

Using Geographic Information Systems In Institutional Advancement

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Introduction

Today, hundreds of colleges and universities use geographic information systems (GIS) for a wide variety of purposes. College faculty use GIS to support their research and to teach spatial decision-making to their college students. GIS is used in higher education administrative offices, such as student recruitment, admissions, and alumni relations. Using GIS fosters data sharing, forestalls duplication of efforts, and helps organizations to save money.

Can using GIS be used to *raise* funds for those same institutions? Are college and university Institutional Advancement offices using GIS in support of their fund-raising work? In what ways can GIS support their work of research and marketing to effectively raise more funds for their organizations?

This report summarizes some findings and recommendations for Institutional Advancement staff members considering use of GIS in the work place:

- (1) A literature review of (written and online) resources regarding current GIS use in Institutional Advancement;
- (2) An electronic survey sent to Institutional Advancement offices seeking information on their current use of GIS in their work place; and
- (3) A review of three GIS software programs for potential use in Institutional Advancement work.

This project began as the result of an encounter in October 2006 with two members of the Northland College Institutional Advancement Office, who asked if GIS could be used in their fundraising efforts.

Northland College's Institutional Advancement Office used Microsoft Excel to create and maintain their donor database and utilized MapQuest online to plan routes for fund-raising business trips. They questioned how effective GIS would be in helping them to visualize their database and route business trips for making donor contacts. They expressed hope that GIS could make them more efficient in their research.

Specifically, the Institutional Advancement staff wished to be able to:

- Locate the address location of any current/potential donor on a map of the U.S. or U.S. city,;
- Pinpoint other potential donors located near to a donor already located on the map;

- Color-code each donor based on a range of variables to help visually identify priority locations for personal visits;
- Plan routes and measure distances between airports and donor locations when planning visits;
- Set a certain radius of travel from a pre-determined location and determine which donors are located within the resultant circle;
- See all personal data pertaining to any selected donor or group of donors; and
- Easily add or change donor information as needed to keep their database current.

Thinking over the specific GIS tasks requested by Advancement, several questions came to mind.

(1) Where is this type of GIS work already being done? How are they using GIS in Advancement? In this way, we wouldn't have to start from scratch.

(2) Which GIS software programs are being used for this type of GIS work? How are they being used to support Institutional Advancement research?

To begin answering these questions, I conducted both a literature review of resources and a survey of Institutional Advancement offices across the United States to gather information on their current use of GIS.

Literature Review of GIS and Institutional Advancement

Using Geographic Information Systems in Institutional Research¹

The most explicit resource found connecting GIS with Institutional Advancement was the journal, *Using Geographic Information Systems in Institutional Research*, edited by Daniel Teodorescu. Inside the journal is a collection of eight articles each focused on a different aspect of GIS use in institutional research.

A close look at the article entitled *Using GIS in Alumni Giving and Institutional Advancement* applied clearly to the question at hand: How are they using GIS in Institutional Advancement? Daniel Jardine is a research analyst in the Office of Institutional Research at Binghamton University (SUNY) in New York. He visually illustrated the potential use of GIS in presenting and analyzing donor information and assisting fundraising campaigns.

His case study demonstrated how the Office of Institutional Research used GIS to analyze donating patterns and behaviors of Binghamton University alumni from 1992 to 2002 and to create predictive models of alumni giving to allow more targeted solicitations.

The alumni database contained more than 75,000 records. Most of these records contained each alumnus' zip code. Using the zip codes, GIS was used to geocode the location of alumni and better visualize alumni data.

A series of maps was produced based on the alumni records, the first of which was mapping the number of alumni by their state of residence. With 60% of alumni still living in New York, they also mapped the distribution of alumni within each county of New York. The state and New York counties maps created with GIS included:

- Number of Alumni;
- Number of Donors;
- Percentage of Alumni Donating;
- Total Donations;
- Average Total Donations;
- Median Income overlaid by Total Alumni Donations by State; and
- Alumni and Students in Key Congressional Districts.

