Chapter 42
Cognitive Mapping and GIS for Community-Based Resource Identification

Lyn Kathlene
Colorado State University, USA

ABSTRACT

This chapter describes and analyzes the effectiveness of two methodological techniques, cognitive mapping and geographical information systems (GIS), for identifying social service resources. It also examines the processes used to integrate hand-drawn map information into geocoded data points and provides recommendations for improving efficiency and precision. As a first step to integrate Jefferson County social service delivery into community-based child welfare "systems of care" (SOC), both formal and informal services had to be identified. Cognitive mapping, a process by which participants draw visual representations of geographical areas, was conducted with 247 participants in Jefferson County, Colorado. Over 3,500 resources were identified and entered into a GIS to analyze the availability, capacity, and distribution of social services in the county and within communities. Identification of community resources via cognitive mapping and GIS analysis provide: (1) a comprehensive database of existing services; (2) a basis to build communication networks and cooperation among government and community providers; (3) the ability to create an efficient system that avoids duplication of efforts; (4) an understanding of the geographical distribution of resources; (5) the identification of resources lacking in the county and specific communities; and (6) knowledge differences among diverse participant groups.

INTRODUCTION

In December, 2003, the Colorado Institute of Public Policy (CIPP) at Colorado State University was contracted by Jefferson County, Colorado, Division of Human Services, to conduct a resource identification analysis. The project was one component in the first year of a five-year Health and Human Services — Children's Bureau grant to create a "systems of care" (SOC) in child welfare social service delivery.[1] Jefferson County, Colorado, was one of eight pilot sites awarded an

DOI: 10.4018/978-1-4666-2038-4.ch042

SOC grant. The CIPP component was to identify services available at the community-level and discover services that were lacking.

SOC is a major paradigm shift in social service delivery. It removes the locus of authority away from one individual, the social service worker, and replaces it with a group of service providers, family, and community members to develop *collectively* a comprehensive plan to move the child and family out of crisis. The provision of services are to be coordinated, *community-based*, culturally competent and individualized (Stroul, 1986).

To integrate Jefferson County social service delivery into community-based comprehensive child welfare SOC, both *formal* and *informal* services had to be identified. Informal services are of particular interest since these are likely the least well-known (there was no official directory) and serve populations at a community SOC level (rather than county-wide). For definition purposes, informal services were identified for participants as private or not-for-profit programs, including services such as church soup kitchens, non-profit agencies providing transportation services for the elderly, and in-home daycare providers not registered with the county. Formal services are public programs at the state, county, and local level, such as Jefferson County Mental Health Services, Title XX daycare providers, public schools, public transportation, and park and recreation programs.

To identify existing resources at the community level, cognitive mapping, a process by which participants draw visual representations of geographical areas, was conducted with 247 participants in Jefferson County, Colorado. Participant groups in the mapping included social service, non-profit, and faith-based providers, social service clients (Temporary Assistance for Needy Families (TANF) recipients, youths, foster care providers, and adoptive parents), residents and ethnic/racial enclaves (Latino, Eastern European, Native American, and African American). In addition, all resources listed in the Jefferson County resource guides were included in the resource database. Over 3,800 unique resources were identified and entered into a GIS — ArcMap, a component of ArcView — to analyze the availability, capacity, and distribution of social services in the county and within communities. Census data was overlaid to identify high-need areas and ethnic enclaves.

Here, a novel application of GIS for designing improved social service delivery systems is described. The chapter also discusses complications involved in working with human service agencies, and reconsiders the processes developed to merge cognitive mapping information into ArcMap.

Cognitive Mapping: Origin and Uses

Cognitive mapping has not been comprehensively integrated with GIS to the degree discussed in this project, although elementary integration has been done in some previous projects (Fulton, Horan, & Serrano, 1997; Kathlene, 1997; Kathlene & Horan, 1998; Horan, Serrano, & McMurran, 2001).[2] The potential usefulness to the human services sectors through projects that use the combined methodologies is substantial. To better understand this "fit," a brief review of cognitive mapping follows.

Cognitive mapping did not originate from research on humans. Rather, the term "cognitive map" was originally used to describe the mental representations that rats develop as they navigate the same maze multiple times (Tolman, 1948). Quickly, researchers became interested in using the information from cognitive maps in the human context, and the resulting collection of methods became known as cognitive mapping. Later, the term expanded to include mental depictions of more abstract entities, like ideas or chains of events. Since its inception, cognitive mapping has been used as an approach to a number of real-world issues.

Cognitive mapping's first practical application was in the field of urban planning when Kevin Lynch (1960) found that certain places or elements in a city generated a positive emotional reaction