"GEOSPATIAL COLLECTION DEVELOPMENT POLICIES IN ACADEMIC LIBRARIES: A WORLDWIDE RESEARCH"

Ifigenia VARDAKOSTA[1*], Sarantos KAPIDAKIS[2]

[1] *PhD Candidate, Laboratory of Digital Libraries and Electronic Publishing*
Department of Archives and Library Science, Ionian University, Ioannou Theotoki 72,
Corfu 49100, Greece, Email: ifigenia@ionio.gr
Head Librarian, Library and Information Centre, Harokopio University of Athens, Greece
[2] *Professor, Laboratory of Digital Libraries and Electronic Publishing*
Department of Archives and Library Science, Ionian University, Ioannou Theotoki 72,
Corfu 49100, Greece, Email: sarantos@ionio.gr

ABSTRACT

The widespread applications of GIS have challenged librarians worldwide to provide geospatial collections and services to their users. Despite the fact that collection development policies in digital environment have derived from the policies set down in traditional environments of information, geospatial data address a wide array of issues (metadata, standards, reliability, co-operations, data management etc) that require special attention as well as an understanding of both cartographic and geographic concepts.

Therefore, geospatial collection development policies compose a basic element for those libraries, wishing to support their user's access in geospatial data. Since a lot of libraries internationally have adopted the World Wide Web as a mechanism for enhancing existing services, it is common place for patrons to use it as the starting point to explore the GIS services their library offers.

Therefore, in this initial research, we aim to research academic libraries' websites worldwide, for the presence of information regarding GIS services in order to investigate: 1) How many libraries with GIS services have geospatial collection development policies? 2) What kind of services they offer? 3) Do they use commercial or open source software?

We also intend to proceed to comparisons across regions and extract specific conclusions, regarding the use of geospatial collection development policies and the developed GIS services.

The results of this study confirmed our initial hypothesis that geospatial collections development policies are not world wide adopted by academic libraries for constructing geospatial collections, while user education programmes are considered as an important issue for the efficient use of technological infrastructure and data. Finally, we conclude that FOSS (Free Open Source Software) GIS is not widely accepted as the main software in the use of geospatial data in libraries.

KEYWORDS: *Geospatial collections, collection development policy, GIS services, academic libraries, researches*

1. INTRODUCTION

The rapid and widespread transmission of information worldwide has revolutionized the operation of business organizations and consequently influences the economic situations globally. Knowledge is valued as a commodity and geospatial data and libraries have become important components of socioeconomic process, political activities, and academic research within the emerging information economy (Abresch e.a, 2008). Geospatial data offers new services, collections research collaborations and prompts libraries to take advantage of the data produced by the universities. As resources and collections of digital geospatial information increase daily in the information market, collection development policies consist of a universal process in the library world that permits the library to develop a collection in correspondence with the information needs of the user thus currently establishing various trends: the

satisfaction needs of the users, the use of new technologies, the increase of the plans for cooperation, the forms of presentation of information, the increase of technological and financial resources (Sanchez Vignau & Meneses, 2005). Policy questions associated with geospatial information lie at the heart of any review concerning the international dimensions associated with such information" (Boxall, 2006).The intention of this paper is to investigate the use of collection development policies in geospatial collections sustained by academic libraries worldwide, through their websites. These results will demonstrate whether collection development policies are considering nowadays, as a vital action for the establishment of a geospatial collection and GIS services. Furthermore, the study will reveal some geographical characteristics related to geospatial data and GIS services.

2. PREVIOUS STUDIES
From an international perspective, unfortunately, the majority of respondents from several surveys of GIS used by libraries, are academic ones and mostly from North America (Stone-Muilenburg, 2001). At the end of 1990's where ARL GIS Literacy project was developed, several researches occurred mainly in the US to determine the use of GIS services in joint libraries. ARL's survey (1999) concluded that 53/64 libraries were using GIS services while Kinikin's and Hench two surveys (2005, 2005a) indicated the wide use of GIS in small academic libraries. In 2000 a survey was undertaken in two mail discussion lists by Stone-Muilenburg, with the objective to understand the current use of GIS in libraries. 67 participants were from US and Canada, 1 from UK and 1 from Australia, and 85% of them were from academic libraries. Gabbaldon and Repplinger (2006) surveyed 103 institutions in two consortia and found that 31 academic libraries had already implemented GIS services and 15 other were considering its implementation. The presence of GIS services to the websites of 35 academic libraries and the potential barriers to the users were examined by Sorice (2006) in her master thesis while Good in his survey (2009) concluded that the percentage of GIS implementation in academic libraries is approximately 90%.
A research conducted by authors (Vardakosta and Kapidakis, 2011) to 133 websites of US academic libraries determined that out of 95 academic libraries that appeared to sustain GIS services, only 13 of them had a collection development policy regarding geospatial collections. The same research concluded that 58% of them named ArcGIS as the main software package while they use FOSS additionally.

