

MODERN LIBRARY MANAGEMENT SERVICES WITH GEOGRAPHICAL INFORMATION SYSTEM

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Abstract:

In-library use data is crucial for modern libraries to understand the full spectrum of patron use, including patron self-service activities, circulation, and reference statistics. Rather than using tables and charts to display use data, a geographic information system (GIS) facilitates a more visually appealing graphical display of the data in the form of a map. GISs have been used by library and information science (LIS) researchers and practitioners to create maps that display analyses of service area populations and demographics, facilities space management issues, spatial distribution of in-library use of materials, planned branch consolidations, and so on. The "seating sweeps" method allows researchers and librarians to collect in-library use data regarding where patrons are locating themselves within the library and what they are doing at those locations, such as sitting and reading, studying in a group, or socializing. This paper proposes a GIS as a tool to visually display in-library use data collected via "seating sweeps" of a library. By using a GIS to store, manage, and display the data, researchers and librarians can create visually appealing maps that show areas of heavy use and evidence of the use and value of the library for a community. Example maps are included to facilitate the reader's understanding of the possibilities afforded by using GISs in LIS research.

Introduction:

Research, public, academic, and special all type of library have become active users and providers of GIS resources (Frank 1994; Lai and Gillies 1991; Smith and Gluck 1996). The interest in GIS has been sparked by a number of factors. The first is the utilization of new technologies such as GIS in support of education, research, and effective access and retrieval to information resources. Second, collecting, maintaining, preserving, and providing access to spatial resources is not new to libraries, but the advent of GIS has resulted in libraries exploring new approaches to many, if not all, of these traditional library functions. Third, the rapid expansion and utilization of networked services, particularly within the academic sector, as communication and educational tools present new opportunities for libraries to address the information needs of a diverse clientele.

These changes are occurring at the same time as libraries are in a state of transition, experimentation, and transformation to serve a varied clientele, libraries work with a numerous of information technologies and information resources in multiple formats. Indeed, libraries are constantly challenged with the introduction of new technologies, services, and formats (Lyman 1996). They also have to design training programmes that will assist in the effective integration of new programmes and services. Thus the growing array of geospatial information products and services, particularly within the governmental and academic sectors, requires that libraries engage in GIS activities to provide effective access to these digital resources.

Literature review:

Although much has been written on the use of library facilities, little of the research includes studies of how patrons actually use existing public library facilities and whether facilities are

designed to accommodate this use.¹⁰ Rather, much of the research in public library facility evaluation has focused on collection and equipment space needs,¹¹ despite the user-oriented focus of public library accountability models.¹² Recent research in library facility design is beginning to reflect this focus,¹³ but additional study would be useful to the field.

Use of GIS is on the rise in the modern technological world. A GIS is a computer-based tool for compiling, storing, analyzing, and displaying data graphically.¹⁴ Usually this data is geospatial in nature, but a GIS also can incorporate descriptive or statistic data to provide a richer picture than figures and tables can. Although GIS has been around for half a century, it has become increasingly more affordable, allowing libraries and similar institutions to consider using a GIS as a measurement and analysis tool.

GISs have started being used in LIS research as a tool for graphically displaying library data. One fruitful area has been the mapping of user demographics for facility planning purposes,¹⁵ including studies that mapped library closures.¹⁶ Mapping also can include in-library use data,¹⁷ in which case a GIS is used to overlay collected in-library use data on library floor plans. This can offer a richer picture of how a facility is being used than traditional charts and tables can provide.

Using a GIS to display library service area population data

Adkins and Sturges suggest libraries use a GIS-based library service area assessment as a method to evaluate their service areas and plan library services to meet the unique demographic demands of their communities.¹⁸ They discuss the methods of using GIS, including downloading U.S. Census TIGER (Topologically Integrated Geographic Encoding and Referencing) files, geocoding library locations, delineating service areas by multiple methods, and analyzing demographics. A key tenet of this approach is the concept that public libraries need to understand the needs of their patrons. This is a prevailing concept in the literature.¹⁹

Prieser and Wang, in reporting a method used to create a facilities master plan for the Public Library of Cincinnati and Hamilton County, Ohio, offer a convincing argument for combining GIS and building performance evaluation (BPE) methods to examine branch facility needs and offer individualized facilities recommendations.²⁰ Like other LIS researchers,²¹ Prieser and Wang suggest a relationship between libraries and retail stores, noting the similar modern trends of destination libraries and destination bookstores. They also acknowledge the difficulty in completing an accurate library performance assessment due to the multitude of activities and functions of a library. Their method is a combination of a GIS-based service area and population analysis with a BPE that includes staff and user interviews and surveys, direct observation, and photography. The described multimethod approach offers a more complete picture of a library facility's performance than traditional circulation-based evaluations.