The last map was created specifically for a visit to key congressional representatives serving on appropriations committees dealing with federal research funding. The map showed the location of thousands of alumni in key congressional districts.

Geographical Information Systems: A Tool for Institutional Research²

As early as the 1990s, the application of GIS to institutional research was being discussed. Authors Prather and Carlson, in a 1994 Association of Institutional Research forum, declared that by its very nature, institutional research lends itself to the gathering, processing, and analyzing of data, and then disseminating the resulting information. Institutional researchers could augment fundraising projects with GIS, such as:

- Determining local alumni support for events and clubs;
- Examining alumni gifts based on geographic location, and whether in-state or out-of-state alumni are more likely to give; and
- Developing neighborhood maps for use during donor recruiting.

A GIS approach to alumni research could help researchers target the most efficient ways to maintain and enhance alumni contacts. GIS could show:

- Alumni's histories of contributions;
- Progress of pledge campaigns;
- Pledge fulfillment rates;
- Success and productivity rates of capital campaigns; and
- Combined with census and business data, the location of alumni clubs and events to maximize potential participation.

This very informative article provided a multitude of ways in which GIS can support higher education, specifically institutional research. The “how to do it with GIS” was left up to the GIS user and was not within the scope of this article.

*Geographic Information Systems in Philanthropy*³

ESRI’s white paper entitled, *Geographic Information Systems and Philanthropy* (2002), proclaims the use of GIS as an important tool for both the fundraiser and the grant writer. The nature of charitable behavior is based on a complex set of circumstances, and GIS can help to integrate the different circumstances of donors in a visual way.

Universities and colleges establish fund-raising campaigns to feed endowments that will generate income through investment. The goals of these fundraisers are three-fold (ESRI, p. 3).

- (1) Identify individuals capable of a charitable gift;
- (2) Qualify an individual’s charitable intent in relationship to the needs and mission of the organization; and
- (3) Maintain and continue a history of charitable giving to the organization.

One of the goals of a fundraising organization should be to create a dependable information system that does the following:

- Captures correct address information using an address management system;
- Geocodes every address at the most refined level possible and stores that information as part of each donor's permanent record. This data would only change if and when the donor's address changes;
- Appends a series of standard geographical codes to every record to allow more relevant geographical queries to be asked of the data;
- Creates donor or non-donor profiles from secondary data linked to the geographic area from which the donor comes;
- Tests the statistical relationship between various known philanthropic metrics (known donors); and
- Identifies geographic areas that contain individuals similar to those who match your donor profile (p. 6).

GIS software can be effective in supporting the philanthropic organization to carry out its important work. Using GIS to develop profiles of likely donors or recipients from existing data and then applying it to the best donor or recipient geography clearly provides an advantage over traditional methods.

Using GIS to Map Potential Local Business Donors to the College of Business Administration, Cal Poly in Pomona, CA⁴

This case study of using GIS to raise construction funds was presented by Donna Tillman and Lin Wu at the 2000 ESRI User Conference. The College of Business Administration at California Polytechnic State University in Pomona, CA, wished to construct a new academic building and needed a systematic method to find donors to help meet construction costs.

A database of all businesses in the Southern California region contained location information (addresses) and annual sales figures. The database was converted to a dBase IV format and added to an ArcView GIS display. Using the StreetMap extension for ArcView GIS, the database was searched using the businesses' geographic locations within 25 miles of Cal Poly Pomona and those that had annual sales of at least \$5 million. This analysis generated 152 businesses within the targeted geographic area. Ninety-two of these businesses had sales of \$5 million or more and were symbolized using different sized circles according to their annual sales. By clicking on the map one could get exact directions from Cal Poly Pomona to any of the identified 92 businesses.

The fundraising process using GIS not only provided the donors' information, distribution, and direction for road access, but also provided an organizational tool for fundraising within the College of Business Administration.

GIS for G.O.D.: Geographical Organization of Data for Notre Dame Church Membership⁵

At an ESRI User Conference in 1997, Zamudio, Redmond and Redmond presented their GIS project: Notre Dame church officials in coordination with consultants developed a geographic database of registered parishioners. With 2,700 families, manual processing would have been too costly and time-consuming. Using GIS, church family addresses were geocoded to a street address network, and maps were created for volunteers wishing to make home visits for fundraising purposes.

