

Geographic collections development policies and GIS services: a research in US academic libraries' websites

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Abstract. Management and analysis of geospatial data evolved into a rapid developmental field nowadays. Scientific researches debate that 80% of economic and political decisions internationally, include indirect or direct geographic information while this is also present in everyday life under various applications (GPS, in PDA's, in mobile phones). The digital libraries offer various tools, including open systems that can be used in order to organize and accommodate the retrieval of a variety of geospatial data. In addition, institutional arrangements have facilitate the access to geospatial data setting the geospatial information a promising field for libraries that want to offer a variety of new services to their users. In order to investigate the GIS services and whether the libraries hold a geospatial collection,(had also established a collection development policy for it, we systematically reviewed, in March 2011, 133 websites of US academic libraries. This paper aims at tracing those libraries that use GIS services in order to make their geospatial collection, (either developed by subscriptions or by their own sources), accessible to the end user. The following elements were examined in the current research: 1) How many libraries provide GIS services? 2) How many libraries provide collection development policy for their geospatial collections to their patrons? 3) What kind of information do they offer? 4) What kind of infrastructure do they provide to the public? 5) What services do they offer? (user education, assistance, remote access, guidelines for hardware/software). We also aim to compare the results of our survey with the results of previous surveys in the field while we parallel the libraries we research in our survey to ARL, UCGIS, and FRPAA lists. The majority of the examined libraries offer GIS services, but only 14% of them currently inform their users for their collection development policy. The types of information that these collections sustain varies (gazetteers, maps, geographical data sets etc), while most of the libraries provide information about their infrastructure (workstations, printers, scanners etc). The main desktop software for 58% of the reviewed libraries that mention it is ArcGIS. As little previous research has been conducted on the topic of geospatial collection development policies and GIS services, this study is exploratory. Although the timing and the fixed duration of the study limited the size of the sample and the depth of the investigation, sufficient data were collected. This paper seeks to examine the potential role of policies in geospatial services that libraries can offer, in a rapidly changing digital environment.

1 Introduction

Libraries are facing new challenges with the distribution of geographic information in digital form. Most important, libraries will be challenged to manage geographic information in a new way since the opportunities include the spread of geographical information science and spatial analysis across disciplines, the ability to present map information in more dynamic forms than previously possible, the increasing information query, the interpretation and display capabilities, and the access to more current information [1]. Furthermore, libraries are challenged either to find ways to provide information in this area, or scholars, students and others users will obtain the information they need from sources outside the library [2].

A geographic information system is an appropriate tool for libraries whose primary function is the management (storage and distribution) of information. In a way, most libraries use GIS when they store and manage atlases and maps. Libraries are now expanding that traditional usage by employing computer based, automated GIS capabilities. This expansion is spurred by the rapid development of computer hardware and software capabilities [1]. The advantage of having a unifying GIS platform in which users may combine otherwise disparate data sources is attracting an ever increasing number of users [3]. An academic library's homepage mainly functions as a public service, typically including digital reference, online interlibrary loan request forms and online information tutorials, to name a few [4]. Thus, it is reasonable to ask, however, whether there is a GIS services role in a library's homepage.

2 Literature Review

2.1 Collection Development Policies

GIS data collection development constitutes a core element of GIS services within libraries and information centres. As "collection development is a process that allows the identification of the strengths and weakness of the materials collection of a library in terms of users needs and the resources of the community [5], in the creation of GIS collection development policy, library professionals should consider the established collection development policy, needs of the GIS user community, and library infrastructure. Additionally, information professionals should examine the current and planned GIS activities in the institution, which will have strong influence on their form [6].

When making decisions regarding GIS data acquisition, the decision maker should consider cost, availability, license agreements and distribution policies, documentation, data structures, software and hardware [7]. The policies could differ from one organization to another in the sense that each one has its own requirements and priorities [8] but the most important and helpful for librarians is "to incorporate

elements of a need assessment into their workflow to help organize the various types of information elements they collect” [9].

2.2 GIS services

Geographic Information Systems (GIS) are designed to allow the management of large quantities of spatially referenced information about natural and man-made environments, covering areas such as public health, urban and regional planning, disaster response and recovery, environmental assessments, wetlands delineation, renewable resource management, automated mapping/facilities management, and national defence [10]. GIS platform in the library opens many new gateways and provides several opportunities to the libraries for contributing their share in planning and decision making in the area of handling geographic information, which they did not avail earlier. It is possible to answer a variety of queries put by patrons working in different fields [11].

