Final Project Brief
Crowd Sourced City
Professor Sarah Williams
22 December 2010

Mapping Healthy and Unhealthy Foods with Students in Washington Heights

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INTRODUCTION

This project was a joint effort between teachers at the Manhattan School for Scientific Inquiry (MS 328) and graduate students at Columbia University. During a school-wide "Sustainability Week in November, we engaged with two teachers and an educational consultant to explore children's access to healthy foods. Students mapped locations where they could purchase fast food and healthy food, and were able to visually see the information they gathered. Teachers then challenged their students to analyze the data through statistics and graphs.

The purpose of this project was to enhance students' understanding of healthy and unhealthy food choices in the area and ultimately improve food choices by fostering awareness of food choices and health in students, parents and teachers. Our clients would like this initiative to extend beyond Sustainability Week and use the data gathered for better food options in the community.

To support these efforts we co-created an interactive learning tool. Using an free online mapping site called Crowdmap, based off of Ushahidi, we set up a map of the Washington Heights area where students uploaded the food choice information they gathered. Through canvassing the area, recording food options, and taking photos, the students were able to strengthen their data gathering, analysis, and mapping skills, and create a spatial understanding of healthy and unhealthy food options in their school's neighborhood. Ultimately, we found that the data gathering process we used did not lend itself to strong quantitative data, but that it could be used as a good conversation piece around food options and could be expanded to a district-wide project.

PRECEDENTS

- Kibera: this project aims to increase information generated locally by community members in Kibera, an informal settlement in Nairobi. The project measures multiple indicators and extends technical training to teach local youth in using GPS devices and OpenStreetMaps. Information is collected for various individuals and groups, whereas ours will be collected primarily for teaching. However, the general purpose is the same: to use locally collected geographic-specific information for local knowledge and advocacy purposes while teaching technical skills.

- Youth Mapping: this is a data collection project which engages young people to canvass their neighborhoods for places and activities. Youth collect data and enter it into a centralized system where it is validated and approved.

- Youth Project: This Digital Democracy (DD) project asked "what does real time mapping with New York City public school kids look like?" Students did an exercise to create their ideal vision of 2020 where cars were scarce and the environment polluted. Students then entered their own Ushahidi reports into a public map. Although this project did not engage students in crowdsourcing or data collection, it is an example of how interactive maps can be used in a classroom setting and highlights some of the challenges and advantages of engaging youth in data-entry.

IMPLEMENTATION

A) Technological elements

We tested various methods of mapping GPS points with the class-provided Nokia phones. After considering and testing a number of existing technologies, including Nokia mapping applications, Walking Papers and Google Maps "MyMaps", we decided to use Crowdmap, a free online mapping platform based on Ushahidi.

The main benefits of using Crowdmap to display project data are:

- it allows for the entry of qualitative data
- has a simple user interface
- more easily displays categories
- allows for visual recognition of trends and data
- is free to maintain
- requires only computers and internet access
- can be built out to incorporate other social media and texting tools which allows the platform to display any type of information in near real time

We decided to use Crowdmap in conjunction with low-tech paper maps so that each student could have his or her own map[1] and spreadsheet[2] to write down the locations of healthy and unhealthy foods. Given the limited number of phones and the amount of time we had for training students, we believed paper maps would best engage students. Students used the phones to photograph food choices, which provided a graphic account of the mapping exercise.

B) Platform Design for data collection:

We created a set of icons to represent categories of food[3] and we grouped them into healthy and unhealthy foods. This allows for a food location entered in the map to be associated with multiple food categories at the same time. This location and its associated categories constitute a report.

The home page[4] (ms328.crowdmap.com) includes a map of the canvassed area where reports can be viewed according to the categories associated with them. When a category is selected, only reports associated with that category appear on the map.[5]

Selecting any icon will bring up a bubble which provides information about how many reports are associated with that icon. This can then be selected to view more detailed information of each food location, including associated photos.

C) Mapping (November 16-23):

In preparation for the mapping exercise we prepared the following materials:

- Crowdmap instance with specific food categories
- Area canvassing breakdown in 9 zones[6]
- Individual paper maps for each group of students and for each of the 9 zones

We executed the mapping process as follows:

1. Students were divided into groups of 6 students each. Each group was accompanied by a chaperone.
2. Each kid in each group was assigned a healthy or unhealthy food category to look for (e.g. one checked for candy and sweets, another checked for leafy greens and vegetables etc.). One student in each group was designated as the group reporter. The reporter's task was to take pictures and visually document the mapping process.
3. With maps in hand, students walked around their designated areas and recorded the locations of each store they visited on the map where the assigned food was found as well as the address and any relevant attributes. Group reporters took photos of each store and the food choices in each.
4. After 3 hours of mapping their communities, students went back to the school and the teachers collected the paper maps to do data entry the next day.

