
5 Qualitative Research Methods and GIS

Chapter Description

This chapter offers a discussion of how GIS can be integrated with various forms of qualitative research. Some of the specific forms of qualitative research that are addressed include Grounded theory, participant observation, ethnography and oral histories. This chapter provides a concrete discussion of sociospatial grounded theory research, including seven specific steps for the integration of GIS into one's research. Coding and analysis of spatial qualitative data are also discussed.

Chapter Objectives

- Introduce methods for the integration of social science theory and research methods into a GIS-based analysis approach.
- Present an example of how GIS can be integrated into a public participation planning approach.

After reading this chapter, you should be able to perform the following tasks:

- Select data collection methods and approaches that facilitate integration of data into a GIS.
- Differentiate between an inductive, grounded theory and deductive, scientific method approaches to data collection and analysis.
- Develop an approach to using GIS in a public meeting or focus group to enhance the end result or decision arrived at through an analysis.

Introduction

For those researchers who plan to collect qualitative data, the notion of using a GIS as a part of the research process may be somewhat daunting.

Have no fear, however, because a GIS can be just as useful to the researcher who collects qualitative data as it is to the scientist who collects quantitative data. In fact, a GIS provides an excellent opportunity to integrate both types of data into one comprehensive database.

Grounded Theory: GIS Using an Inductive Approach

As a researcher, you also have the option of employing an inductive model in your research design. This type of approach begins with a different series of steps than those traditionally followed when using a deductive approach. An inductive approach begins with the data and proceeds to glean an understanding of themes and patterns. From this information, theory is then generated, thus the term grounded theory. It is called grounded because of its strong connection to the reality represented by the data. This inductive research approach is qualitative in nature. Grounded theory is a very appropriate research method that can be used to assess case studies, transcripts, oral histories, and archival data.

Grounded Theory and GIS

The key to determining whether or not you will use grounded theory is to consider the purpose of your research. Grounded theory is an inductive research approach that is characterized by its sequencing: data collection followed by theory generation. Glaser and Strauss (1967) first coined the term grounded theory in the late 1960s in their seminal book titled *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Since that time, many other qualitative researchers have adopted and written about grounded theory. Grounded theory has become a popular approach that has been embraced by a variety of disciplines, including public health, business, and criminology, just to name a few.

One of the primary attractions of grounded theory is that it provides the opportunity to “generate theory that will be relevant to [scientists’] research” (Glaser & Strauss, 1967, p. vii), unlike verifying theory, which one uses when following the traditional scientific method, which is a deductive approach. Grounded theory is a good approach to employ when you are interested in the discovery phase of gathering information because it more appropriate for researchers whose goal is to generate information, themes, and patterns, not to prove theory.

The main premise of grounded theory is that theory emerges from an examination of the data. Rather than the researcher dictating themes and ideas that will be investigated, the data dictate what is relevant and important to study further. “Grounded Theory is based on the systematic

generating of theory from data that itself is systematically obtained from social research” (Glaser, 1978, p. 2). Thus, the grounded theory approach views research methods as a part of the theory-generating process. The process is very iterative; the researcher is constantly conducting analyses, looking for themes, and then conducting more analyses. It is a very hands-on approach to sorting through one’s data.

The core of grounded theory is in the analysis and search for patterns in the data. In the analysis, the researcher attempts to reach a point of “theoretical saturation” (Dey, 1999). This means that there are no additional themes or concepts, categories or relationships that emerge from the data. This can only be achieved after the researcher has made a series of run-throughs with the data: identifying themes and looking for data that support the themes. This process is continually repeated until no new themes emerge. When this occurs, one is said to have achieved theoretical saturation.

Bernard (2000, p. 443) summarizes how grounded theory can be accomplished using the following series of steps:

1. Begin with a set of information (e.g., interviews, transcripts, newspaper articles).
2. Identify potential themes in the data.
3. Pull data together as categories emerge.
4. Think about links between categories.
5. Construct theoretical models based on the links.
6. Present the results using exemplars.

Following these steps, you begin with whatever set of data or information you want to analyze. This information will most likely be of a qualitative nature. Identifying potential themes in your data can be done by hand or with the help of a qualitative computer data-analysis program. As you sift through the data, certain words or phrases begin to emerge consistently. You can then use the themes that you identify to develop a coding scheme (see Strauss & Corbin, 1998) to complete the analysis of the themes. Step 3 calls for grouping, or categorizing, your information. In essence, you look for similarities, differences, and repetitions that occur in what has been stated. This is an iterative process that evolves as you analyze the data using your own specific coding process (see Dey, 1999, for more specifics on coding your data).

