AC 2007-470: SPATIAL DATA (GIS) SUPPORT FOR MULTIPLE DISCIPLINES WITH LAND SURVEYING ENGINEERING AS THE LEAD ELEMENT: A WORK IN PROGRESS AT THE PENN STATE WILKES-BARRE CAMPUS

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Spatial Data (GIS) Support for Multiple Disciplines with Land Surveying Engineering as the Lead Element: A Work in Progress at the Penn State Wilkes-Barre Campus

Abstract

Geographic Information Systems GIS) technology has been suitable for applications that make their attainment not only useful, but necessary in the information world in which we currently operate. Awareness of GIS capabilities in the University arena has spawned a dramatic demand for spatially referenced materials in digital or electronic format to support management decisions, resource management, and research activities. No longer confined to engineering and the social sciences, many other disciplines are now using GIS in all forms where geographically referenced data is used. The Penn State Wilkes-Barre campus library is slowly emerging as the logical provider and facilitator for the use of GIS technology across campus. The library occupies both a central and neutral position on campus, and by design, serves all disciplines in like manner. Engineering programs, with Land Surveying Engineering at the lead, had been the sole user of GIS technology on this campus until a library initiative found other disciplines that also had strong desires to use this technology. In the last few years, the campus library has embarked on a mission to extend its services to include GIS support to disciplines and programs at the campus. This work in progress is examined in detail as a follow-up to a paper presented at the 2004 ASEE conference in Salt Lake City, Utah.

1. Introduction

At the 2004 ASEE Conference and Exposition in Salt Lake City, Utah, we presented a paper which discussed an initiative to provide geospatial data visualization support in the library at the Wilkes-Barre campus of the Penn State University. Our Land Engineering Surveying group had suggested that the campus explore the possibility of having a GIS site in the library. Justification for implementing a local GIS support site at this campus focused on the geographically dispersed nature of the Penn State Campus Libraries and the limitations of data communications networks to carry large graphical data packets across campuses during laboratory exercises or geospatial research activities. Another consideration was the inability of local librarians to provide adequate support to users if GIS software and data were operated on a remote system.

The library viewed the GIS initiative as an opportunity to potentially expand services and support to other disciplines throughout the campus. “Providing GIS Support through the libraries gives all users from all departments equal access to services as the library is often in a central location with open access and long hours of operation”.[1] Whereas faculty members from programs other then engineering recognize the importance of the technology, they had been slow to incorporate GIS into their course offerings. However, the recent interest level in GIS has been dramatic due to the rapid growth and expansion of digital technology. For example, Business

and the Administration of Justice departments at our campus are now appealing for access to GIS application for their programs.

Through the implementation stages major changes have occurred with regards of senior administrative support, course or program re-alignment and attrition of faculty and other matters. However, the initiative remains unchanged. This paper presents an update of the GIS visualization support effort and provides future directions towards a full scale GIS analytical support for teaching and research at the campus. In particular, it examines the approach, lessons learned, and adjustments the library has made to continue the process of establishing spatial data visualization and analysis support to its campus.

2. University configuration

Penn State University is a large and complex organization. It is divided into three distinct sections. The first section is located at University Park which serves as the administrative center and houses the main colleges of the university. The second section includes 19 Penn State campuses which are geographically dispersed throughout the state of Pennsylvania. These campuses serve a dual purpose of providing standalone degree programs as well as providing a conduit for feeding programs at the University Park campus. The third section is comprised of seven Special mission campuses that include the Penn State Hershey Medical Center, Penn State Dickinson School of Law, and the Penn State World Campus. Wilkes-Barre belongs to the second section of campuses which acts as a "feeder" to programs at the University Park campus. The campus also has some standalone programs which include Business, Administration of Justice, and the only Surveying Engineering Program in the entire system.

3. Accomplishments to date

The initial objectives were to:

- Implement a GIS in the library by acquiring computer hardware, software, and digital databases that are needed for the configuration.
- Train selected library personnel in the use of the technology so that they are able to provide the assistance to users of the technology
- Provide technical assistance to faculty and students with regard to GIS related teaching and research activities.

