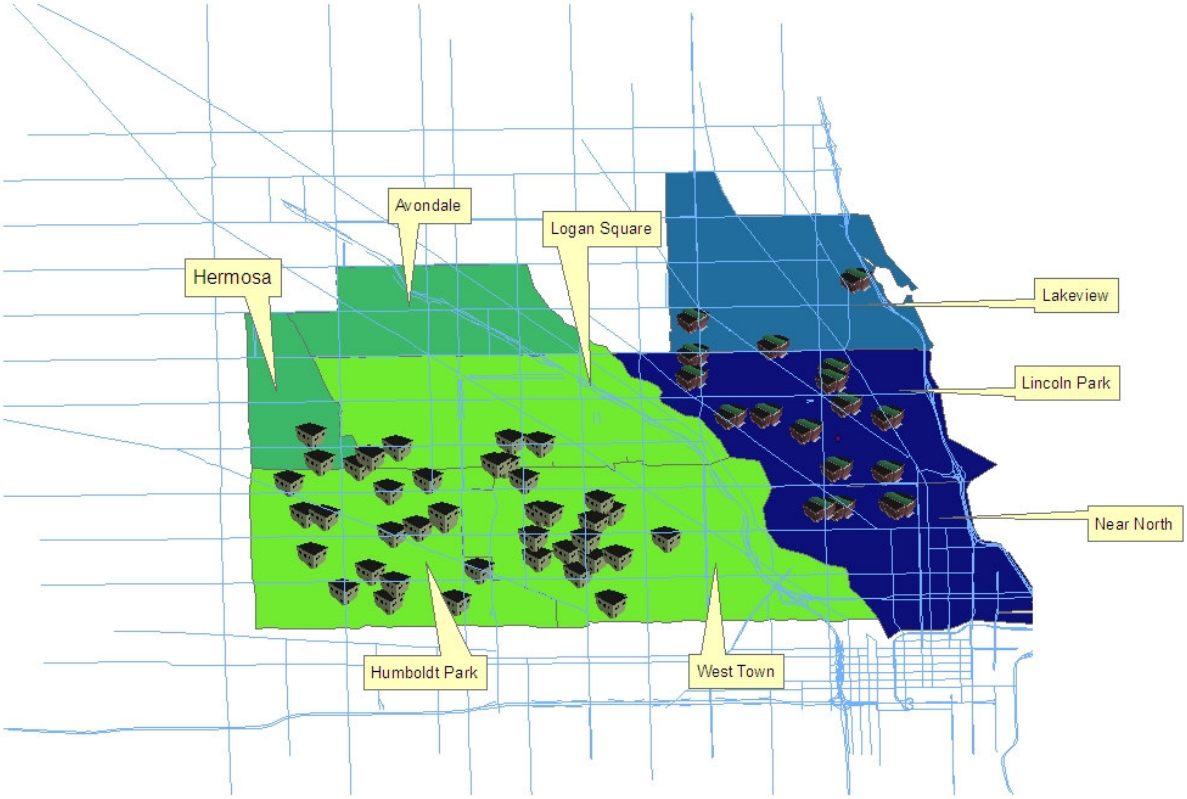
2. Recommendations

Future research and analysis is necessary, in order to more fully explore the disparate access of the children in Humboldt Park to healthy food at school. Some approaches to this question could include an evaluation of the nutritional value of the meals provided by each of the private food contractors, as well as a comparison of those meals to the nutritional value of meals provided when students receive lunch from home or from independent school cafeterias.

