

LOUIS STOKES ALLIANCE FOR MINORITY PARTICIPATION (H-LSAMP)

2005 COMPUTERWORLD HONORS CASE STUDY

EDUCATION

UNIVERSITIES PARTICIPATE IN A PROGRAM TO INCREASE THE ENROLLMENT AND GRADUATION RATES OF MINORITIES IN TECHNOLOGY RELATED FIELDS OF STUDY, NAMELY SCIENCE, MATH, ENGINEERING, AND TECHNOLOGY. [20055336]

SUMMARY

The Louis Stokes Alliance for Minority Participation is a nation wide program sponsored by the National Science Foundation. Many universities and alliances of universities participate in the program to increase the enrollment and graduation rates of minorities in technology related fields of study, namely Science, Math, Engineering, and Technology. As a participating institution in the LSAMP program, annual data must be supplied to the NSF via an online web based data collection system called QRC. The AIMS project developed at the University of Houston identified two additional information technology gaps in this program that needed to be filled to increase the overall program's effectiveness at their institution and the other institutions within the Houston Alliance. The University of Houston partnered with Parkelle, Inc. and Cynergy Systems to design and build the AIMS application to create a web based data collection tool to meet these needs. AIMS allows each member institution a common platform for collecting the data required by QRC on an annual basis. Not only is this data beneficial to fulfilling the annual QRC data reporting requirement, but when combined with other data elements necessary for administering a universities individual program, it empowers an Alliance level administrator to manage, analyze, and report on the operations at all schools within the alliance. Furthermore, the annual process of entering the data into QRC via their web application is now automated as the data can be sent electronically.

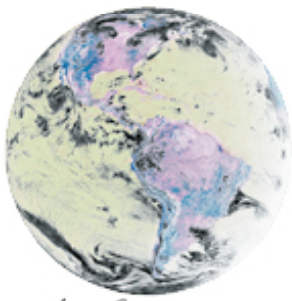
APPLICATION

As a participant in the AMP program, the university, at a minimum, must keep track of the students participating in the program. The NSF and QRC have defined the data elements they want to capture and each school must report this data annually. This information generally includes personal information about students directly involved in the program and additional aggregate information for the entire set of students interfacing with the program, both directly and indirectly. As institutions build their programs, they immediately see the need to develop a system that helps them organize their own data. These solutions were found to include technologies such as Excel spreadsheets, Access databases, or paper and pencil systems. These systems would then be used as a source of data for an annual labor intensive effort of entering this into the online QRC system. We found that while these disparate systems to be somewhat adequate in helping each institution individually meet their annual reporting requirement, they were rarely providing much assistance towards the effort of day to day program administration. Furthermore, the data was not accessible externally to other parts of the alliance on a real time basis, causing problems when the Alliance administrator needed real time information or reports for all schools within their Alliance.

AIMS was designed to bridge these technology gaps. It was the intention of the AIMS system to define a common data structure that could meet not only the annual reporting requirements of each institution, but to also include the other data elements that could provide a better analysis of each program, either individually or collectively as an Alliance by providing access to real time and consistent data. We also wanted to take the burden of technical support out of the hands of each member institution, which could be accomplished with a single application in a single location. Lastly, we wanted to leverage the data and time spent collecting it by automating the time consuming process of manual online data entry of the annual reporting to the QRC.

Parkelle, Inc. in an information technology solutions company specializing in the analysis, design, development and implementation of distributed and web based database interface applications. For more information, visit our site at www.parkelle.com

Cynergy Systems, Inc. provides information technology consulting, training and mentoring services to



A Search for New Horizons



Robert Carrigan,
Chairman of the Chairmen's Committee

Ron Milton,
Vice-Chairman of the Chairmen's Committee

Dan Morrow,
Chief Historian

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BENEFITS

AIMS benefits the individual program administrators, the alliance administrator, and other key faculty throughout the participating institutions in several ways. AIMS supports the individual program administrators by providing online real-time access to student's application data, scholar personal information, scholar participation data, and activity data. Having access to the historical information of each student's involvement in the program is also valuable in counseling the scholars, analyzing patterns in the program, and making acceptance/rejection decisions for applicants in future semesters. The Alliance administrator is a person acting as a liaison between the NSF and the Alliance. They are responsible for coordination efforts common to all schools within the Alliance, and for ensuring each participating institution is meeting their goals and satisfying their data requirements for QRC. AIMS allows the administrator access to each schools information as well as providing reports that summarize the efforts of each and all participating institutions. Instead of having to communicate with each program administrator at each school individually, the alliance administrator can access the data within AIMS. This also provides a valuable tool to other key faculty external to the program as it is common the Alliance Administrator is called upon to provide information about the Alliance to various academic and business administrators within the institutions.