The objectives were strengthened by the fact that a new baccalaureate degree program using GIS technology was being planned. It was envisaged that with the new program, opportunities would arise for students in other disciplines to have a minor degree in GIS. This would have increased the use of the GIS resources in the library. The status of the new program will be discussed later in this paper.

The implementation of the geospatial data visualization support system began with the purchase of a dedicated computer and proprietary software ArcGIS™, together with some digital databases to compliment current collection within the Penn State University system. Also, it was economically prudent to conduct an inventory of freely available databases such as those that were available on line at the Pennsylvania Spatial Data Center (PASDA), Bureau of Land Management (BLM), Federal Geographic Data Center (FGDC), National Geodetic Surveys (NGS) and many others are valuable resources to students and researchers. Such links would be provided at the online Library Information Access System (LIAS) at Penn State.

For licensing purposes Penn State is considered as a single university but geographically dispersed. This means that certain software licensing agreements are valid across campuses. This necessitated a review of the licensing agreements associated with the software and digital databases that were in circulation. Other administrative issues which have been addressed included, among other things, the responsibilities for computer networking and communications support, updating and maintaining information at the website, and overall system maintenance. Such matters are the responsibilities of specialized personnel who are already employed at Penn State. In effect, administrative arrangements such as system maintenance and additional data sources have been addressed with little or no financial expense. The next objective was to plan the initial training so that the library personnel could provide adequate support to users.

4. Challenges and Lessons Learned

Although it was easy to install a GIS support system in the library, unforeseen problems have hampered efforts to have faculty members utilize the system by incorporating GIS technology into courses and research activities. Even though the project was well planned and thought out, unforeseen problems have hindered the planned training program which was planned for the library staff. The project has not proceeded as quickly as was intended for the following reasons:

- Proposed trainer at the Maps Library moved to another position outside the area.
- The newly proposed GIS course to be taught at this campus was placed on hold because of administrative changes in the University. This decision had a direct effect on training of instructors as well as promoting GIS to students who would have taken the course.
- Plans to reorganize existing courses to include aspects of GIS technology have also been suspended because Penn State has been conducting realignment exercises on courses that are offered across multiple campuses.
- A new library building was commissioned after a long-sought out donor was found and time and effort was spent here rather then on the GIS project
- Software licensing restrictions

The library continues to acquire GIS-related materials whenever they become available. Most of the monographs are accompanied by a CD that can be used on a student's computer to activate the exercises that illustrate a hands-on approach to the learning materials. Much of the GIS material being acquired has been recommended by the Engineering and Land Surveying Faculty. The library also is expanding their Engineering related databases and specialized software that provide information that libraries must possess in order to satisfy the needs of our students and faculty that demand quick and accurate data.

Whereas the idea of GIS support in the library was a welcome idea, economic factors, administrative changes and attrition of faculty and even course or program changes could greatly advance or hinder progress. For example, at the inception stage, there were plans to develop a baccalaureate degree program in Geospatial Information Science at the Wilkes-Barre campus. The proposal was successfully evaluated by the Academic Affairs committee and gained the support of the campus administrators. However, the proposal was shelved at the next level of evaluation because Penn State was in the process of evaluating existing programs with a view to standardize programs and courses that are offered at different campuses. This senior administrative decision affected plans to incorporate GIS into existing non-engineering courses.

Another source of hindrance was the fact the some faculty members who originally embraced the notion of GIS for non-engineers actually changed jobs for unrelated reasons. Through all these delays, students who had originally been excited about the opportunity to learn and use the technology graduated. Although the possibility of incorporating GIS applications in non-engineering courses still exists, it has not been possible to make definitive plans regarding the starting dates.

While reorganization of program objectives and course contents are in progress, the library staff has not been idling either. In fact, the delay in implementing the system has given the library staff the opportunity to increase their knowledge base in the mechanics of the technology. It has been possible to attend many more GIS related workshops. Such increased expertise in the library is occurring at the Wilkes-Barre campus as well as the main Penn State campus.