Step 4 calls for thinking about the links between the grouped categories that you have seen emerge. In essence, it is akin to developing a conceptual framework or model, as described in Chapter 4 (see “Stages of Sociospatial Research,” Step 5). This leads to the next natural step, which is to construct a theoretical model based on the links that you observed. This is your best model of the relationships that you saw emerge between themes that you

identified in the data. Finally, in Step 6, you present the data using exemplars. These are nothing more than quotes or snippets from the data that illustrate the themes, concepts, and relationships that you are discussing. One can think of exemplars as examples (shared words, quotes, etc.) of concepts or themes that emerge from the data analysis process.

Sociospatial Grounded Theory Using GIS

To date, a GIS has rarely been incorporated into analyses that explicitly use grounded theory. We believe that the spatial information provided by GIS can provide an important additional component to research that adopts an inductive approach. The visual patterns that are often visible in spatial data can provide a powerful indicator when exploring emergent themes drawn from existing data to develop theory. We've developed a series of steps that you could follow when using GIS as part of this approach to social research:

1. Determine a topic of interest.
2. Determine a geographic location of interest.
3. Collect the data (qualitative, spatially linked social data).
4. Geocode the data.
5. Ground truth the data.
6. Analyze the data and look for spatial and social patterns.
7. Generate theory (spatial and social).

Determine a Topic of Interest

This step is almost exactly the same step that was mentioned in Chapter 4, which explains the 10 steps in the deductive research process. The same basic advice applies here. In choosing your topic, you want to make sure that you pick one that you find interesting. That way you will enjoy the process more and actually be more energetic throughout the research process. In considering your topic, you should also consider what might be a feasible area of study, considering time, money, and interest. Having a lot of time, money, or resources substantially influences your research method selection—for example, you might select detailed interviews. If you have less time, money, or resources, then you may need to rely more heavily on available data.

Determine a Geographic Location of Interest

Determining the geographic location of interest means that you identify a study location that is associated with your topic. This could be a neighborhood

or county or something less defined, such as former residents of a community that no longer exists. In New Mexico there was one such community called Santa Rita. It was located next to an open pit mine, and when the mine expanded, the town site became part of a giant hole that was the mining pit. Many of the town's homes were moved to other surrounding towns, and ex-Santa Rita residents moved into them. A study today of these residents' perceptions of the town would be conducted about a place (the town of Santa Rita) that no longer physically exists.

Assuming you can track down the former residents of this town, you could conduct your interviews with these individuals regarding their perceptions of the town. You would also want to note where these individuals now live. Why? Because the geographic locations where former Santa Rita residents currently reside may be a factor that corresponds to their individual perceptions about the former town. For instance, questions you might ask would be, "Do residents who live within 5 to 10 miles of the old mining pit (Santa Rita town site) share different perceptions of the community than individuals who moved farther away from the town? Or do all residents, regardless of current geographic location, share the same perceptions of the town?" The point that we want to make is that the physical location of a place can play an important role in the analytical process when using grounded theory.

Collect the Data

When you collect your data, even when using a grounded theory approach, you can simultaneously collect information about the spatial surroundings. Why do we advocate this? Our reason for collecting both types of data comes from a philosophical belief that the social and physical environments interact with and affect one another. The degree to which a researcher employs a dual data collection process will be determined only by the researcher and her or his preferences.

It makes sense when employing a grounded theory approach to collect information on the geographic location and the natural environment related to your data. Why? The inclusion of this type of information could greatly enhance the emergence of themes, ideas, and relationships that exist in your model. In fact, it may lead to the inclusion of physical, social, and environmental features into your theoretical model, features you had not previously considered. That is where grounded theory and GIS are quite compatible. Grounded theory is flexible enough to allow for the inclusion and identification of a variety of different data types, including geographic information.

Geocode the Data

When you spatially code the data, you are assigning a code that reflects the geographic location of your data. For example, let's say you are

interested in analyzing different newspapers' coverage of the issue of immigration. In your content analysis, you choose to analyze newspaper articles from various locations around the country. As a part of your grounded theory analysis, you could code the location of each newspaper, note other attributes about the community in which it is published, and see what kinds of patterns emerge in your data analysis. This would enable you to determine if the physical environment and population are related to perceptions of immigrants. If you fail to collect this information and treat all of the newspapers the same, you may be missing a key explanatory element for your theoretical model. In conducting your analysis, it would be interesting to observe if differences in attitude toward immigration emerged between various newspapers' coverage of these issues. A content analysis of the data mentioned would reveal some themes and patterns that could then be crafted into a theoretical model.