3 Methodology

The websites of 133 US academic libraries funded by either the public or the private sector were examined in March 2011. We choose academic libraries because:

- academic libraries support a wide part of the society,
- they have more reliance on new technologies,
- of the quantity of US academic libraries,
- of their history in the implementation of GIS services [12].

The objectives of the review were: 1) How many libraries provide GIS services? 2) How many libraries provide collection development policy for their geospatial collections to their patrons? 3) What kind of information do they offer? 4) What kind of infrastructure do they provide to the public? 5) What services do they offer? (user education, assistance, remote access, guidelines for hardware/software). Specific information regarding the examined questions was recorded in Excel sheet.

4 Limitations of the research

Among the limitations of the study we include the specific library type and the geographic region as we examined only academic libraries’ websites in the US. As the author was the sole researcher we can’t exclude any amount of bias into the analysis.

5 Research Results

5.1 GIS in Academic Libraries services

95 out of the 133 libraries we examined appeared to have GIS services for their academic community while 17 out of 133 provide GIS services either cooperatively with an academic department or they offer such kind of services in a Center¹ or a Lab². Overall, 21 out of 133 libraries did not offer GIS services at all.

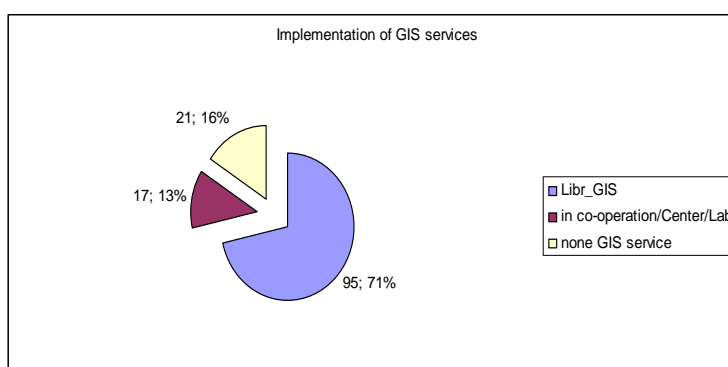


Fig. 1. Implementation of GIS services

5.2 Collection Development Policies

Of the 95 academic libraries that had established GIS services, only in 13³ (14%) we located a geospatial collection development policy. The majority (82/95, 86%) did not have any information on their webpage about such policies.

¹ University of Cincinnati, <http://www.gissa.uc.edu/>

² University of Denver, <http://www.du.edu/gis/dataresources.html>.

³ Colorado State Library, Duke University, Emory University Library, Portland State University Library, Stanford University-GIS at Branner, University of Connecticut, University of Georgia, University of Hawaii-Manoa, University of Iowa, University of Nebraska-Lincoln, University of Wisconsin-Madison, University of Wisconsin-Milwaukee, Western Michigan University.

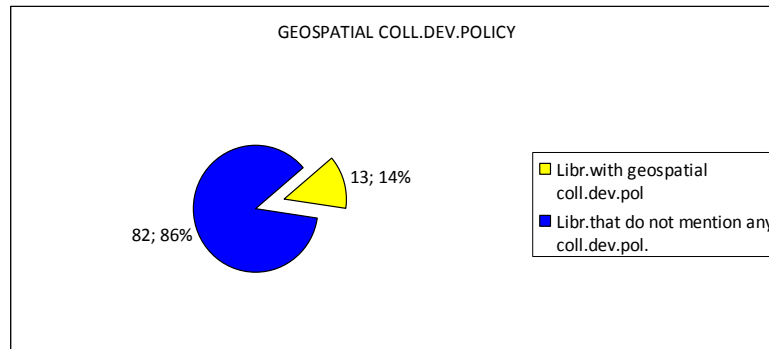


Fig. 2. Geospatial Collection Development Policy

5.3 Provided information

As most of the libraries (85/95) were members of the Federal Depository Library Programme (FDLP)⁴, patrons have the chance to access a variety of Government's Information (local base data, national data sets, data from federal agencies, etc). In conjunction with ESRI, the majority of libraries provide data as tutorials as well. The growing use of electronic information is particularly obvious in the specific type of information sources and GIS Librarians have organized their websites in a form that provides access to several free electronic resources containing either national, local or international data in several topics (e.g. labor statistics, US Census Data, International Financial Statistics). Scanned historic maps, interactive maps, digital orthophoto files, satellite imagery, aerial photographs, aeronautical charts, atlases, gazetteers and thesauri, shapefiles, are some of the collections that patrons can find and use, for their educational or scientific purposes in a diverse variety among 95 libraries with GIS services. Of course, except for the above, more "traditional" collections are also available like journals, databases, books and dictionaries that cover GIS aspects.

