

EDITORS' NOTES

A geographic information system (GIS) is a constellation of hardware and software that integrates computer graphics with a relational database for the purpose of managing data about geographic locations (Garson and Biggs, 1992). GIS technology has been used for almost three decades now. It has, however, for too long been viewed as the province of specialists rather than a generic tool for social scientists. With the proliferation of affordable, easy-to-use, PC-based GIS packages and improved collection and dissemination of geographic data—notably the U.S. Census Bureau's digitized maps—this is changing.

Over the past decade the use of GIS technology and applications in business and academic research has grown exponentially. Integrating spatially oriented data with digitized mapping, GIS tools facilitate the examination of geographic patterns in data, which would be virtually impossible to uncover with traditional statistical analysis. GIS is used by many industries, among them utilities, businesses, law enforcement, transportation, health care, and agriculture, as well as local, state, and federal governments to solve problems and communicate information. It has facilitated natural resource management, land use planning, demographic research, crime analysis, emergency vehicle dispatch, fleet management, environmental assessment and planning, and geological research.

GIS analysis is particularly valuable to local governments, because almost everything that happens in a public policy context happens also in a geographic one; redistricting boards, transportation planners, planning commissions, and crime task forces all must consider questions of *where*, in addition to the usual ones of *how*, and *why*, and *how much it will cost* (Greene, 2000). Williams (1987) estimated that about 80 percent of the informational needs of local government policy makers are related to geographic location. In higher education administration, GIS use is less obvious but interest in learning this technology is growing. Like city managers, campus administrators have to manage people, facilities, equipment, and data. The spatial framework and data integration capabilities of GIS could potentially benefit all areas of campus operations.

Oftentimes, however, the use of this technology in higher education administration is limited to managing facilities and other physical resources. For instance, through the integration of computer-aided design (CAD) drawings and local databases, many campuses have developed systems that help them manage the planning, leasing, constructing, and maintaining of facilities, as well as developing emergency response plans.

The premise of this volume is that, beyond the obvious use in resources management, geographic information systems are likely to play an ever-larger role in many other areas of institutional research. If GIS is still a largely unrecognized opportunity in the IR field, this will probably change. Questions of *where* become increasingly evident to institutional researchers and other campus administrators as they realize that a large part of their data have a spatial component. In a GIS system, address records can be geocoded to their census block group or tract. Given the many address records colleges and universities have on file, research questions inevitably arise that may be addressed through a GIS system. For instance, institutional researchers might be asked to use GIS tools to assist a development office in planning fundraising campaigns by strategically locating areas with a higher level of alumni giving, to assist admissions officers in targeting recruitment and solicitation efforts, to assist continuing education directors in identifying potential markets for nontraditional students, and to assist academic units in optimizing classroom utilization.

Are we equipped with the skills necessary to embark on such projects? For most of us, the answer is probably no. Traditionally, GIS techniques have never occupied a central place in the methodological instruction of social scientists in general, or institutional researchers in particular. Until recently such skills were the exclusive domain of computer scientists, geographers, and marketing consultants. It is clear, then, that there is a need for generalist knowledge about GIS tools that at least introduces the IR professional to their potential applications, concepts, data, and methods.

The purposes of this volume are first to present institutional researchers with a framework for analysis and decision making through the use of geographic information systems and second to discuss examples of GIS applications that are best suited for use by institutional researchers.

The first chapter offers an overview of the GIS concepts, tools, types and sources of data, and types of analysis. The chapter sets the background for the remainder of the volume, which addresses specific examples related to particular applications of GIS in institutional research.

In Chapter Two, Victor J. Mora discusses how a major public research university has been using GIS technology to inform decisions in the areas of planning and implementation of recruitment strategies and tactics. A major strategic planning issue for college and university admissions is the development of inquiries that facilitate attainment of stated institutional enrollment goals with respect to quality, quantity, and diversity. This is a challenging task in light of the difficulty of identifying potential prospects from a very large population and of the increasing competition for students among institutions. The GIS approach described by Mora links current, detailed demographic data at the block group level with local information on enrollees to identify geodemographic profiles of those potential students who are most likely to enroll at his university.

Building on past GIS work at the same university, Manuel Granados presents in Chapter Three several mapping methods to visualize and ana-

lyze student enrollment. Through carefully selected examples, the author stresses the importance of selecting the right unit of analysis when creating, analyzing, and interpreting GIS maps.

In Chapter Four, David R. Blough discusses how GIS can be integrated in one of the most widely known IR methods, survey research. The author suggests that GIS can add value to several stages of survey research: research design, data analysis, and reporting. His examples from surveys of the market for higher education are general enough to apply to other contexts and will be insightful both for clients and practitioners of survey research.

Chapter Five illustrates how GIS can serve as an effective tool for space planning, facilities management, and environmental planning of a university campus. It can reveal the most or least utilized space on campus. In this chapter, Nicolas A. Valcik and Patricia Huesca-Dorantes describe the implementation of an integrated GIS for facilities management at a public research university. The project focused on integrating utilities and spatial and relational information, along with distributing this information over an intranet.

Chapter Six explores critical organizational issues that campus administrators are likely to confront when developing an “enterprise system” (a campuswide GIS). Grant McCormick’s assumption is that key benefits of a GIS are to be realized with a system that permeates the enterprise, links divisions, integrates data sources to create new understanding, and creates efficiencies by overcoming territorial boundaries.

In Chapter Seven, Daniel Jardine illustrates the use of GIS mapping in analyzing alumni donating patterns and the potential this analysis holds for developing predictive modeling of alumni giving. By linking alumni data with demographic information supplied by census data, GIS can assist alumni offices in gaining greater understanding of where alumni are located and where to focus future campaign activity.

The final chapter draws on the examples of the preceding chapters to highlight the key benefits GIS can bring to institutional research. It also discusses a few resources for those who want to learn more about this technology. The discussion includes information on software, data sources, and training options.

This collection of applications is not intended to turn out full-fledged GIS analysts but rather to expose professionals working in institutional research to this powerful presentation and analysis tool. It is the editor’s hope that, by illustrating the potential of GIS with examples of applications from several higher education institutions, this volume will spark the reader’s imagination and encourage new approaches to working with this technology in institutional research. Through its clear and intuitive presentation of complex data, GIS has the potential to become one of the most useful tools available to institutional researchers.

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References

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