Ground Truth the Data

What do we mean by ground truth? Ground truthing involves checking to ensure that the computerized data that you have are representative of what exists on the ground. How do you ground truth data? Most often, ground truthing is accomplished by physically visiting the location under study and field checking a subset of the data. In cases where this is not possible (inaccessible or unsafe location, historic data), alternative sources may be used as surrogate ground truth (e.g., phone books, property tax listings, historic records, aerial photography). Ground truthing data is perhaps one of the most important steps of integrating GIS into social science research. Why? Anytime you are dealing with GIS data, although it may be tempting, you must not accept data at face value. You should check (at least a sample of the data, if not all of the data) to ensure that the data are without major errors and represent the information required and to the level of detail necessary for your analysis. Most problematic are data sets that are not current or that were originally collected for a different purpose. For example, you might have a data set from several years ago detailing the location of soup kitchens in a city. It would be wise to visit these locations to ensure they are still active or, if this isn't possible, to check the locations in a current phone book. Errors may also arise when data from multiple sources, scales, or projections are combined in your data analysis. Successfully employing grounded theory requires that the data informing the theory are free of major errors because reliance on flawed observations or data can produce a theory that does not accurately fit the situation under study. If your observations do not reflect reality as defined for your specific analysis, you risk a serious problem, especially when it comes to geographical data (e.g., the location of something).

Analyze the Data and Look for Spatial and Social Patterns

As mentioned earlier, a major part of the grounded theory approach is the search for patterns in your data. Ideally, if you want to integrate a GIS into your information-gathering process, you connect each piece of data or information with its geographic location.

For example, let's say that you have a collection of historic diaries from the 1940s. As a researcher, you might be interested in understanding how World War II influenced people from that time period. You could employ grounded theory in your analysis of the diaries and simultaneously develop a coding system that notes the geographic locations of where the diaries were recorded. For instance, individuals living in different parts of the United States may have had very different experiences during the war, depending on a myriad of factors. For example, were military bases located nearby? Did the diaries' authors live in a region populated by particular ethnic groups from parts of the world viewed either positively or negatively because of the war?

Keeping track of the geographic information as you conduct your qualitative data analysis may reveal geographic patterns in the data indicating that location plays a role in the attitudes expressed by people in their diaries. Certain geographic areas may have been harder hit by rationing, may have had a greater number of local men and women who went off to war, and so on. None of this would be obvious at the outset of a grounded theory analysis. However, if you keep track geographically of where the diaries were recorded, your analysis could produce some interesting results.

One might ask the logical question: How do you know when you have sufficiently analyzed the data? Dey (1999) provided a clear summary of the analysis process using grounded theory. He noted that researchers should conclude their research when they reach theoretical saturation, identify a core category or main story line, integrate the analysis around the main story line, and then use the coded information to modify the results, stopping the process with the emergence of a useful theoretical model (Dey, 1999).

Generate Theory (Spatial and Social)

This is the most creative part of the grounded theory approach. At this stage, you get to generate a theoretical model that reflects the patterns you observed in your data. As mentioned in the previous step, the geography—or, rather, spatial location—associated with a piece of data may factor significantly into the theoretical model that you generate. In any of the examples provided in this section, the variable geography could potentially play an important role in the analysis. When you construct your model, you should indicate whether the physical, social, or environmental context, or all three, factored into the grounded theory that was generated through the research process. Figure 5.1 is an example of a model that does just that. The

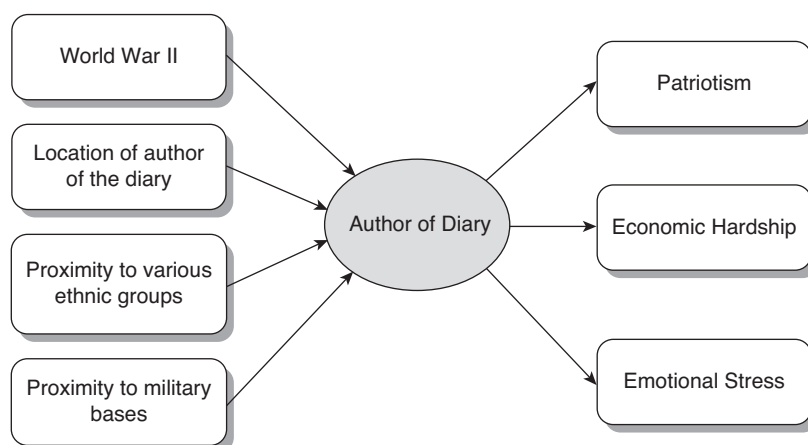


Figure 5.1 A variety of variables, including environmental, geographic, and social, are believed to affect the author of the diaries assembled for an analysis using a grounded theory approach. In some combination, these might influence the themes that emerge from the diaries and help to inform the eventual theory that is suggested from this research.

figure illustrates how geographic location can play a role in people's perceptions of World War II, as evidenced in their diaries.

Figure 5.1 illustrates some patterns that might be observed through an analysis of data from wartime diaries. Conducting a grounded theory analysis generates the following emergent themes: economic hardship, emotional stress, and patriotism. Perhaps those living in the heartland felt less stressed than those on the coasts fearing attack from German submarines or Japanese kamikaze planes. Those near bases might have felt a greater sense of stress because many of their friends and loved ones were directly involved in the war effort. Areas of the country with concentrations of ethnic groups tied to the Allies may have felt a greater sense of hardship or stress. This figure illustrates grounded theory in action from a historic perspective.

