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Title: GIS – The Human Component
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Abstract

While we are able to map out the technological achievements of the hardware/software and data components of Geographic Information Systems, the often overlooked and most important component is Human Interaction. In truth, all of the other components are integral within the Human Component, with the addition of emotion. This presentation will address the importance of gaining the enthusiastic support and acceptance of GIS technology within the work environment of a small municipal utility. Acceptance and use are critical to the success of GIS in any work environment. A high-performance sports car still needs a driver to operate it. Zoom, Zoom!

Introduction

Lehigh County Authority (LCA) is a regional provider of water and wastewater services in Lehigh County, Pennsylvania. LCA currently supplies 5.2 million gallons per day of water to 16,000 residential, commercial, and industrial water customers. It also transports 5.9 million gallons per day of wastewater, primarily through a regional interceptor system. The service area covers approximately 50 square miles. LCA's 34 full-time employees work in four departments: Administration, Capital Works, Customer Service, and Operations. For several years, LCA has been in a service expansion mode due to high population growth in Lehigh County and an ongoing acquisition program.

In 2004, LCA completed the final implementation phase of their enterprise-wide Geographic Information System (GIS). This system provides access to critical data for every department and every employee within the Authority. The 5-year project included a number of distinct phases including: Needs Analysis, Implementation Plan Development, Pilot Study, Geodatabase Design, Data Conversion, Application Development, System Roll-out, and Training. Every one of these phases required at least some degree of input from both managers and end users. The purpose of this paper is to share some of the ways that LCA was able to involve and educate personnel in order to gain their support and subsequent "buy-in" to the system.

Fostering Organization-Wide Involvement

Initial efforts in planning the GIS quickly identified the need to involve all personnel in the use of the end product in order to justify the costs. Expenditure estimates for full development of the GIS exceeded \$1.5 million. This was not going to be a system sitting on one computer and used simply to print out maps. Instead, it had to be shown that the GIS would actually be used in an array of business processes, spanning the needs of all departments.

The first step towards achieving this goal was the formation of an Internal GIS Committee with representatives from all departments. These individuals were tasked with securing professional services, reviewing documentation and system options, and making decisions based upon consensus.

During the Needs Analysis Phase, it was necessary to gather the anticipated needs of each department as well as each key process within the Authority business plan. A majority of the staff was not familiar with GIS technology. Many did not even know what 'GIS' stood for. To address this issue, group-training sessions were conducted for all employees focusing on basic GIS concepts and proven benefits. Demonstrations and industry peer testimonials were presented as well.

Next, formal interviews were conducted on either a personal or departmental level so that every employee participated. Most employees were also involved in the generation and review of business process flow diagrams to assist in the identification of potential applications for GIS.

A Pilot Study was then conducted to assess the value of various applications and to test data conversion techniques. Approximately half of the staff received 4 hours of introductory ArcView training. After the training, they had 2 weeks to complete a course assignment using the Pilot system and a project feedback form. This effort not only established levels of learning retention, but the form assisted in identifying the practical functionality of the applications.

After completion of the Pilot, LCA moved into the Database Design and full system Conversion phases. During that time, the GIS committee continued to be involved with maintaining the direction of the project. Monthly progress reports were circulated and the GIS committee helped to promote the use and functionality of the anticipated system. Levels of user access were also established based, in part, on the individual learning retention as well as the need to manipulate the data. The three levels included Primary, Secondary, and Tertiary users.

Primary users require direct access to the GIS data residing on the data server. They will access a fully functional GIS application that can perform all types of spatial analysis and data maintenance procedures. These staff will be in charge of maintaining and modifying the GIS data sets and must have the training, tools, and access to the data to perform these functions. One employee received this level of access and training, requiring 24 hours of ArcINFO instruction.

Secondary users require direct access to the GIS data as well. They will access many of the viewing, query, and mapping functions within their GIS application and will perform most of the GIS functions "from scratch." Typical tasks will include making customized attribute queries and presentation-quality maps.

Four employees received this level of access and training, requiring 16 hours of ArcView instruction.

Tertiary users require indirect access to the GIS data. Access for them will occur through a web based GIS interface that streamlines and simplifies the GIS functions and provides users easy, efficient access to specific data about the system. All staff received this level of access and minimal training, requiring only one hour of instruction.

The GIS was officially launched at LCA in September of 2003. Training for the system occurred over the first few weeks. Feedback was requested for both the website as well as the overall system through the use of forms. These forms included "Bug Reports" and "Data Errors." Functionality comments were also welcomed. After compiling received forms for 30 days, a summary was developed and discussed with the GIS consultant. All bugs were fixed and data errors were flagged for future edits. Functionality comments were separated into those that can be fixed by simple programming and those that were true enhancements to be considered at a later time, as the system evolves. All actions were communicated back to employees to reassure them that their feedback was taken seriously.

Current and Future Efforts

In 2004, further modifications were made to the website application, the ArcGIS software was upgraded, and data maintenance procedures were enhanced. Currently, a half dozen employees access the website on a daily basis. Secondary users have increased to 7 through the use of four floating licenses for ArcView. Earlier this year, LCA hired its first full-time GIS-dedicated staff member. The GIS Technician will assume responsibility for timely data entry into the geodatabase as well as promote the use of GIS throughout the organization.

The immediate goal of the Authority's current efforts is to increase user access to the GIS. Unfortunately, there continues to be some reluctance to use the system. One-on-one training will hopefully encourage personnel to see the value of GIS for their job functions and increase their comfort level with the technology. Mentoring is also being applied for this purpose. The GIS Technician will meet with at least one individual per week to reinforce prior training, evaluate usage, and to develop a list of user needs/concerns. Once a month, selected groups of users will meet for a couple of hours to accomplish essentially the same goals as the Mentoring Process, but on a department or group level.

Conclusion

Although an enterprise-wide GIS is scaleable, it is still a tremendous undertaking and expense. The human element of GIS is as important, if not more important, than the hardware, software, and data for the system. Employee involvement is critical for the successful implementation and long-term viability of the system. Participation from all levels of personnel beginning with system planning, through

implementation, roll-out, and beyond will make your project a success. NASCAR pit crews know that to win the race they need to train, support, and continually communicate with their drivers. Ladies and Gentlemen, start your engines.

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