Political Fundraising with Geodemographic Tools⁶

An article in a November 1999 issue of Directions Magazine described how a political candidate can identify new potential donors without spending the profit earned from the donations.

In 1996, the Republican Party of Wisconsin used a GIS to create a geodemographic model of donors. This model was a combination of demographic characteristics indicating the subset of the target that will be most susceptible to appeals for donations.

The model they used included the following variables:

- Household: Male only or male and female;

- Household income: Over \$25,000 (55% from \$30,000 to \$45,000);
- Occupation: Retired, business owner, both blue & white collar worker;
- Home value: Over \$50,000;
- With credit card: Yes; and
- Age: over 35.

Using a GIS, they mapped both potential donor locations and political boundaries. In this specific case study, they identified areas of high historic Republican voter turnout. As a result, the normal yields from prospecting went from 1-2% up to 18%. In two years, the small donor program grew from 4,000 donors to over 40,000. Revenue grew from \$200,000 to over \$1,200,000 in two years.

Land Trust GIS - Fundraising and Membership⁷

Land Trust GIS is a joint project of the GreenInfo Network in partnership with the Land Trust Alliance. Begun in 2004, the project emerged out of extensive involvement in land trusts and their use of GIS by all of the sponsor organizations.

Fundraising from individuals, foundations, and public agencies is critical to many nonprofit organizations. The Land Trust GIS web site (<http://www.landtrustgis.org>) suggests six ways using GIS can help.

- Membership support: GIS can quickly locate where members' addresses are, creating a "point" layer of all members that can be displayed on a more general map. Using this data, GIS can be used to produce maps showing overall distribution of members, guide members to events, or educate them about an organization.
- Membership acquisition: Many commercial businesses target people based on GIS analysis. GIS can be used to help identify new supporters. For example, GIS can be used to rank address lists against underlying demographic factors.
- Major donors: To support significant gifts, GIS can generate personalized posters of a basic map highlighting major donors.
- Grant proposals: Using GIS to better analyze goals for land acquisition and stewardship can improve the willingness of some donors to consider a funding request.
- Capital Campaigns: For organizations seeking to mount major capital campaigns, GIS can be used to create maps for targeted donors, maps that analyze demographics of beneficiaries, map images for brochures and presentations, and interactive maps which can be critical to educating potential donors.
- Targeting: Using GIS to identify individuals to whom an organization wants to provide information is a valuable approach.

Summary. While GIS use is exponentially growing across the globe and articles fill Google Search pages, only a few resources were found with information specific to GIS use in Institutional Advancement. The few articles summarized in this literature review showcased inspiring results of GIS use in fundraising, however neglected to specify the GIS skills and/or tools needed to accomplish the tasks.

Survey of Institutional Advancement Offices

Using an electronic survey software package called *Web Questionnaire* from Compress Web (<http://www.compressweb.com/index.php>), I was able to publish a questionnaire to my personal website. All replies to the questionnaire were retrieved through an interface with Microsoft Outlook. I emailed 140 Institutional Advancement offices with the GIS project description and offered them the questionnaire web site link.

I designed a questionnaire to collect information on how GIS is being used in Advancement Offices at higher education institutions. The GIS questionnaire can still be viewed and completed at the following web site: <http://www.ncfaculty.net/cmav/questionnaire.html>.

The objectives of the survey were to:

- Understand whether Institutional Advancement offices are using GIS to support their fundraising efforts;
- Identify which GIS software programs Institutional Advancement use;
- Learn what specific activities Institutional Advancement use GIS for; and
- Understand whether Institutional Advancement staff feels that GIS is important and has been effective in their work.