Questions to Guide Integration of GIS Into Field Research

You should consider the following questions before going into the field to use a GIS as part of the data collection process:

1. Will you bring a laptop with GIS software to the field location under study?
2. Do you have a base map of your research area or other map data that represent one or more of the key variables? What format are the map(s) in?

3. Have you verified or ground truthed the source map(s)?
4. What are the cultural perceptions of technology (including computers) at your study site?
5. What will happen to the results of your study once you are finished? Who will have access to this information?
6. Are there any written sources of local, traditional knowledge and information?

The following sections provide detailed answers to these questions to help explain how to incorporate a GIS into various types of qualitative research.

GIS Software in the Field

Although it can sometimes be convenient to enter data directly into the computer, it is not always the best choice. Consider factors such as the climate and conditions where you will be conducting your research. If it is going to be rainy and damp all of the time, it may not be advisable to bring a computer to your site, especially if your lodging accommodations are primitive. Will you have access to power the computer or recharge the batteries? Can you reliably store and back up your data while you are in the field? What would you do if your hard drive crashed? Will your computer be secure? If you have a safe place to store your computer and a power source, it might be worthwhile to bring a GIS to the field.

You may also want to consider the process of recording data directly into your computer. If you will be interviewing respondents, will you be able to type responses at an adequate pace to keep up? Will the computer distract them? Would it help to have the GIS map available for respondents to mark information on and to interact with and assist in data collection? In many situations, it may be preferable to gather data using some other means (e.g., a tape recorder, a camera, or even paper and pencil) and then transfer this data to the computer later. When you transcribe interview data, it is especially useful to transcribe the interviews as soon as possible after completing them and while it is fresh in your mind. Any of these alternative methods can always be incorporated into a GIS at a later time.

Maps of Your Research Area

Obtaining a base map of your study site could be easy or extremely difficult depending on the location and whether or not it has been previously or recently mapped. Even in locations where you would expect maps to be available, they may not be up-to-date enough to be useful for your study. There is also no guarantee that the maps will be available in digital form.

You can work with a hard-copy map (hard-copy meaning a map that exists in a physical form). Most often maps are available on paper, although maps may be made of other materials, from stone to papyrus (if you are doing research on ancient societies) to photographic paper, microfilm, plastic, acetate, and other materials.

Chances are that a map of your research site exists in some form. However, this map may not be in the level of detail that you require for your study. If that is the case, we advise starting with the best map that you can find. You can then add additional detail as you visit the field and gain more information on the region.

As with any other data collection process, it may be safer to mark all of your data points or features on a hard-copy map. This information can then be transferred into a GIS at a later date. Computers do occasionally have technical problems, get dropped, or run out of power. Paper and pencil do a much better job of surviving a fall than the average laptop computer, not to mention your pencil is unlikely to run out of batteries and need to be recharged. Sometimes a low-tech data collection methodology is better for fieldwork; that way if a glitch happens with the technology, you are safeguarded against data loss.

Ground Truth of Map Data

If you are planning to conduct fieldwork, you may not always have the ability to ground truth some features of the map until you are physically on site. You might find that the map you have is several years old, but what may be less apparent is how much things have, or have not, changed since the time the map was made. An old map is not necessarily bad; sometimes little has changed and the data are perfectly appropriate.

Regardless of the age of your map sources, it is a good idea to engage in some amount of verification or ground truthing. If you have access to the site, you might do spot checks of the map, especially if you have a sense of features that might be new or different since the map's creation. If you are unable to visit the site in person, you can compare the map to an alternative source. Often there are more recent aerial images from an airplane or satellite that can be used as a comparison; this is sometimes referred to as surrogate ground truth because the photo acts as a surrogate for an actual field visit. Furthermore, imagery can provide additional detail necessary to locate sites in the field that are not depicted on standard maps. For example, a map might not show each individual house, barn, or shed, but these features may be clearly visible in an aerial photograph of the same location.

To use surrogate ground truth, you do not have to go physically in the field, but you need to get a sense of appropriate indicator variables that are visible in the alternative data sources used. An indicator variable is something that can substitute for the real variable of interest. For example, using the imagery you might be able to infer particular land uses observed in

aerial photos. In an American agricultural region, one might observe large expanses of crops, often organized in regular geometric patterns with a few buildings and roads intermixed, showing a low population density. This looks very different from a rural region dominated by other industries, such as forestry or mining, and certainly has very little in common with the land use for a large urban area.

Therefore, one could infer by observing aerial photos of various regions which particular communities might be termed agricultural communities, based on the observable land use. Similarly, aerial photographs of an urban area with high population density that indicate the presence of many factories might indicate the presence of an industrialized or manufacturing-based community. In both examples, the aerial photographs assisted in helping to determine the classification of these communities based on land use. The indicator variable for these two conditions is land use. Although it is not directly related to ground truth per se, it is worthwhile to note that this same process might be useful in selecting sampling locations when designing your study.