3. RESEARCH QUESTIONS
The objective of this paper is to present an overview with up-to-date information for the use of collection development policies in geospatial collections established by academic libraries worldwide. In particular, we outline the services those libraries provide to their users, as well as the use of software (commercial or open source).
The research questions are: 1) How many libraries with GIS services have geospatial collection development policies? 2) What kind of services they offer? 3) Do they use commercial or open source software?

4. METHODOLOGY
Geographic collections consist of a particular kind of information which expresses the use of GIS thus, we searched websites of academic libraries in Universities which inter alia operate those departments whose curricula are based in the use of geospatial information and GIS e.g. Geography, Geology, Topography, Earth sciences, Environmental sciences etc. So, we randomly chose academic libraries from Canada, Australia, New Zealand, South America, Europe, Asia, Middle East and Africa. For locating these academic libraries we used the Lib-web-cats, a directory of libraries throughout the world, part of Library Technology Guides (http://www.librarytechnology.org/) and Libweb(http://lists.webjunction.org/libweb/). If we could not locate a geospatial collection or GIS service through the main page of the library, we additionally used keywords to search the site of the library or the university and Google as well, just to exclude the possibility of the necessary information existing in some other website or page of the library. Specifically we investigated websites of 160 academic libraries: 37 in Canada, 38 in Australia, 6 in New Zealand, 14 in Africa, 13 in Middle East, 12 in Asia, 6 in South America and 34 in Europe.We excluded from our calculations those libraries that we could not have access even if they were in the final list.

Although we traced an academic library with geospatial collections in Middle East the absence of translated pages in the English language, prevented from further research. Microsoft Excel was utilized as a main tool to synthesize, analyze data and present results.
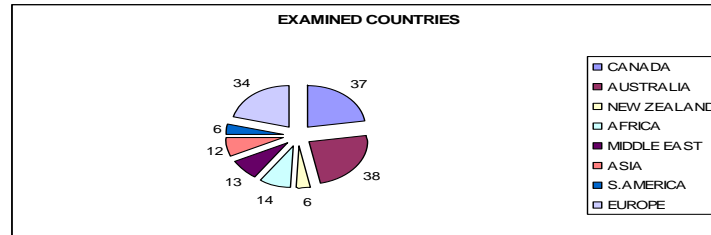

Fig.1: Countries included in the sample

5. RESEARCH RESULTS

We will present our results in two sections. In the first section we will answer the research questions in relation to the total sample of libraries (n=160). In the second section we will analyze our findings according to geographic regions.

5.1. Findings regarding research questions

As shown in Table 1 out of 160 universities examined worldwide, 36.2% (58/160) sustain geospatial collections. In 6.25% (10/160) of the cases these services are developed through a Department or a Lab, not an issue to be examined in this paper. Thus, the number of academic libraries that sustain and provide such services to their patrons and which focused our research are **30% (48/160).** Libraries with no GIS services were 63.75% (102/160).

GIS/LIBR	DEP/LAB	NO GIS	TOTAL
30	6.25	63.75	100

Table 1: Frequency statistics regarding total sample

1) How many libraries with GIS services have geospatial collection development policies?

Out of 48 academic libraries with GIS services, 23% (11/48) sustained geographical collection development policies or geospatial collections were mentioned in their collection development policy.

2) What kind of services they offer?

For the purposes of this research through our investigation in various websites we tried to examine if a user could easily find any information about provided services regarding *user education*, *remote access* and the necessary *technical infrastructure* (workstations, printers, scanners etc) for the effective use of geospatial data provided. So, 35.4% (17/48) offers user education programmes, 21% (10/48) offers remote access and 33.3% (16/48) a patron can find information about infrastructures that the library sustains.

3) Do they use commercial or open source software?

Information regarding the commercial software that the library uses, can be found by a patron in 60.4% (29/48) of those libraries. The above number represents ArcGIS users except one library which indicates MapInfo as the main commercial software.

Among 29 libraries that refer to the proper software so their provided data could be easily used by their patrons, 38% (11/29) mention that they also use an open source software. The majority of these named GoogleEarth, GoogleEarthPro and QuantumGIS. None of the above examined libraries named a FOSS as the main software for data manipulation.