5. Further Action

Training for the librarians and staff is critical to the success of this project. Even though there have been setbacks in this area, other opportunities have now become available. When the project was initiated it was problematic acquiring the proper training that would also fit our work schedules and funding levels as well. University Park's GIS program has expanded in the past two years, and they now offer courses and workshops for faculty use. They offer an Introduction to GIS and basic skills, followed by three GIS Analysis classes. "Topics covered require participants to work through exercises using GIS data provided during the workshop, and include image processing utilized with GIS, ERDAS imagine, image data in ArcGIS™, and working with GPS data, http://www.gis.psu.edu/index.html."[2]

Non-credit workshops and training are now available from many new sources. ESRI Virtual Campus Online Course, ESRI Authorized Software Training from Geography Department at U.

Park is also available to the campus colleges. Another source that is now available to us through the Penn State World Campus is their online Certificate Program in GIS. This is a noncredit program designed to meet the needs and busy schedules of full-time professionals. The certificate is earned by successfully completing four courses which involves more than 100 hours of hands-on activities with authentic GIS software online. GIS Software is now at all labs at the main campus at University Park. ArcView 9.0 is now available in all University labs that have Microsoft Windows machines. The site license allows unlimited use. ArcInfo 9.0 is also available in the same labs but with limits on use. As such, there are more opportunities for the library staff to receive needed training.

Meanwhile the potential still exists for new courses to be geared toward GIS technologies Faculty members in the Business and the Administration of Justice programs are currently reviewing the their courses, so as to identify areas where socioeconomic applications of the technology can be utilized. For example, faculty members in the Business have already identified courses such as Marketing Management, Principles of Marketing, Marketing Research, and Retail as courses in which the technology can be applied. In a similar manner, faculty members in the Administration of Justice have identified areas in which the technology can be applied for judicial purposes, such as crime fighting, tracking gang activities, sexual offenders, and the relationship between demographics, socioeconomic, conditions and violence. Application of GIS technology to support theses courses will begin as son as the course alignment exercises have been completed.

Researchers can use it to relate incidences of particular crimes to social indicators like poverty and unemployment rates. There are countless ways in which students and faculty can benefit from GIS. Once utilized, it would be an indispensable part of our program and students would benefit greatly by gaining competency, and assist them in furthering their careers.

We are also trying to secure additional funding through the Penn State Geospatial Information Systems Council which provides grants to facilitate GIS-related activities that increase the awareness of the use of GIS, and define other GIS-related issues University wide. "There is also the ESRI GRANT Assistance Program that provides a listing of grant proposal that ESRI has sponsored along with information on Non-ESRI Grants http://www.esri.com/grants/past/index.html, (ESRI Grant Assistance Program)."[3] We are also investigating other state and county development grants that may be available for our campus.

Eventually, the library could join initiatives with other schools and community offerings and possibly become a campus Mapping Center that might offer assistance with economic development and community project planning.

6. Conclusions

The library has been slow in accomplishing its goal of creating a fully functional GIS support site that the Penn State, Wilkes-Barre campus. The delays have occurred mainly due to institutional priorities. However, such setbacks have not derailed the project entirely. As such, progress is being made in the view that the administrative and institutional matters will give way to final implementation. There have been new credible training avenues identified as well as a

positive ground swell for disciplines to use our GIS site that did not exist when we started the program. Services and training that could propel the campus site are now available at University Park.

Lessons have been learned during this implementation activity. Firstly, the library is a support service entity which should work within the objectives and priorities of both the Wilkes-Barre campus and the university as a whole. Secondly, the rate of implementation is greatly influenced by the economic, organizational, and institutional priorities of both campuses. Thirdly, while those priorities are being addressed, the library should remain focused and ready to provide the necessary assistance when those priorities change and faculty and students begin to utilize the technology. Finally, it is important to work with faculty to maintain the interest that has been generated, so that they can continue with a desire to apply the technology and to pass the knowledge to students.

References

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[2]Penn State University (2007) Welcome to Penn State's Geospatial Information System (GIS) Council Home Page from http://www.gis.psu.edu/index.html

[3]ESRI Grant Assistance Program: Past Grant Information. http://esri.com/grants/past/index.html