If you want to ground truth a map that illustrates different population distributions by ethnicity, an image may not serve you well. You may be able to see houses, but you cannot see the ethnicity of the people who live there! Instead, you might opt to ground truth the data against other sources of data for population, such as the U.S. Census. The goal of ground truthing is to determine if the data you are using for your study are reasonably current, accurate, and appropriate to your goals.

Of course, you need not rely solely on existing data; you can gain invaluable ground truth by eliciting help of some local experts—people who are familiar with the lay of the land and local social and geographic features. This is part of the notion of public participation and GIS, which is discussed later in this chapter. Of course, you want to be clear about your plans to conduct research in the area prior to soliciting the help of local people. A clear communication of your stated research objectives should occur early in the data-gathering process. This is to ensure that locals are aware that the ultimate goal of your presence at the site is to collect data about their community. There may be some cases where the research method being employed precludes total openness about your purpose in being on-site (e.g., participant observation), but as in any research it is important to follow protocols appropriate to the study.

Cultural Perceptions of Technology

Prior to collecting data of any sort or using any technology (even a tape recorder), it is a good idea to investigate how that technology is viewed by people living in the local area. Does it make them uncomfortable? Are they afraid of it? Do they embrace it? For example, if researchers were to conduct a field study of the Amish, researchers would need to realize that the

Amish religion forbids them from having their picture taken because a picture is considered a graven image. Any researcher who goes into the area to “study” the Amish needs to be aware of this and use alternative methods. It is no wonder, with the significant presence of tourists and researchers, that Amish children are taught to run when they see a car slowing down near their fields! If you are conducting a study in a part of the world that is largely unfamiliar with modern technology, it may be better to avoid using such tools than to risk your study by assuming the technology will be embraced by those you are studying.

Access to Results

When you begin a study, it is important to consider who will have access to the data when you are through with your study. This is an important question to consider because the answer could affect the type of data that you will collect. For example, if you are going to collect data on individuals participating in some type of illegal or socially unpopular behavior, you need to be particularly careful about the data you collect and how you collect it. Divulging such information could get your respondents in trouble with the law and could put you in danger for simply trying to collect it. Always consider the need to protect both yourself and your study subjects to the degree that is possible and appropriate.

When researchers conduct their research, they are aware of their own proximate purposes for the data. Wherever you collect data, it is very important to consider who else might at some point read your report or see your data. It is essential that whenever you conduct a research project that you carefully select the information to include in the final report and realize that once information is out of your hands others may have access to it. Of course, you should also consider how data will be kept secure and confidential during the course of the study, especially when that data may contain additional details that are not planned for public distribution in the final report.

Local Sources of Data

For the social researcher, local knowledge is always an important data source. Sometimes, local groups preserve their knowledge about features important to their group, such as oral histories. Other communities commit such information to written form. Local sources of data might appear in the form of stories, dances, rituals, and ceremonies, none of which may be officially recorded, except for in the heads of community members or in some cases specific community members (community elders, healers, religious leaders, or others, depending on the culture). An exciting part of your

research might be to try to record this information in a form that is accessible to researchers as well as to other members of the community or future generations or simply for the preservation of knowledge.

The advantage of finding any form of data, especially if it is not recorded in a form that is already accessible, is that it can then be incorporated into your study. For instance, let's say that you are interested in documenting the geographic location and relevant social information concerning the sacred sites of an indigenous group of people in Latin America. The maps that you have access to may be rough, but they give a good working picture of your study site. Sacred sites important to the local indigenous people—places that the local people consider to be important—are probably missing from these maps. When you are in the field collecting data, a GIS could be useful for matching your field notes with geographic locations of these sites. As mentioned earlier, your starting point would be a base map of your area.

Oral History Interviews

Oral histories are an important way to collect data from people who don't necessarily conceptualize their lives as data. The stories that people tell about significant events in their lives can be very informative to a researcher who wishes to gain an understanding of a particular time and place. Oral histories can be collected in a written form, where the researcher conducts an interview and takes copious notes. They could also be recorded on tape or digitally as long as the person being interviewed does not object. Using a combination of both written and recorded interviews offers an opportunity to capture the story as told by the respondent. Digital recordings can be stored on the computer as part of the GIS database and linked to the location the respondent is being interviewed about. Written notes and transcriptions of the recording are also useful in conducting qualitative analysis and for linking the interview information in the GIS database using key words or concepts.

GIS and Oral History

How would a GIS be integrated into the oral history method? There are several ways. First, the GIS can be used as a data organization and visualization tool. Imagine you are conducting oral histories about how people perceive the Mississippi River. You plan to interview people who live at different locations along the river. A main goal of your study is to determine if people's location on the river affects their perceptions of the river. For instance, people living close to a busy commercial port might have a different view of the river than those who live in peaceful, remote locations along the river.