5. On Friday, Nov. 19 we went back to the school to aid the students and teachers in populating the map. Again, the students were divided in the groups they had formed before and they received a laptop provided by the school.
6. In each of their groups, students collaborated to enter the data by compiling the information found in their individual maps and by creating one report per restaurant.
7. Because a few students hadn't attended school the day of the mapping exercise, we asked them to match the reports that the other students created to the photos that the students took.
8. We repeated the data entry process on Tuesday, Nov. 23 with the second batch of students.

DATA

During canvassing, students recorded 18 pre-defined categories of food and the associated restaurant, grocery store, food cart or deli in an area that encompassed the main arteries of the school's neighborhood. Food categories were marked regardless if a student observed 1 banana in the grocery store, or 111 bananas.

Healthy food was observed at 53 (91%) locations.
- Low fat milk, observed at 32 (54%) of food locations.
- Grains (other than pasta and whole grain bread) observed at 34 (59%) food locations.
- Whole grain bread was observed at 31 (53%) food locations.
- Dark leafy greens were observed at 20 (34%) food locations.
- Fruits were observed at 26 (45%) food locations.
- Other vegetables were observed at 27 (47%) food locations.
- Yogurt was observed at 21 (36%) food locations.

Unhealthy food was observed at 55 (95%) locations.
- Baked goods were observed at 29 (50%) food locations.
- French fries were observed at 12 (21%) food locations.
- Fried chicken was observed at 17 (29%) food locations.
- Hamburgers were observed at 24 (41%) food locations.
- Hotdogs were observed at 14 (24%) food locations.
- Snacks were observed at 25 (43%) food locations.
- Soda was observed at 41 (71%) food locations.
- Pastas were observed at 25 (43%) food locations.
- Ice cream was observed at 24 (41%) food locations.
- Candy was observed at 24 (41%) food locations.
- Pizza was observed at 6 (10%) food locations.

This information was then entered into Crowdmap by students as a report[7,8]. Each report stood for a food location, and contained data on the foods observed at the location. In all, 58 reports (food locations) were entered. Data fields captured on these reports included; address, GPS points, food categories, date, source reliability, information probability, and any pictures. Names were not enforced because of student privacy concerns. Photographs were gathered using the Nokia phones and uploaded into each food location report.

Crowdmap allows quick visualization of the locations of restaurants where different food categories exist. Users can select one category to view at a time, such as "leafy greens". Crowdmap allows grouping of reports, which lets visitors to the site to quickly see *how many* food locations in the area have bananas, pizza, etc. Reports can be ungrouped, which allows visitors to see where each restaurant or grocery store is located.

This process of data collection and method of visualization did not lend itself to rich data analysis because we did not perform a comprehensive survey of every food location in the area. Data was limited to the locations students could cover over the span of 3 hours, and only to open food sights. Because of the time of day, many restaurants were not included in the dataset because they were not open. Additionally, because food categories were marked regardless if a student observed 1 banana, or 111 bananas, it is not clear if the food site is a *good* option for healthy food; only that it has some available.

Our primary result was that healthy and unhealthy food options exist at almost every food location. Also, we see that restaurants, food carts, and grocery stores exist near the main arteries of transportation.

For stronger data analysis, we recommend re-surveying the area, including qualitative information in each online report (i.e. calorie counts for a typical meal, what a student would choose to eat), and creating a threshold for each category (i.e. leafy greens will only be selected if the food site has more than 1 variety available).

The data visualization on Crowdmap would have been improved if food locations with each food option could be displayed side by side on the map at the same time, but the platform does not allow for this

RECOMMENDATIONS

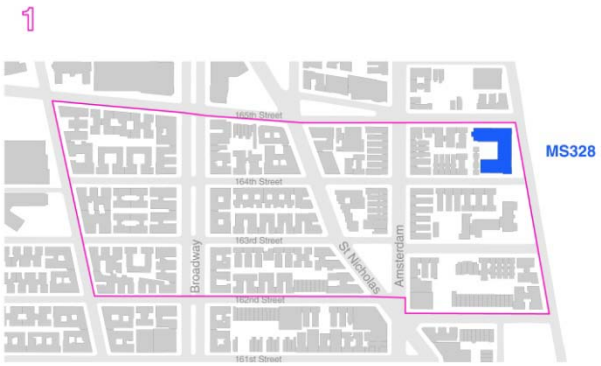
During our project, we found that gathering data via paper maps and categories worked very well in involving all of the students.

