Participatory GIS and Mapping – A Student's View of Their Community

Rachael A Sukola

University of Washington – Tacoma

PARTICIPATORY GIS AND MAPPING – A STUDENT'S VIEW OF THEIR COMMUNITY

In constructing my research project, I was interested in finding a way to combine GIS research methods and directly working with people in a community setting. After doing some reading, it seemed that using participatory GIS methods would be the most natural and practical way to do so.

My research plan was based off of research conducted by Dennis, Gaulocher, Carpiano, & Brown, in 2009, from an article called 'Participatory photo mapping (PPM): Exploring an integrated method for health and place research with young people'. Participatory GIS (PGIS) and participatory photomapping (PPM), is a research strategy for studying the inter-related aspects of lived experience in an integrative manner (Dennis, et al.). Through the use of PGIS, researchers are able to integrate a set of digital tools and participatory research protocols that enables transdisciplinary community-based health partnerships to produce shared knowledge that can benefit the design of place-based interventions and policies (Dennis, et al.). This concept is one that can be considered across disciplines, as it is not just limited to health-based partnerships. While preparing to do my research, I focused on youth and their perception of neighborhood space. Following the methods used by Dennis, et al. in their journal artical, I was able to develop a participatory project that utilized GIS and participatory mapping to research how my sample group (7th graders at Lakota Middle School in Federal Way, WA) perceived their neighborhood space. Dennis, et al., state that people's perception of space is related to experiences and interactions, and is multi-faceted. By drawing on maps, photographs and narratives in an integrative manner, PPM increases our capacity to pull together the three dimensions of people's lived experience with health and place (Dennis, et al.).

Using the concepts that were explained in the article by Dennis, et al., I developed my research project, and focused on using sketch maps as a way of collecting information from the students in my sample group. To begin the process, I chose the geographic region I was interested in learning about. I chose to sample a group of middle school students at Lakota Middle School in Federal Way, Washington to see how they viewed and interacted with their immediate neighborhood. After deciding where I was

going to focus my project on geographically, I developed a simple base map for the students to use. The base map consisted of the area within the school boundaries, and small portions of the outlying area. On the map, I used the major arterial roads that fall within the region as guides for students to use as a spatial reference. Next, I included parks within the area (both state and city), some schools that were nearby, bodies of water, and a few other landmarks that the students were familiar with. In addition to this, I also added a layer of all the other roads in the area; however, they were not labeled, and were not highlighted like the main arterial roads. Along with the map were some directives for the students. I asked them to label in red, the areas where they felt unsafe. In green, they were asked to label the areas in which they felt safe. In blue, they were asked to label the areas where they spent time after school, and in orange, they were asked to label the areas that they avoided. In addition to this, I asked the students to indicate their gender, so further analysis could be conducted to see if there were differences between the information shared and gender.

When it came time to have the students participate in the mapping process, I worked with two 7th grade science classes at the school; one was an integrated classroom with students of all needs and abilities, and the other classroom consisted of students from the school's highly capable (honors) students. The students were given the maps, and then asked to draw the areas that they would classify as safe, unsafe, places they avoid, or places they spend time after school. The result of this process was approximately 150 sketch maps, created by the students, indicating their views of the community space.

Of the 150 maps that were collected, about half of them were usable when it came time for the analysis. Maps that were not used were excluded for various reasons. Some of these reasons include students submitting conflicting maps that had lines on them, instead of polygons, coloring in the entire map in, and not specifically indicating anything, and others were not possible to accurately read and decipher what the student was intending to indicate. After sorting out the usable information, I then took photos of all the completed sketch maps. I then inputted the sketch maps into ArcMap, where I

