Role of Universities in Gis

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Geographic Information Systems (GIS) were actually born and raised in the university environment. It first received its name in 1950 from Dr. Roger Tomlinson of the University of Ottawa, Canada. So, it's really no surprise that universities are still involved with GIS. Here in Indiana we have at least five universities involved in GIS. Various kinds of research continues at each of these institutions, and more universities are becoming involved all the time. Universities have also assisted in the development of legislation that will help city and town governments establish a GIS in their community.

Much of the research in GIS has been aimed at supporting planning and management activities. This includes the management of some rather sophisticated mathematical models for applications in transportation and land use pattern prediction. One of the big problems with university GIS research is the expense, both in terms of dollars and time. For example, if you wanted to study something today, it might take you several months to several years to get the database in order to actually test the application you were considering.

The universities' role in GIS is two-fold. We provide technical assistance and also provide appropriate technology. In our role of providing technical assistance, we find ourselves defining what a geographic information system is. What does it do? How does it do it? How does one system differ from another system? We also have to define and describe the applications. What exactly will the GIS do for me and my office? How do we get data into a geographic information system? This is part of the data conversion issue.

Another problem is the development and application of software. In some cases, the GIS might not be able to do exactly what you want it to do. For example, you might have a GIS database and you would like to be able to access that data to plug into one of your transportation models. The software might not exist. One of the roles of the universities is to help you develop that application software. In our role of providing appropriate technology, much energy has been devoted to defining data requirements, an essential item needed in your organization. What data do you need? Once the needs are understood, then and only then, can you decide if the applications that you want are indeed possible.

You also need to determine specifications for hardware and software. One thing to be very cautious about is newer software systems. There are many of them on the market. Some of these systems will be able to do the job you need, but others will not. Universities are in a good position to help sort through the different systems, because we generally have numerous types of GIS systems and can tell you which ones can do certain things and which ones might be limited. We've also

been working on trying to determine appropriate standards for mapping and for databases.

Assistance and services are possible in the university environment because a variety of resources are available. We have expert personnel and technical staff, as you can imagine. Also, in some cases, the university sometimes becomes a kind of neutral territory. It was because of that advantage that IUPUI became the technical hub of the IMAGIS Project. We have fiber-optic links connecting various participants. Plus, we already had a computing services group that cared for our other machines twenty-four hours a day, so no additional effort was needed to take care of one more machine. This has really worked out nicely, and solved the problem for the IMAGIS group.

We also have a collection of application experts. Chances are good that universities will have someone who is an expert in any field you might be worried about. This would include geography, surveying, civil engineering, cultural engineering, foresters, planning, agronomy, soils sciences, geology, hydrology, biology, zoology, computer science, etc. One focus of the Laboratory for Applied Spacial Information Research at IUPUI, is inter-disciplinary research. Almost everybody at the university can think of an application for a GIS, so we have formed a new committee called the GIS Advisory Committee with members from each of the schools within the university. Awareness is maintained. They can carry the message back to the departments, keeping everyone well advised as to the progress being made and the capabilities that are available.

Probably, one of the most important occurrences recently has been the establishment of the university GIS alliance. Currently, we have five members, and we have published a brochure that discusses the facilities and the personnel involved in GIS at each of the five universities. The universities are Purdue University at West Lafayette, IUPUI, Indiana State University at Terre Haute, Indiana University at Bloomington, and Ball State University. There is a possibility that IU-Southeast will be joining the Alliance soon.

The goals and objectives of the alliance are:

1. to provide leadership in the development of GIS technology and locate its capabilities within the state of Indiana;
2. to establish a formal network of individuals and resources at various Indiana universities who are involved in GIS technologies;
3. to Provide the leading edge GIS technology development;
4. to develop an environment for cooperative GIS research including data and information sharing; and
5. to organize educational opportunities, such as training, symposia, conferences and workshops.

At our first annual GIS conference, on February 6th, 1990, we thought we would be lucky if we had 75 people attend. We ended up with almost 300, so the interest in GIS is growing remarkably.

I'd like to finish by briefly describing where I believe universities will focus much of their efforts over the next few years. GIS, and the need for accurate databases, will foster a geodetic control network program, where all surveys will eventually be keyed to this very precise framework. Satellite information will, of course, be instrumental in establishing this geodetic control system. Universities will help local entities establish their cadastral-mapping base in each town, city and

county. This base will probably be at a scale of one to one hundred for the urban areas and one to four hundred for the rural areas. Universities will also assist in the conversion of information from existing maps and newly flown, controlled aerial photographic mosaics. The information that will be taken will include, but not be limited to, soils, structures, elevation, surface drainage, hydrology, crops, wetland, forest, wildlife, archeological sites, endangered species sites, etc.

Efforts will be made to convert existing data from forms into GIS compatible information. We are all overrun by forms in our offices, and if the information on these forms can be converted into part of the GIS database, they can be accessed readily and the spacial component of the information in those forms can be realized. Also, the information in file cabinets, dusty boxes and other computer systems will be made GIS compatible.

Efforts will also be made to establish standards for mapping and databases, so that data quality, data accuracy, and data transferability are assured. Plus, GIS will assist in planning and management strategies for sites, local governments, regional issues and state programs. Finally, once databases are available, basic and applied research at universities will finally be possible. It takes a great deal of time, effort and dedication to create these databases. Yet, once they are created, the universities will have a cornucopia of information available for research purposes.