Here are some of the survey questions:

- Does your department currently utilize GIS?
- Which GIS software does your department use? What database management system are you currently using?
- What (if any) other geographic software do you use to support your department's work?
- Select all those activities that you use GIS for in your department (multiple choices)
 - Creating a database
 - Editing and updating a database
 - Querying the database for subsets of information
 - Analyzing data
 - Creating maps as visual aids
 - Planning business travel routes
 - Creating graphs for reports

- How important are maps and geographically referenced information to your office's mission?
- How effective has using GIS been in your work?
- Do you see GIS technology as playing an important role in your organization in the future?
- What is the biggest challenge facing the development of your GIS?

While the sample size of the questionnaire responses was relatively small (36 out of the 140 responded), I gained some interesting information. A majority of responses were from prospect researchers (70%), most of which were female staff (72%). Seventy-eight percent of respondents replied that they do not currently use GIS to support their research. Of those not currently using GIS, 39% said they are planning to use GIS in the future.

Of the 22% stating they currently use GIS, 92% had been using GIS for less than one year and their chosen GIS software was equally divided between ESRI (ArcGIS/ArcView, BusinessMap) and Microsoft MapPoint. When asked about GIS training to support their work, 94% indicated they had no GIS training.

Summary. The following conclusions were made based on all of the survey responses received.

- There doesn't appear to be any enterprise-wide GIS systems in Institutional Advancement. Most Advancement offices are in the beginning stages of using GIS. Those offices that have been using GIS for more than two years are in the minority.
- Advancement use GIS primarily to analyze data, create maps and graphs, and plan business travel. A few use GIS for data management, while most use Microsoft Access and Excel for their databases.
- A majority of Advancement staff feel that:
 - Maps and geographically-referenced data are important in their work;
 - GIS has been effective in supporting their work; and
 - GIS technology will play an important part in their IA research in the future.

GIS Software for Use in Institutional Advancement

Specific survey results showed that while half of the respondents used ESRI's ArcGIS/ArcView/BusinessMAP software in their Advancement work, the other half was using Microsoft's MapPoint 2006 software. An investigation into the characteristics of the different GIS software programs currently used in Institutional Advancement revealed their similarities and differences.

Microsoft MapPoint 2006

The selling points of MapPoint 2006 include being able to:

- Map business data by creating and viewing sales territories to analyze trends;
- Combine business data (of the software user) with demographics (built into the software) to target customers;
- Evaluate territory performance;
- Create maps to insert into Word documents and PowerPoint presentations;
- Create maps from data stored in Excel, Access, Outlook or other database sources;
- Plan business travel by creating routes from a starting point to a destination; and
- Track current location in real time using a GPS unit connected to a laptop computer.

BusinessMAP

This software offers database mapping and access to data for business professionals new to GIS. Users can:

- map contacts;
- analyze demographics;
- design sales territories;
- create targeted mail lists;
- perform drive time analysis;
- update data; and
- print maps.

ArcGIS StreetMap

The GIS computer lab at Northland College is equipped with ArcGIS Desktop software. When I investigated the possibility of its use in Advancement, I came across StreetMap, a software package that provides nationwide address matching and street map display. Users can geocode addresses by interactively matching a single address or by batch matching from a file of addresses. One can perform simple point-to-point routing or multi-stop routing across nationwide street networks. StreetMap can be used to geocode the donor database and create routes for business trips.

I personally reviewed each of the GIS software programs used in Institutional Advancement. The table below summarizes each program as related to their tools, capabilities, and potential use in Institutional Advancement.

GIS SOFTWARE COMPARISON FOR INSTITUTIONAL ADVANCEMENT

<i>Characteristics the Advancement Office wished to utilize in a GIS</i>	<i>ArcGIS StreetMap</i>	<i>Microsoft MapPoint 2006 with GPS</i>	<i>BusinessMAP</i>
Comes with GIS data	X	X	X
Create, display, and print maps	X	X	X
Import Excel databases (.xls)	X .xls read-only .dbf read/write	X	X
Import Access databases (.mdb)	X	X also: *.txt, *.csv, *.asc, *.tab, *.stp	X also: *.dbf, *.wk4, *.txt, *.csv, *.asc, *.tab
Find a travel route	X	X	X
Use with GPS for travel		X	X
Market analysis			X
Territory design		X	X
Analyzing patterns		X	X
Creating reports	X		X
Insert maps into Word			X
Insert maps in Excel			X
Insert map into PowerPoint			X
Cost (as of June 2008)	Comes w/ ArcGIS	\$285	\$350