As you collect your data, you can incorporate contextual factors about the environment, such as the number of people who live in the community where the informant was surveyed, the number and locations of ports and industry, the presence or absence of oil spills in the region, and the presence or absence of nature preserves along the river. You could then create files for the different geographic locations on the map and attach coded data regarding the environmental and social contexts that are important to your study. This would help you find patterns in potential factors affecting people's perceptions of the Mississippi River.

The second way to incorporate a GIS as part of the data collection process for oral histories is to use maps portrayed with the GIS to display information about particular issues or problems for research subjects. The oral history method is useful for studying the social and environmental context. For instance, you might be interested in researching the social and physical transformation of a particular neighborhood over time. You could use the GIS in the course of interviewing longtime residents of the community to interactively gather an environmental and social history of the neighborhood under study. Respondents could be shown various historical maps of the neighborhood and could point out relevant and important features or buildings (e.g., local town square, parks, neighborhood gathering spots where people interacted or gossiped), which could then be marked on the GIS map. In this way, the GIS becomes an interactive data recorder as well as a technology to assist people in relating their oral histories, remembering stories and important events from a time gone by.

The GIS is perfect for both the portrayal and recording of historic information. Such information may exist in people's heads or on old maps and historic photographs. This information could be integrated into a working GIS that then interactively produces stories, photographs, or historic documents related to locations on the map and that can be viewed by others in the research process.

Most social scientists are familiar with a data analysis method called content analysis. A GIS could be used as part of environmental and social history content analyses over time. One could conduct a geographic content analysis of particular variables in a spatial context. For example, you might identify patterns of particular variables and attributes across the study space: Do they cluster or are they dispersed? Do certain variables seem to relate to particular locations or physical or environmental features on the map? Such patterns can be assessed as part of the GIS analysis.

Participant Observation

Participant observation is a research method in which researchers actively participate in whatever issue or topic they are studying. Researchers make observations of the group they are participating with. At the same time,

researchers record their own experiences in a field journal. This journal reflects social and environmental observations about the group being interacted with as well as some of the researchers' sentiments about participating in the group. So how could GIS become a part of this process?

An example of participant observation might be as follows. Say that you are interested in recreational activities of people of different social classes. Your hypothesis is that people of different social classes engage in different forms of recreation. Participant observation would necessitate you going into the field and participating in recreational activities with the people in these groups and interacting with these people. To integrate into a group of higher social class individuals, you might temporarily join the local country club and participate in activities such as golfing and tennis. Because the elite sometimes maintain barriers to unknown individuals participating in their circles, perhaps you would take a job as a waiter or waitress at a country club. In both cases, the goal is for you to place yourself in a role where you have an opportunity to observe the recreational activities of the elite. Similarly, if you were seeking to participate in the recreational activities of the middle class, you might spend your time in the city park, observing who is playing basketball or throwing horseshoes, or you might observe people working out at a public gym.

So where does GIS fit into the study? You can integrate GIS by geographically locating these different recreational activity sites into a GIS and coding them by social class. It would be interesting to see if the higher and middle-class people recreate in different sorts of geographic locales and how these locations relate to where they live and work. Is there any overlap between classes and if so at which sorts of recreational facilities do these interactions occur?

As a part of maintaining your detailed field journal, you could actively record observations about the context of these recreational locations and the people who frequent them, using the following questions: What types of facilities are present? Are there tennis or basketball courts? What about a golf course or swimming pool? What are the conditions of the facilities? Where are these facilities located relative to where the people live? Do these facilities charge a fee for use and if so how much? Are these facilities limited access, member's only facilities or are they open to the public? What amenities are located near the facility? Are they secure and well lit? Do the facilities exist in natural or man-made environments? All of the data would then be combined with base maps of sociodemographic data and other relevant information for the analysis.

News as a Source of Data

News is an excellent source of data. In addition to being a good source of background data for your research, the news may actually be the data you

are studying. Some researchers may choose to investigate a research question that involves the news as a data source. The news has a lot of information that could be useful to a researcher who is interested in conducting content analyses within a GIS. Almost all articles in a newspaper list the location of the story in the opening line. This alone can be the basis for linking stories to geographic locations. It might also be important to know the location associated with the newspaper or the author of the article. Similar spatial information is included in some form in magazine, television, and online news formats.

News analysis might be done using a content analysis approach as one approach. In this approach, a researcher would search through the news stories in an attempt to find patterns related to a particular topic or subject. Let's say for instance that you are interested in conducting a content analysis of newspaper articles related to immigrants. To incorporate a GIS into your study, you could note the location where the newspaper is produced and see if that relates to the type of immigrants being discussed. For instance, would the articles referring to immigrants from Canada be published from locations in the northern United States? Or would the articles that focus on Latino immigrants occur in newspapers located on the West Coast? To extend this analysis further, using a GIS you could investigate if there was a difference in focus on immigrants between rural and urban areas? For instance, do newspapers located in rural areas present a more negative portrayal of immigrants than newspapers located in more urban areas, where there are more diverse populations and higher percentages of immigrants?