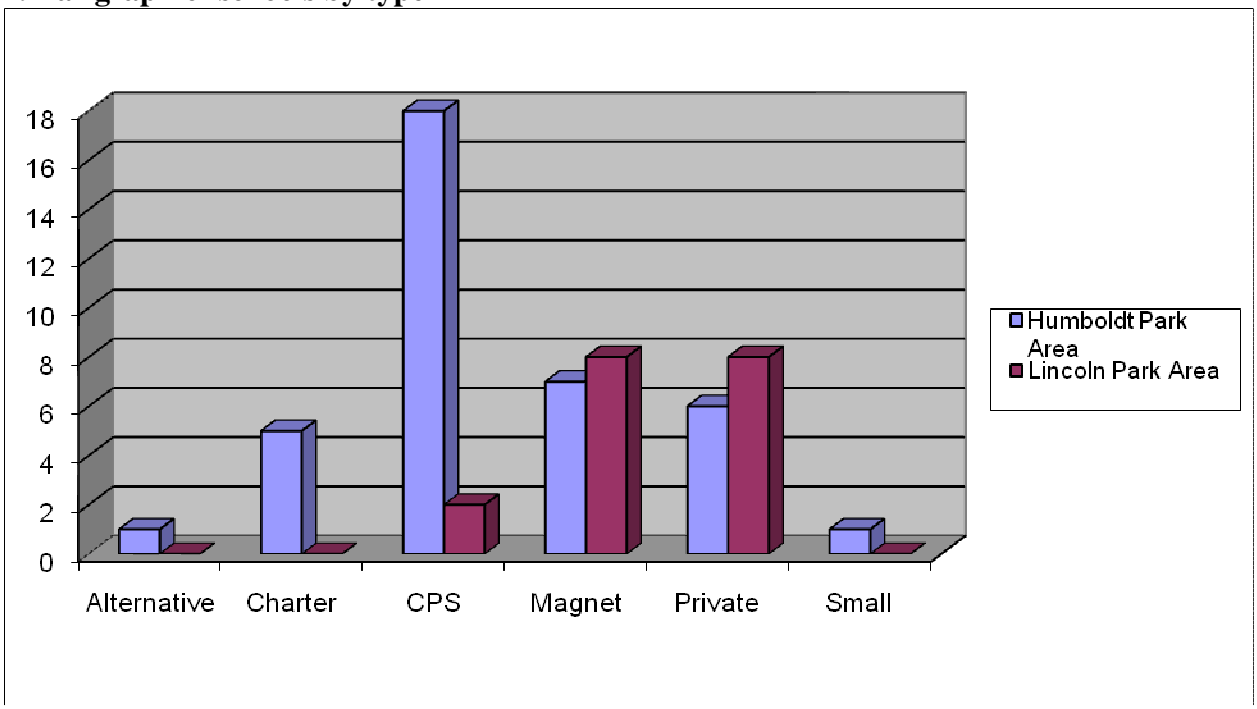
Any of these additional steps, or another attempt at our project's research goals, would benefit from a more comprehensive set of data on the schools. Additionally, it would be almost essential to present the menus provided by food service providers or description of school lunches brought from home to a nutritional specialist, for evaluation. Both the overall healthiness of the lunch and its appropriateness for school-aged children should be determined.