Further use of GISs in library facility planning can be seen from a study comparing proposed branches by demographic data that has been analyzed and presented through a GIS. Hertel and Sprague describe research that used a GIS to conduct geospatial analysis of U.S. Census data to depict the demographics of populations that would be served by two proposed branch libraries for a public library system in Idaho.²² A primary purpose of this research is to demonstrate the possible ways public libraries can use GIS to present visual and quantitative demographic analyses of service area populations. Hertel and Sprague identify that public libraries are challenged to determine which public they are serving and the needs of that population, writing that "libraries are beginning to add customer-based satisfaction as a critical component of resource allocation decisions" and need the help of a GIS to provide hard-data evidence in support of staff observations.²³ This evidence could take the form of demographic data, as discussed by Hertel and Sprague, and also could incorporate in-library use data to present a fuller picture of a facility's use.

Challenges and Opportunities of GisIn Library Services

GIS service policies in libraries

As with other institutions, a number of factors conclude the level and type of GIS services provided by different types of libraries. The service level will vary depending upon the library type and the institution's mission, clientele, budgetary and staffing considerations. In examining the introduction of GIS services into all type of libraries, two themes are evident. First, no one service model has emerged; rather, each library has formulated strategies to meet local institutional needs. Second, an important distinction arises in defining the 'GIS services' to be provided by libraries. To most libraries, providing access to GIS or spatially related information constitutes 'GIS services'. Access is defined in the context of traditional library roles-collecting, maintaining, preserving, and archiving spatial information. Increasingly, libraries provide educational services to ensure effective access to these spatial information resources and programmes.

Staff and training issues

Clearly the level of GIS service offered is the key determinant regarding staff skills and the development of training programmes for both staff and users. The significant learning curve associated with GIS has placed new demands to library staff. Staff development and training issues continue to be a key element in Indian libraries. The IIT's provides a forum for libraries to experiment and engage in GIS activities. The Association of Research Libraries, in cooperation with GIS vendors and users, solicits donations of GIS software and data, organises regular training sessions for participants, sponsors an electronic mail list, and works with government agencies on GIS projects and related issues. Support and expertise has been provided by GIS vendors, GIS practitioners in the public and private sectors, and foundations. From the outset of the Project, the development of a team of GIS professionals in the research library community willing to lend time and expertise to applications, user training, and education programmes related to GIS, was recognised as key to the successful integration of GIS services in the library arena. Cline and Adler (1995) comment that: 'GIS requires an understanding of computing and the ability to work with visual representation of data, in addition to the knowledge and skills typically found in libraries relating to organization of data, knowledge of information retrieval systems, reference services, and collection development. To implement GIS as a strategic direction for a library, requires a commitment to developing this special combination of strengths, either in individuals or teams.

Partnerships

Establishing partnerships within a community, be it an academic institution or a public library serving local community information needs, is another critical component in the successful integration of GIS services in libraries and community projects. Those institutions that have reached beyond the library and have worked in collaborative relationships with GIS users in all settings have been the most effective and successful in becoming GIS literate. For example, James Boxall of Dalhousie University (personal communication) notes the relationship between academic departments and the initiation of GIS activities: 'Those libraries that have longstanding and/or official connections to academic departments dependent upon GIS seem to have had a

longer experience with GIS and GIS services in a library context. Those universities such as McGill University, Brock University, University of Victoria, and Queens University, have seen the close association with geography departments and/or GIS programmes benefit the introduction of GIS services in their map libraries.

Selected Library Programmes

Each library engaging in GIS activity has developed plans that seek to meet the local needs of an institution and each provides differing levels of service to meet their unique information needs. Many libraries have discovered that the primary issue is no longer of providing access to GIS resources but rather of determining how significant investment should be and how it will evolve over time. The John R Borchert Map Library at the University of Minnesota, a US FDLP regional map depository and the US Geological Survey Earth Science Information Center for Minnesota, has an ambitious amount of GIS activity underway. The Map Library has one of the largest research map collections in the nation, including 275 000 sheet maps, 10 000 atlases and reference books, and over 300 000 aerial photographs of the State of Minnesota. It serves more than 25 000 patrons each year. Using funds from the US Department of Education and the University, the Library established the Automated Cartographic Information Center (ACIC). The ACIC presents one model for academic and map libraries to consider

Conclusions and Future Prospects

Becoming literate in GIS and becoming active providers of GIS information and services are considered important long-term strategic investments by many libraries. The initial impetus for working with GIS was to meet the immediate and pressing demand of providing access to data resources, such as those from the Bureau of the Census. GIS has now become an integral part of many library public services programmes. GIS services allow these institutions to manage spatial data better on behalf of diverse constituencies. They also present opportunities for libraries to rethink current approaches to tasks like cataloguing. This can be undertaken in an environment conducive to research, education, and public access.

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