GCDP	SERVICES			SOFT	
	US.EDUC	REM.AC	INFRAS	COMM	FOSS
23%	35.4%	21%	33.3%	60.4%	38%

Table 2: Percentage scores regarding research questions

5.2. Findings regarding geographic regions

Our research targeted 160 libraries worldwide seeking to determine how many are familiar with geospatial collections. We did not trace any academic library holding digital geographical collections in Africa, Middle East, Asia and South America. On the contrary, the majority of such collections, as shown in Table 3, are located in Canada (62.5%, 30/48), followed by Europe (20.8%, 10/48), Australia (14.5%, 7/48) and finally New Zealand (2%, 1/48).

Geospatial collection development policies seems to be a familiar issue for Canadian academic libraries since 27% of those libraries with geospatial collections include such policies in their websites while in Australia the correspondence percentage is 14.2%, in Europe 10% and in New Zealand 100% since the only library with GIS services contains collection development policies for geospatial data.

User education programmes, as well as information about *technical infrastructure,* can be found by a patron in 46.6% of academic libraries in Canada while *remote access* is provided by 23.3% of libraries. The above results are lower in Europe for all the aforementioned services, except remote access that maintains a higher percentage than Canada (30%). In the contrary, Australia does not provide user education programmes, remote access nor dopes it demonstrates the existing infrastructure.

The majority of Canadian academic libraries' websites provide information regarding software that library uses for accessing and manipulating geospatial data while only 30% refers to the *Free and Open Source Software* (FOSS) that can also be used in the library. European academic libraries also inform their users regarding the software they use but they have no information for the implementation of FOSS.

New Zealand's academic library with geospatial collection and geospatial collection development policies organizes user education programmes and informs about the existing infrastructure and software as well.

COUNTRY	GIS/LIBR	GCDP	US.ED.	REM. ACC.	INFR.	SOFT.	FOSS
CANADA	62.5 (30/48)	27 (8/30)	46.6 (14/30)	23.3 (7/30)	46.6 (14/30)	80 (24/30)	30 (9/30)
EUROPE	20.83 (10/48)	10 (1/10)	20 (2/10)	30 (3/10)	10 (1/10)	30 (3/10)	-
AUSTRALIA	14.5 (7/48)	14.2 (1/7)	-	-	-	14.2 (1/7)	28.5 (2/7)
NEW ZEALAND	2.08 (1/48)	100 (1/1)	100 (1/1)	-	100 (1/1)	100 (1/1)	-

Table 3: Percentages and frequency scores in respect to geographic regions

6. DISCUSSION

The main aim of our study was the investigation of geospatial collection development policies in academic libraries worldwide that sustain geographic collections. Moreover, we attempt to reveal the services that a library can provide to its patrons alongside with the software (commercial and open source) that it uses for data management.

The analysis of our results showed that geospatial collections are not particularly developed by academic libraries worldwide even if they serve academic communities with geospatial interests. For these academic communities the ability to access and manipulate geospatial data is vital for their educational and research purposes. Furthermore, geospatial collection development policies despite being an essential element in librarian world, according to many researchers (Longstreth, 1995; Boxall, 2004; Sorice, 2006; Abresch e.a, 2008, p.213) has not been adopted by the majority of libraries that maintain such collections. A number of factors, such as user needs, available budget, technological infrastructure and staff development programmes are important in constructing a policy (Abresch e.a, 2008, p.212) and require further study.

The high percentage in user education programmes of the libraries which maintain geospatial collections led us to assume that training seems to be a priority among services. GIS is an important service that academic libraries can provide to their academic community however a successful implementation requires that the library recognizes the need for training, no matter how this, would be better accomplished

(e.g. by the library, on-site, group-based instruction, one-to-one instruction with an individual instructor, tutorials).

As Dodsworth (2010) assumes *"GIS is an interdisciplinary field where many academic courses can find value. As the geospatial resource hub for the campus, the library will always play the challenging and oftentimes consuming role of demonstrating to students and faculty the value of geospatial mapping and analysis"*.

Finally, concerning the third research question which refers to software, our research concludes that despite the fact that there has recently been a growing movement in the development and adoption of free and open source software for GIS, in libraries this seems to work complementary to commercial GIS product. These results come in agreement with Kinikin's and Hench research (2005) and Donnelly's (2010) as well. In Kinikin's and Hench survey, the majority of their respondents (21) answered that they use ArcView of ESRI and 19 of them indicated that the software was located on individual workstations, while Donnelly evaluated six FOSS GIS and compared it to proprietary software like ArcGIS concluding that *"Despite the advantages of FOSS GIS, it would likely be an addition to the GIS toolkit for large research libraries and not a replacement for proprietary GIS products"* and *"for small to medium libraries FOSS GIS could be a solution for providing some GIS services as opposed to providing none at all"*.