III. Information Products

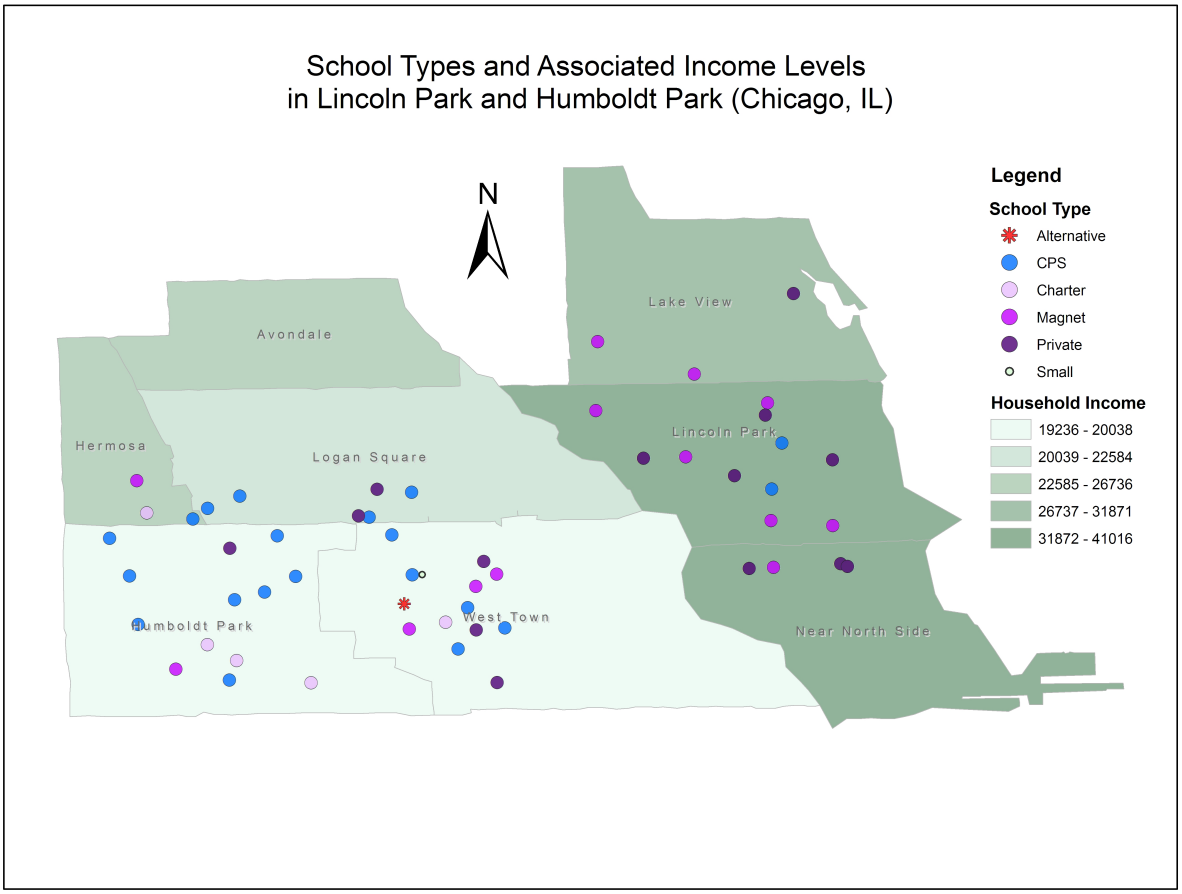
1. Map of Schools in Project Sample



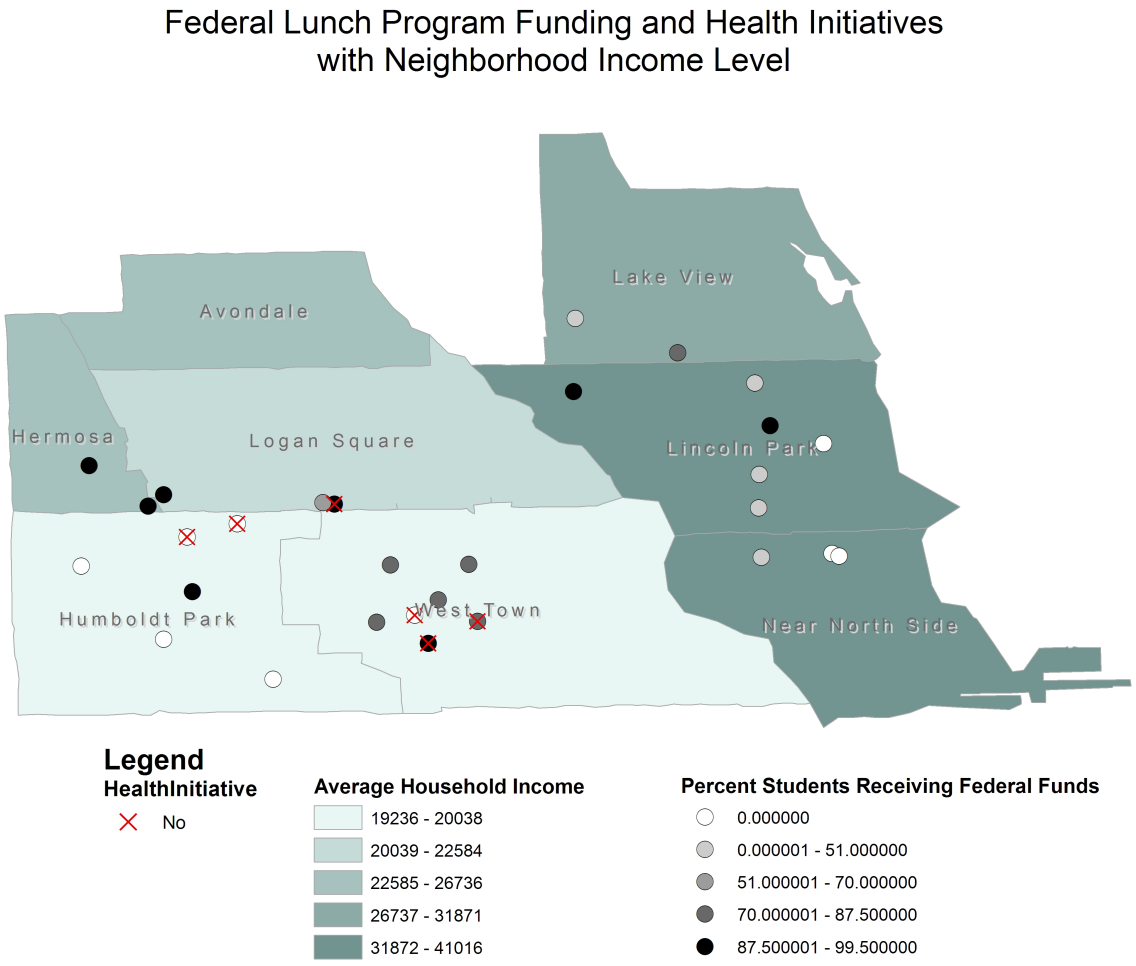
2. Bar graph of schools by type



3. Map of School Types and Income Level



4. Map of Schools with Health Initiatives and Percent of Students Receiving Federal Funds



IV. Appendices

1. Appendix A – Contact Information

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