5.4 Infrastructure

Hardware: 46 out of 95 libraries provide information on the infrastructure that can be used in the library and which contains: workstations, printers, scanners, plotters, GPS. We note that infrastructure availability varies from library to library, although there are libraries⁵ that have the ability to offer all the above in order to cover their users needs.

⁴ The Federal Depository Library Program (FDLP) was established by Congress in 1813 to ensure that the American public has access to its Government's information (<http://www.fdplp.gov/home/about>)

⁵ Pennsylvania State University, Rice University-Fondren Library, Washington University in St. Louis

Software: As ESRI was partner in ARL GIS Literacy project it is not a surprise that 58% use ArcGIS. We also detect information about other software packages like Auto Cad, Idrisi/Erdas, SPSS, as well as open source software like GRASS, QuantumGIS, DIVA, MapWindow, GoogleEarth, GoogleEarthPro that were provided either for educational purposes or for developing specific applications.

5.5 Services

According to their websites, 51 % of the 95 libraries organize training programmes, while 77% offer assistance to the users (e.g. Ask a Librarian). A patron can find information about hardware/software that can be used in 44% of the GIS libraries, while guidelines for data/software use, provide only 16%. The majority of examined libraries (67%) provide data for local access.

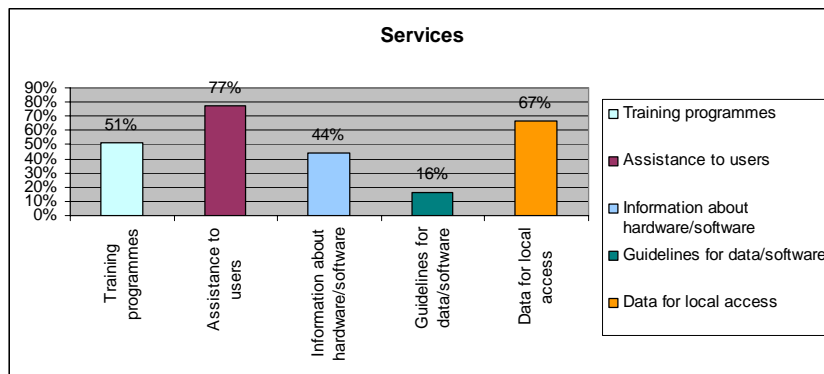


Fig. 3. Services

5.6 Other Findings

While searching websites for answering our 5 main research questions we record some additional interesting findings, useful for further research: Among 95 libraries offering GIS services and support to a community of users focusing on services such as information literacy, access, infrastructure, based on a static collection housed in a specific location accessible via the internet, it is rather interesting that 9 developed such services while didn't serve any familiar department (e.g. Geography, Environmental Science, Architecture etc.).⁶ Besides data and infrastructure, personnel is the third important element for the whole service in order to be properly delivered to the public and 11 libraries adopted the term "GIS Librarian", recognizing that way that "in addition to the requisite skills needed by librarians in today's hybrid libraries,

⁶ American University Library, Emory University Libraries, Georgetown University, Miami University, Michigan State University, New York University, Oklahoma State University, University of Pennsylvania, Washington University in St. Louis.

additional skill sets are basic for librarians who want to work with geospatial data” [12]. For our research, we proceed on examination of ARL GIS Literacy Project list and exclude all other kind of libraries except for academic ones (college and public libraries and libraries of Canada that we intend to research in future survey). Library of Congress and National Libraries, excluded as well as they were not in target group, in this initial examination. For the academic libraries left, we examined their websites and discovered that 58% were members of the initial ARL project and continue to supply their patrons with such kind of services.

In 1994, representatives of 34 US universities and other research organizations met in Boulder, Colorado and decided to establish an organization “dedicated to the development and use of theories, methods, technology, and data for understanding geographic processes, relationships, and pattern” [13]. We conclude that 46% out of 95 libraries we trace offering GIS services were members of the UCGIS as well.

Finally, as lately there has been a lot of discussion about the need to make research results accessible to a worldwide readership, and having in mind FRPAA⁷, we discovered that 35% of libraries were in institutions that their presidents and provosts support it.