Analyzing the results regarding geographic regions we recognize a "gap" regarding the implementation of geospatial collections worldwide. Regions like Canada, Europe, Australia and New Zealand which traditionally evolve in not only library science, but also in technology and economy, seem to be interested in the wide use of geospatial data by their patrons. Nevertheless, noticeable differences exist between those regions regarding results in our research. After a brief overview of Table 3, Canada is the geographic region that mostly incorporates geospatial collection policies and GIS services in academic libraries. This is quite reasonable since a number of Canadian academic libraries were among those that were part of ARL GIS Literacy project. Beyond that, as Boxall (2004) states *"Licensing restrictions and Crown Copyright still apply, but these are enforced through a ´mutual trust and respect´ paradigm rather than a "data policing" situation. As a result, libraries have been able to build their collections of digital geospatial information"*. The investigation of correlation between geospatial collection development policies and the final provided services would offer more insights into the geospatial collection building and services. Another important but relatively unexplored area for future research involves the extended use of FOSS GIS in libraries applications and services should be further explored.

7. CONCLUSIONS

As the academic library continues to redefine its role in the digital environment, it needs to leverage its strength and innovate to create responsive and convenient services (Li, 2006). Geospatial information is crucial for several aspects of everyday life and its proliferation of either public or private sector in the web, the central forum for data storage and information exchange, leads libraries and especially academic ones, to exploit this opportunity.

The deep knowledge academic libraries have in organizing and disseminating data could be used in developing new collections and services for their patrons. Brindley (2006) argues that libraries in the digital age should consider to reshape and rethink their services and skills, in order to maintain their relevance and contribution, to invest more in innovation and digital activities. In this era of global financial crisis with lower budgets, but at the same time with the advantage of technology (e.g. FOSS GIS) geospatial services could be used as a marketing tool in order to get people into the library.

8. ACKNOWLEDGMENTS

advices, and to Mrs Anastasia Avramidou and an anonymous reader for reviewing this study.

9. REFERENCES

Abresch, J., e.a (2008), *Integrating GIS into Library Services: a guide for academic libraries.* Hershey: Information Publishing Company

ARL (1999) The ARL GIS Literacy Project. SpecKit 238. [http://www.eric.ed.gov/PDFS/ED429609.pdf]

Boxall, J.C. (2004) Advances and Trends in geospatial information accessibility-Part I: Geolibraries, *Journal of Map and Geography Libraries,* 1(1), pp7-39

Boxall, J.C. (2006), Advances and Trends in geospatial information accessibility-Part II: policy dimensions, *Journal of Map and Geography Libraries*, 3(1), pp37-78

Dodsworth, E. (2010) Indirect Outreach in a GIS Environment: Reflections on a Map Library's Approach to Promoting GIS Services to Non-GIS Users, *Journal of Library Innovation* 1 (1), pp.24-34

Brindley, L. (2006), Re-defining the library, *Library Hi Tech*, Vol. 24 No.4, pp.484-95.

Donnelly, F. (2010) Evaluating open source GIS for Libraries, *Library Hi Tech*, 28 (1), pp.131-151

Gabaldon, C. and Repplinger, J. (2006), GIS and the academic library: a survey of libraries offering GIS services in two consortia, *Issues in Science & Technology Librarianship*, 48, Fall, [http://www.istl.org/06-fall/refereed.html]

Good, H. N. (2009), Trend of GIS services in US academic libraries: from comparison of past surveys and current situation of the University of Pittsburgh, *Information Science & Technology Association*, 59(11) pp.539-544

Kinikin, J.N. and Hench, K. (2005), Survey of GIS implementation and use within smaller academic libraries, *Issues in Science and Technology Librarianship*,

Kinikin, J.N. and Hench, K. (2005a) Follow-up survey of GIS at smaller academic libraries *Issues in Science and Technology Librarianship*, Summer

Li, X. (2006), Library as incubating space for innovations: practices, trends and skill sets, *Library Management*, Vol. 27 No.6/7, pp.370-8.

Longstreth, K. (1995), GIS collection development, staffing and training, *The Journal of Academic Librarianship*, July, 267-274

Sanchez Vignau, B.S. and Meneses, G. (2005) Collection development policies in university libraries: a space for reflection, *Collection Building*, 24 (1), pp.35-43

Sorice, M. (2006), An analysis of GIS services websites in academic libraries, Master Thesis, [http://etd.ils.unc.edu/dspace/handle/1901/303]

Stone-Muilenburg, J. (2001) The changing role of GIS in the map room in The Map library in the new millennium (Ed.) R.B.Parry and C.R.Perkins, Chicago: ARL, pp.60-63

Vardakosta, I. and Kapidakis, S. (2011) Geographic collections development policies and GIS services: a research in US academic libraries' websites, First Workshop on Digital Information Management Corfu, Greece,30-31 March, 2011.pp.89-98 [http://eprints.rclis.org/handle/10760/15851]