Moving forward, we would like to expand this project into a more crowdsourcing-based model, where students within the NYC public school system are able to send reports of food locations via text or online. One possibility is to launch a similar type of project during a district-wide Sustainability week and have students collect and submit data as a class, but also be able to submit information independently. Involving a greater number of students would allow greater comparison of food choices throughout the NYC area. As is, our project represented more of a data-collection model limited to 52 trained students. However, anyone can access the website and submit reports on their own, giving food information a possibility to be crowdsourced with greater publicity and incentive.

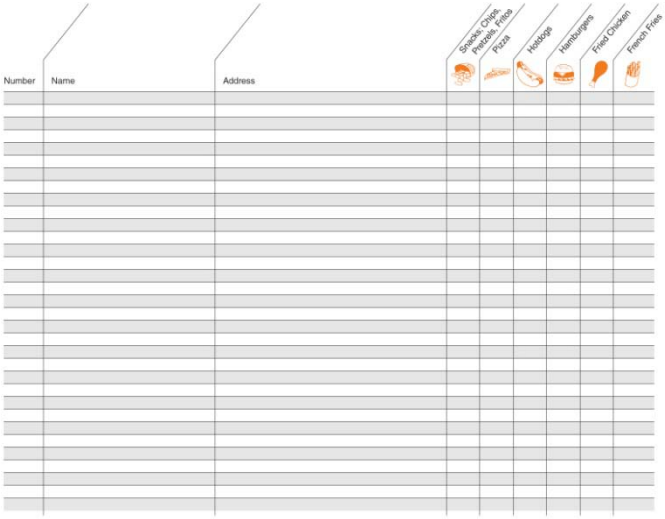
When structuring a project like this, we recommend placing teacher training at the beginning so that teachers can better guide their students in mapping and have the ability to create maps for projects beyond the consultancy period. Using the phones to take pictures of the food sites was very engaging for the students[9,10,11,12], and we recommend adding more graphic, interactive, or social media aspects such as integrating the platform with Twitter feeds.

The methodology we used didn't lend itself to high quality data analysis. For similar projects, we recommend strengthening the qualitative information and including a student perspective, such as a blog or a teacher-led exercise, to address what the results mean in the context of their lives. Finally, we recommend connecting with community organizations and political representatives that may be interested in this type of information from the beginning.