IMPORTANCE

The special needs of this system demanded we pick the right technology. We had to have a system that could be accessed remotely, with little or no technical support required at the various institutions. This requirement alone drove us to build a web application over a traditional rich client presentation. In addition, we had to store the data for all schools in a common repository but make it accessible and available to the right people. In other words, each institution owns their own data and it should not be accessible by other institutions within the alliance, yet still be available to the Alliance administrator. This meant a flexible but maintainable layer of security within the web application. Lastly, we were dealing with a very data intensive application, with several areas of data needing to be exposed to complex business rules. This demanded a strong server side programming language and a data aware front end interface. After analyzing various technologies, we chose a combination of products from Sybase. EAServer from Sybase provided the robust application server we needed to support the security we needed as well as the ability to support a combination of server component implementations. These server components were developed using both Java and PowerBuilder. Java was chosen to implement the more rigid security needs we had in support the J2EE security specifications and PowerBuilder was chosen for its industry leading abilities of providing a robust programming language and use of DataWindows to provide a powerful data interface. The web application was built using JSP (JavaServer Page) technology for handling the user requests. The main ingredient that tied all of these pieces together was the Enterprise Application Framework (EAF) from Cynergy Systems, Inc. EAF played the pivotal role of simplifying the technical interfaces between the JavaServer Pages, EAServer, and the PowerBuilder components. The abstraction provided by EAF allowed development to focus on building specific business software components instead of spending endless hours learning and integrating each of these separate layers of technology. The end result of EAServer, PowerBuilder, and EAF was a widely accessible, data intensive, secure web based database interface software application that met our needs.

ORIGINALITY

In our initial analysis meetings with the various universities in our alliance and other alliances around the United States, we found that nobody had a system in place to bring the data from each institution together at the alliance level. Each reported their data separately to the QRC, but afterwards, the data was not accessible on a day to day operational basis alliance wide for any analysis. Our vision was to collect this data, not only for the end result of automated reporting to the QRC, but also it benefits its users on an ongoing basis to hopefully improve the program by bringing its effectiveness to the forefront.

SUCCESS

Success in a system like this occurs over time. We are in our first reporting year of multi-campus use,

and are still training the various campuses. We will certainly learn more about how effective it is when this reporting year ends and we have access to the data and metrics we have been collecting. Simply having a common system in place is a great place to start when looking for success, especially when combining it with the reduced need to have technical and hardware support at each remote location. The architecture of the application itself also helps to steer the individual institutions into a common set of business practices when administering their own programs.

DIFFICULTY

We faced challenges in both areas of technology and user groups. Our business solution had to provide widespread access to its users, which is a strong case for a HTML based web application accessible within a web browser. While this interface choice is great for accessibility, it does not always make a great candidate for a data intensive application. We were dealing with a large amount of data, around which many complicated business rules were written. Combining this with our need to handle multi-table logical units of work from this web interface made it especially challenging. Our staff was experienced in building database interfaces, but that experience was primarily in rich client applications. We met this challenge by choosing the right technologies and tools. We developed a JSP web application that provided the HTML interface we needed, utilized EAServer to provide the security and web application strength we needed, and PowerBuilder components to support our business rules and data access needs. Enterprise Application Framework brought all of these tools together and together we met our challenge. Our second area of challenges was highlighted when trying to bring our users from the many campuses together. As expected, each institution had their own method for meeting their own challenges, and it became our challenge to extract their needs into one generic but specific application that satisfies everyone. How well we have done in meeting this challenge is another evolutionary process of its own.