Another example of using a news source and integrating a GIS is identifying patterns of car chases for a transportation agency or the highway patrol. Over the last few years, car chases have become a regularly reported event in the media. You could integrate the GIS to help identify patterns in your analysis. For example, you might be interested in determining whether there are differences based on the police jurisdiction in which the chases occur. Let's say in your analysis you were going to go back through a review of TV news segments over the last 10 years for various parts of the country. You could find the date that the car chase occurred, the time that it occurred, what type of road it occurred on (freeway or city street), this street's geographic location, and whether the drivers were charged with another crime in addition to the car chase. The GIS would be an important part of the process of identifying patterns of car chases. Ideally, identifying these patterns would provide information to the authorities about how to better intercept and prevent such chases from occurring in the future.

Ethnography and GIS

If researchers are interested in conducting an ethnographic study, they are interested in providing a detailed description of their problem or issue, rather

than attempting to provide an explanation. Earl Babbie (2003) notes that an important part of conducting an ethnography is telling people's stories the way the people want the stories told. This does not involve the researcher coming in and critiquing or changing what people have told you but rather recording what they said and the exact way that they said it.

A GIS could be integrated into this type of research by having people contextualize or environmentally situate their stories for you over time. For instance, let's say that you are studying the homeless population of San Francisco, and you want to engage in an ethnographic approach. Part of your study might involve collecting the perceptions and stories from homeless people about what it's like to be homeless. You may interview homeless people who have been on the street for at least 20 years and record their stories about being homeless over time. For example, you might map locations described as having been good for sleeping, getting meals, or panhandling at different times, perhaps 20 and 10 years ago as well as at the present time. Key elements or variables that arise from these stories could then be examined in the context of where current homeless shelters are. Such a study might elicit support for the location of new or relocated services for the homeless to better meet their needs.

Case Studies and GIS

In a case study, a researcher seeks to record in great detail a multitude of factors related to a specific geographic or social location. A sociological example of a case study could focus on a particular organizational situation or place, or both. The researcher spends time in the community gaining an understanding of the people, places, and interactions that occur there. A case study is an excellent method when using the grounded theory approach. A case study may occur in a single location or in conjunction with other communities (in such a case, it would be a comparative case study).

Case studies are useful when you have an idea about a particular place or event that could potentially serve as a model for other, similar places. You as the researcher can conduct a case study with the idea that a particular community is a model example of a successful community because it has a thriving economy, local residents appear happy, and health is a major focus for residents. To prove or disprove this hypothesis, you could carry out a case study. The information that you discover in the process of conducting your case study may or may not confirm your initial ideas.

So what role would a GIS play? Let's say that you are interested in conducting a case study not of a particular place but of a particular organization: a local senior citizens' center. The center has a good reputation of providing food to seniors who are shut-ins in a city. To conduct a case study of this particular organization, you would need to gather as much information as you could about its outreach programs: Where do the older adults

served by the center live? How does the center organize its food distribution efforts? Does the senior center get food donations from these older residents' home communities? Are there times of day when the traffic is congested on the streets near the seniors' homes? How does the senior center avoid that? Obviously, the senior center has been successful in keeping its constituents happy and has found a way to accomplish this on a limited budget.

Using a GIS to help document and tell the success story of this organization within its particular spatial context could be very helpful to organizations that have similar goals and to other types of social service outreach organizations. Case studies provide extensive information about successes (and possibly failures) to others so that they do not need to reinvent the wheel or attempt numerous different approaches before finding one that works.

A GIS is useful to those who use grounded theory. In using a grounded theory approach, researchers do not go into the field with a traditional hypothesis or idea about what they are going to find. Instead, they allow the concepts or ideas to arise from the fieldwork itself. In the previous example, researchers would begin the investigation with no preconceived notions about what it is that makes the center successful, but rather they would simply collect the data and see what patterns emerge.

Public Participation and GIS

Public participation is often a major part of the planning process. As GIS technology becomes more prevalent in the field of planning so too has its incorporation into the public participation process, so much so that there is an entire developing subdiscipline known as public participation GIS (PPGIS). What does this mean? Public participation in the planning process means that local people's ideas, thoughts, and actions are solicited to be a part of the process. Public participation is something that has been mandated by many state and federal agencies to become a permanent component of the planning process.

One form of public participation is to hold community meetings or to stage hearings to solicit community input about what is going to happen in a particular situation. Whichever agency has jurisdiction over the issue in question is the agency responsible for soliciting the input. Other important forms of public participation in the planning process include focus groups, surveys, key-informant interviews, and needs assessments, just to name a few.