began the digitizing process. I gave the maps a spatial coordinate system, and aligned them with the roads in the ArcMap program. Next, I created vector shapefiles for each map. These shapefiles consisted of each feature that was indicated on the original sketch map. They were then categorized by safe, unsafe, places to avoid, and areas where students spend time. I gave each category a numeric value (unsafe = 1, safe = 2, areas to hang out = 3, areas to avoid = 4). Additionally, I kept track of gender and the class the map came from in the attribute table. After each shapefile was created, I then converted them back to raster format, for use in the raster calculator. Once they were rasterized, I used a logic statement to analyze the information. The statement that was utilized broke up the information in the shape file, and represented one piece of data at a time (safe, unsafe, etc.). This was necessary because there were many features, all with different values, in each shapefile. The result was a series of maps which were visualized with a gradient, all representing areas of response and the frequency in which they occurred. For example, areas with a high reoccurrence of being labeled unsafe were visualized in a dark read, whereas areas that were not repeatedly labeled appeared lighter on the map.

I was able to take the data from each class, and see how they perceived their neighborhood, in terms of safety and use. Since I sampled multiple classes, I used the raster calculator to add together the maps from the two. For example, I added the overlay raster from the unsafe category from the integrated class with the highly capable class to come up with my end result. This gave me the total number of responses, and then visualized them accordingly. I did this with the overlay rasters from all four categories.

I found the end result to be very interesting. The information from the two classes did not vary tremendously; however, some slight differences could be seen. Overall, many students tend to view the parks in this part of Federal Way as unsafe, and as places to avoid. I was surprised by this result, as I assumed parks would be a safe and central meeting place for many students after school. Another trend that was visible among all classes was that they generally viewed their school as a safe place to be.

Many students also viewed neighboring schools as safe as well. A large group of students indicated that they spent their time after school on campus, which could possibly be attributed to homework clubs or after school sports programs. Additionally, many students stated that they spent time after school at the nearby Starbucks coffee shop. While conducting my analysis, large numbers of students stated that the area that was the YMCA (which has recently been converted into an office building for the school district) as an unsafe place to be, and many students stated that there was a shooting there before, which led to their decision. There did not seem to be any glaring differences between the maps returned by the two groups of students, which I was slightly surprised by. The classes typically indicated the same things in slightly different volumes.

While looking at the results of the maps, I was surprised to see so many students indicating that they thought parks were unsafe, and areas to avoid. These seemed like places that would be centers of activity after the school day, where students could meet up, relax, and spend time. I decided to visit some of the park sites, especially ones that were frequently labeled as unsafe. In doing this, I was able to see why the students might come to that conclusion. Many of the parks labeled unsafe were not very developed, but were forested areas with walking paths that went through them. I found that many were difficult to find, and access to them was limited (there were many deep in residential areas, where there was limited access to cars/parking, and they were often out of the way). On park in particular had multiple entrances, but all were very hard to find. These points of access were between houses in a densely populated residential area. On one of the paths, there was a fence line that was heavily tagged with gang affiliated graffiti. As I followed the path, it led to a dark and secluded gulch, where there was a group of people engaged in what appeared to be gang activity. Many of the other parks I visited, that were labeled unsafe, were not very open, developed, or accessible.

Also, seeing that many of the students spend time on campus after the school day ends, in the adjacent park, or at the coffee shop across the street, it seems that students could benefit from access

to pro-social programming after school, either facilitated by the school itself, or community groups. Students apparently spend their time in that location, so focusing on things to do there, could be a benefit for them, as well as the school.

This method was an interesting one to use to gather information. I found that the students were interested in it, and seemed to enjoy the actual process. They were enthusiastic when it came to participating, and seemed to enjoy sharing their information in a way that they might typically not. My observations were supported by Dennis, et al., who stated, young people, in particular, enthusiastically embrace the method.

This project was just a small glimpse into the larger concept of how students are interacting with their neighborhoods. My conducting more research, and furthering the analysis, I could probably see more reoccurring trends. The information that was gathered can hopefully be used to develop more programs for students in the district, as well as look at what is happening systemically and environmentally, and what can be done to create a safe and healthy environment for students to succeed in.

Works Cited

Dennis Jr., S.F., Gaulocher, S., Carpiano, R.M., & Brown, D. (2009). Participatory photo mapping (ppm): exploring an integrated method for health and place research with young people. *Health & Place*, *15*, 466-473.