As the table above suggests, there are several GIS programs available on the market that can be used to meet the various mapping and database management needs of Institutional Advancement offices. Learning how to use the chosen GIS software will be the most important task, though it may require a significant amount of time set aside from regular office work to get a good handle on manipulating the software. A newcomer to GIS might be intimidated when trying to use a full-blown GIS program such as ArcGIS, in some part dependent on the potential user's familiarity with computers.

Summary. Given an option to use GIS software that is "user-friendly" and geared more specifically to their type of research, Microsoft's MapPoint 2006 may be attractive to non-GIS users. The software can do many of the tasks Advancement personnel seek to accomplish through using GIS. I found MapPoint 2006 to be a useful software package for use in both Alumni and Advancement Offices on the Northland College campus. When compared with the

more sophisticated ArcGIS Desktop, a list of its shortcomings emerges. MapPoint performs many similar functions to other GIS software; however, the ArcGIS Desktop suite offers more sophisticated querying and mapping tools should the potential user have the interest, time, and determination to learn how to use it.

Recommendations for Using GIS in Institutional Advancement

- There is a need to continue educating personnel working in Institutional Advancement offices about the advantages of working with different GIS software programs. Recently representatives of the Microsoft Company demonstrated their MapPoint software at a national conference for institutional researchers. This may explain why so many survey respondents are using the MapPoint software.
- It will be important to have the support of the entire Advancement Office and other administrative staff while institutional researchers learn how to use GIS. This may include allotting money for purchase of the GIS software, allowing time for learning how to use the software, and supporting the staff's continued use of GIS in their work.
- In situations where the institutional researchers may not have the time or interest to learn how to use a GIS program, another option would be to hire college students who already have experience using GIS software; for example, a paid GIS internship or GIS work-study position.
- While the survey results indicated differences in how Institutional Advancement offices are using GIS, it would be helpful to compile how Advancement uses the GIS software in their research. In this way, a "user's guide" or "tutorial" of standard practices could be developed to train Advancement personnel how to use GIS to support their fund-raising efforts.

Resources

1. Jardine, D. (2003). Using GIS in alumni giving and institutional advancement. In Teodorescu, D. (Ed.), *Using geographic information systems in institutional research: New directions for institutional research* (pp. 77-89). California: Wiley Subscription Service.
2. Office of Institutional Research. (1994). Proceedings from 1994 Annual Association for Institutional Research: *Geographical information systems: a tool for institutional research*. Prather, J. & Carlson, C. Georgia: Georgia State University in Atlanta.
3. ESRI White Paper. (June 2002). Geographic information systems in philanthropy. Retrieved August 21, 2007 from http://www.esri.com/library/whitepapers/pdfs/gis_in_philanthropy.pdf
4. ESRI. (2000). Proceedings from 2000 ESRI User Conference: *Using GIS to map potential local business donors to the college of business administration, Cal Poly in Pomona, CA*. Tillman, D. & Wu, L. Retrieved August 27, 2007 from <http://gis.esri.com/library/userconf/proc00/professional/papers/PAP173/p173.htm>
5. ESRI. (1997). Proceedings from the 1997 ESRI User Conference: *GIS for G.O.D.: Geographical organization of data for Notre Dame Church membership*. Zamudio, G., Redmond, Q., & Redmond, J. Retrieved on June 23, 2007 from <http://gis.esri.com/library/userconf/proc97/proc97/abstract/a123.htm>
6. Opitz, D. (November 16, 1999). Political fundraising with geodemographic tools. *Directions Magazine*. Retrieved September 23, 2007 from http://www.directionsmag.com/article.php?article_id=46&trv=1
7. Land Trust GIS. (2007). *Fundraising and Membership*. Retrieved June 23, 2007 from <http://www.landtrustgis.org/best-practices/advanced/membership-and-fundraising>