6 Previous researches

ARL conducted a survey in 1999, to examine the way the ARL libraries have organized their delivery of GIS in the years after GIS Literacy project began⁸, and 64 institutions indicated that they provide GIS services (in 53/64 services administered by library). Kinikin and Hench [14] survey in small academic libraries, in 2002 indicated that 22 (out of 168 libraries which joint the research), support GIS services and proved that GIS services in academic libraries in the United States tend to differ, based on availability of GIS data, software, hardware and staff expertise. Kinikin and Hench [15] conducted in 2004 a follow-up survey of those libraries which had adopted GIS and they discovered that out of the eleven libraries which returned the survey, two have discontinued offering GIS services in their libraries.

Until the last decade, hardware and training costs were often prohibitive for all but the largest institutions. Larger and well-funded institutions have been able to overcome these barriers by hiring full-time staff to work with students and faculty, and to collect data and data sources as Gabaldon & Replinger concluded in their

⁷ FRPAA would require that 11 U.S. government agencies with annual extramural research expenditures over \$100 million make manuscripts of journal articles stemming from research funded by that agency publicly available via the Internet (<http://www.arl.org/sparc/advocacy/frpaa/index.shtml>)

⁸ By the early 1990s libraries were receiving large quantities of government documents, but many of them, lacked the system components necessary to allow the information to be used more effectively. ARL in partnership with Environmental Research Institute, Inc. (ESRI), launched the GIS Literacy Project in 1992. Member libraries were invited to send one or two of their librarians to ESRI for free training in using that company’s software, which was also furnished free of charge (ARL, 199).

research among 103 institutions in two consortia in the United States in 2006. Sorice [17] in her master thesis argues that “no current resource exists that lists academic libraries providing GIS services, so the first challenge was identifying potential candidates before undertaking any evaluation”. She examined how academic libraries present GIS services on their websites and identified potential barriers that the websites may pose to users. In this way she identified 35 out of 69 academic libraries from the ARL/GIS Roster and then she chose 6 eligible websites for content analysis. Finally, Good [18] in his research concluded that approximately 90% of academic libraries in the United States developed GIS services.

Table 1 indicates that the percentage of GIS implementation varies in the last decade although we cannot proceed in any reliable comparison among these previous surveys because of the differences in the methodology and the way they treated the libraries they targeted. Nevertheless we can argue that our research comes to a point: geospatial collections are active part of those academic libraries that are willing to offer high quality services to their patrons.

Table 1. Researches for GIS Implementation in US libraries

Research	Percentage of GIS implementation in libraries
ARL (1999)	64/72 (89%)
Kinikin & Hench (2005)	22/138 (20%)
Kinikin & Hench (2005a)	9/11 (82%)
Gabalton & Repplinger (2006)	31/103 (31%)
Sorice (2006)	35/69 (51%)
Good (2009)	~90% in academic libraries
Our research (2011)	95/133 (72%)

7 Discussion

The paper aims to identify the percentage of libraries offering geospatial collections through GIS services and the percentage of those libraries that established collection development policies. As we conclude, despite the fact that GIS technology and services are popular within the university research environment, only a very small amount of libraries have developed collection development policies. In an academic environment, collection development policies need to support teaching, research, and applications [6]. Collection development is not what it used to be. It has changed considerably in the last ten years by changes in publishing, scholarly communication, technology, and budgeting. Developments in these areas have redefined what a library collection is, how it is acquired, and how it is used. All the above are obvious, but the degree of the resistance to change and the addiction to the status quo, in collection management organization and procedures in academic libraries belies our acknowledgement of the obvious. This is reflected in the structure most commonly employed in academic libraries, a structure that has been in place for two decades or more [19]. For policies to be fully effective, users must understand them. Information about policies, the levels of GIS services users can expect from academic libraries and

what kind of GIS resources are available need to be clearly communicated to users through GIS services websites [17].

Our findings demonstrate a recent contribution to the field while also raise some questions for further research. The investigation of developed policies in college and public libraries enhanced by active GIS services, as bibliography refers⁹, would offer more insights in the way geospatial collection development policies affect those established services.



Fig. 4. Academic Libraries with Geospatial Collection Development Policies

8 Conclusions

As the recent socioeconomic trends and the convergence of telecommunication technologies have had significant effects on geospatial information spread [9] digital libraries can offer a more varied information experience to the community of online users. GIS services in academic libraries represent an evolution of traditional information services and undeniably offer a holistic learning environment. For this achievement to be better accomplished, defined policies should be followed.

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