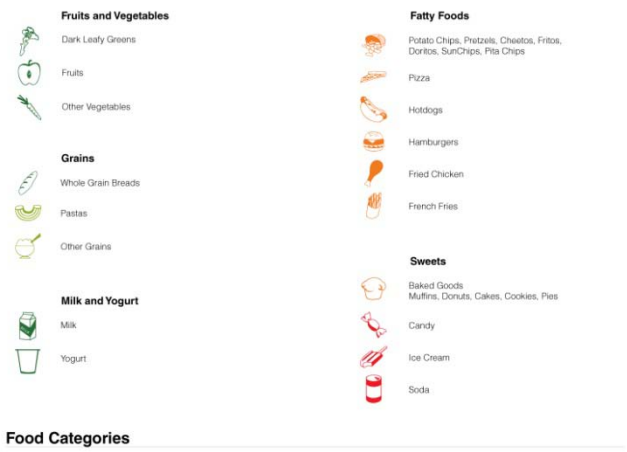
Images



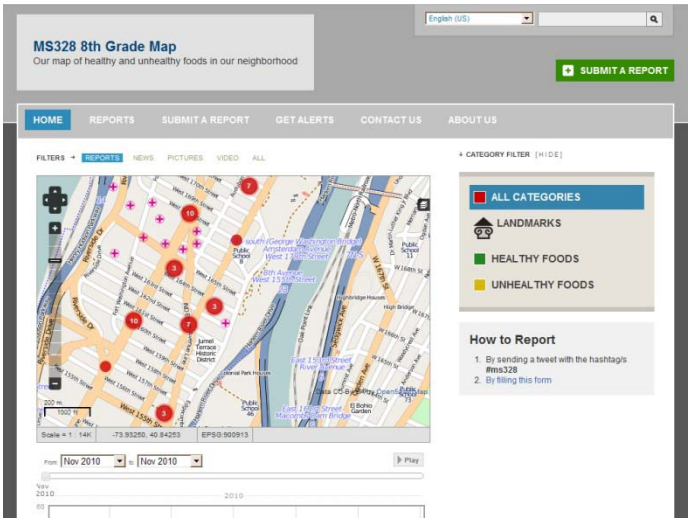
1 Sector map



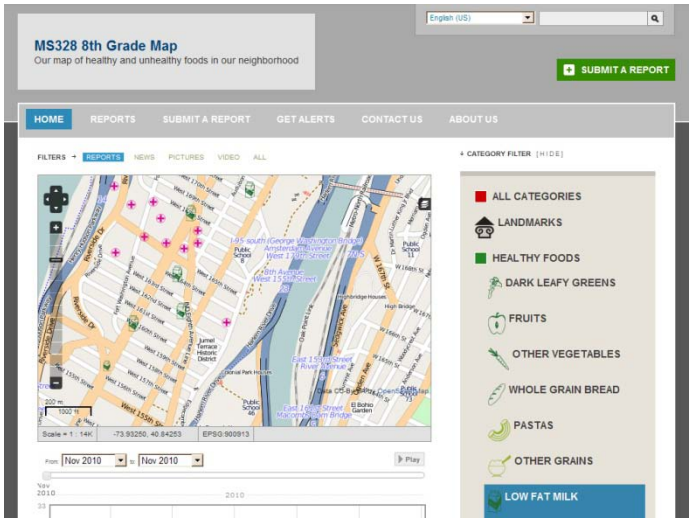
2 Sector spreadsheet for the fatty foods group



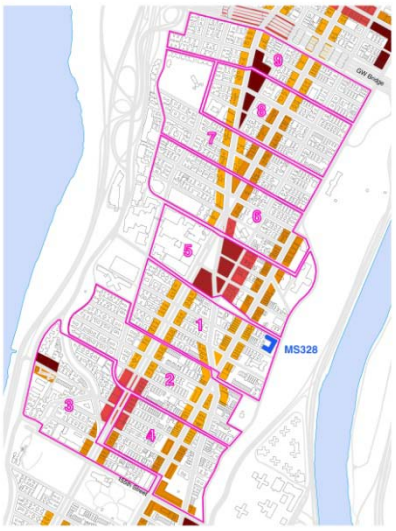
3 Food categories



4 Homepage

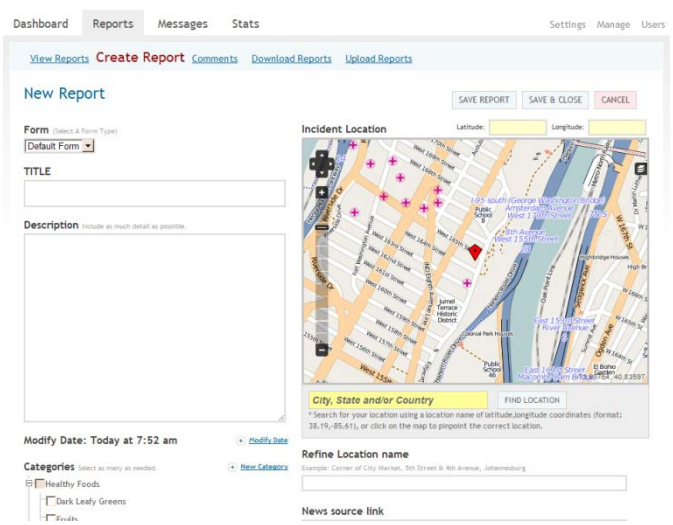


5 Homepage category selection

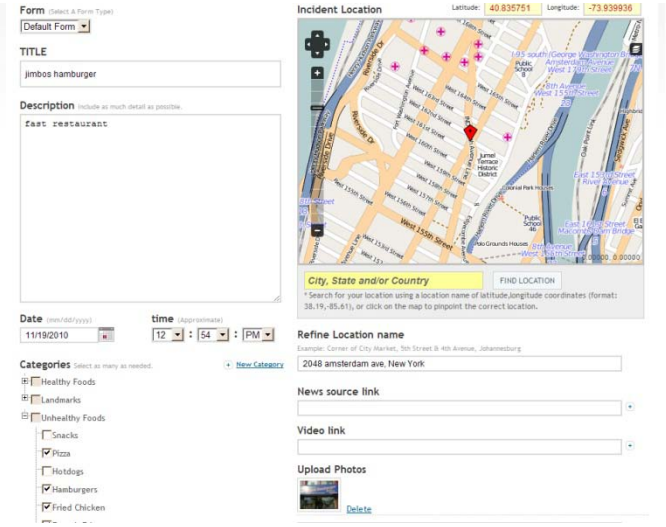


Surveying Sectors

6 Sectors in Washington Heights



7 Blank new report



8 A typical completed report by a student

9 Student photo of a store interior

10 Student photo of a store exterior

11 Student photo of another student recording data

12 Student photo of one group