When soliciting public input, a GIS can play an important role. As different methods of soliciting public input have evolved along with the recognition that this is an important and valuable thing to do, GIS has become part of the process. One drawback of having GIS as a part of the public participation process is that not all members of the general public have an understanding of GIS. However, this can be solved by having trained staff familiar

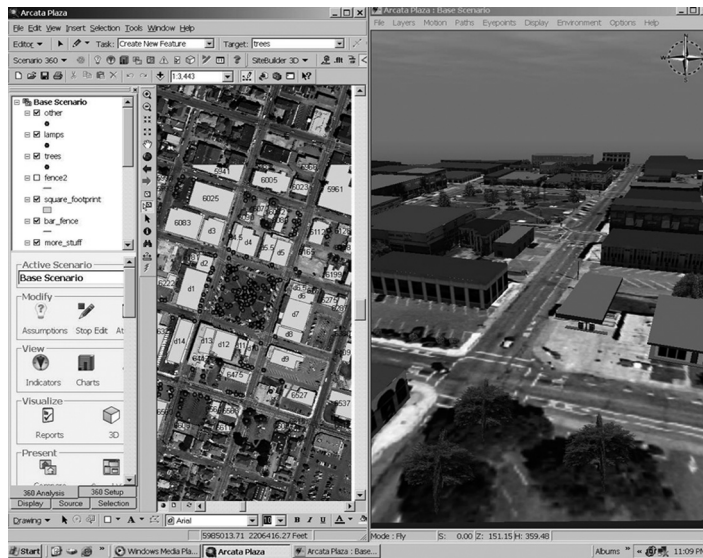


Figure 5.2 An example of a three-dimensional visualization for community planning, using ESRI ArcGIS® with CommunityViz Scenario 360® software. The GIS is used to establish the base data, including a terrain model, a high resolution aerial photograph, and ground-based photographs of key features, including building facades. Prospective alterations to the city can be placed into the model to assist community members in visualizing how these changes would appear when complete. In the lower left of the image, the red lines show the point of view selected in generating the view of the right. After all of the data have been prepared, it is possible to actually move through the data in a fly-through mode, allowing a variety of perspectives on the proposed project.

with both GIS and the issue under discussion available to assist with the technological aspects of using a GIS in an interactive fashion with the general public.

For example, participants at a public comment session could be asked for questions about their vision for the local community, and GIS professionals could chart different development scenarios using the GIS software. With the proper software, it is even possible to generate a three-dimensional model of how different scenarios look, portraying different options on a screen or using printed maps that are further marked up with comments or input from the community. Figure 5.2 provides an example of a three-dimensional visualization generated in a GIS.

The main advantage of using GIS as a part of participatory planning is that it allows people to visually see the data and its physical, environmental, or social context as it is now and perhaps could be in the future. For instance, what if you were interested in soliciting input about what should happen to a local bay located in a seaside community? Different proposed scenarios might call for further industrial development of the bay, more tourist development, and more recreational opportunities for local people in

and around the bay. Using a GIS as a part of the public participation process allows for management professionals to portray different scenarios immediately so that an interested public can actually see the suggestions put forth as part of the planning process. Having the ability to see options in a realistic way provides a very powerful experience and lets members of a local community know that their suggestions are being heard (Figure 5.2).

Similarly, using the GIS as a means of idea portrayal can also give local planners an idea of what the public desires from a planning perspective. It should be stated here that use of the GIS is not for everybody. There are some people who don't like technology and computers and who might reject the use of a GIS because they feel it's too technologically oriented and complex for the layperson. This is a field that is evolving even as we write this book. We look forward to seeing the new developments that arise in this area as GIS become a more commonly used part of planning efforts at local, state, national, and international levels.

Relevant Web Sites

CommunityViz: This is the Web site for CommunityViz, a program of The Orton Family Foundation, the Vermont-based, nonprofit operating foundation dedicated to helping communities make better, more responsible land use planning decisions. <http://www.communityviz.com/>

The Grounded Theory Institute: This entire Web site is devoted to the methodology of grounded theory. www.groundedtheory.com

"Grounded Theory: A Thumbnail Sketch": This site provides a nice overview of grounded theory from the Resource Papers in Action Research Web site. www.scu.edu.au/schools/gcm/ar/arp/grounded.html

Oral History Association: The Oral History Association, established in 1966, seeks to bring together all persons interested in oral history as a way of collecting human memories. <http://omega.dickinson.edu/organizations/oha/>

Oral History Society: The Oral History Society is a national and international organization dedicated to the collection and preservation of oral history. <http://www.oralhistory.org.uk/>

PPgis.net: The site is the electronic forum on participatory use of geospatial information systems and technologies. <http://ppgis.iapad.org/>

"Public Participation GIS (PPGIS) Guiding Principles": This site contains an article about PPGIS by Doug Aberley and Renee Sieber. <http://www.urisa.org/PPGIS/2003/papers/PPGIS%20Principles2.pdf>