

Constructing and Deploying Campus Portals in Higher Education

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INTRODUCTION

A portal is a doorway, a gate, or a means of entrance. For example, the local library is a portal for knowledge. In this age of the Internet, portal refers to a Web site that offers a broad array of resources and services, such as e-mail, forums, search engines, and online shopping malls (Webopedia, 2005). Like any project, portal development should observe the system development life cycle guidelines with activities including planning, analysis, design, implementation, and support. Launching a portal requires careful planning and strategizing. Analysis defines a portal's requirements, determining its content and functionality. Design selects the appropriate software, platform, and architecture. Implementation makes the "build or buy" decision. Support is to maintain the portal, provide support, and perform upgrades.

FROM COURSEWARE, ERP TO PORTAL

The evolution of online technology in higher education has come a long way from courseware management, enterprise resources planning (ERP) to systems integration. Today, 83% of higher educational institutions in the U.S. regularly use course management systems. Besides network security, administrative ERP and system integration are ranked as the top campus technology priorities (Green, 2004). ERP systems provide tools for students, faculty and alumni to access and update academic and administrative data, making school services available real-time via the Internet. Proper deployment of ERP can streamline business processes. With increased productivity, the university can provide better services without increasing staffs. A campus portal is pivotal in integrating and the seamless offering of functions from administration, collaboration to courseware delivery.

Information technology expenditures for course management, administration and digital contents are huge expenditures in educational institutions today. The convergence of digital repositories and Web content management is an inevitable natural evolution for the future (Duncan, 2004). The Internet has made unprecedented impacts on the educational landscape. Along with more effective use of the valuable and expensive digital resources, faculty and students also have

raised expectations. They demand access with simplicity and transparency in an increasingly complex environment.

The campus portal is a hub from which the campus community can locate all the commonly used Web resources. It simplifies access to controlled information, while providing a user-centric interface with personalized information to different constituents. Yet, the campus Web site is not the campus portal, and the campus portal is not the campus Web site. While access to a Web site is anonymous, portal access requires authentication and different users will have different needs, interests, information access and authorization levels (Vincy, 2005). A portal is the centralized, but customized, focal point for varied audiences within the campus community.

Planning and Strategizing

A campus portal can be an effective channel for communication, collaboration, and transaction for different constituent groups, including students, faculty, alumni, and even business partners. Thayer (2002) defined software project planning as specifying the goals and objectives for a project; and the strategies, policies, plans, and procedures for achieving them. Planning is a two-step process: capturing requirements, and plans to deliver the product to the requirements. Delivering a successful product requires careful planning and strategizing, which is far from a simple or trivial process.

As information technology becomes more pervasive and dispersed across the campus, debates are renewed on the mission of an educational institution (NPEC, 2004). A university is made up of classrooms, residence halls, athletic facilities, library, and teachers. On another level, a university is less physical. It is an embodiment of activities that organize and facilitate learning, and bestow degrees; and many of these activities can be provided via a virtual setting. In fact, most institutions are somewhere in between "bricks to clicks." Many are in the process of determining the right mix between the extremes. Where an institution perceives itself along this spectrum is likely to determine the mission critical activities that must be supported by its campus portal.

The most important task in deploying a portal is ensuring its widest adoption possible. After all, the usefulness of a service is determined by the breadth of its user and the

frequency of its usage. Just like any e-commerce portal, universities must carefully consider strategies that garner and retain a thriving user community (Bansler, Damsgaard, Scheepers, Havn, & Thommesen, 2000). Kuh and Whitt (1988) defined culture in higher education as the collective, mutually shaping patterns of norms, values, practices, beliefs, and assumptions that guide the behavior of individuals and groups in an institute of higher education, and provide a frame of reference within which to interpret the meaning of events and actions on and off campus. A successful portal must be customized to the institution's unique culture. It should align students, faculty, and alumni to the institution; enable the dissemination of targeted information to appropriate audiences; and help to foster and build the campus community. Above all, a portal is a service rather than just a product. Proper portal planning should include quality assurance, training, upgrades, feedback, and support for the campus community within the institution.

Requirement Analysis

Requirement analysis addresses both the campus portal's definition and its acquisition process. Requirement definition of the portal should be focused on delivering high-quality and personalized functions based upon a profile created by individual users. The portal should be a vehicle that provides all of the tools different constituents needed on a daily basis in one general area. Strauss (2000) listed several mandatory features of a campus portal: personalization, search, channels, and links; and desirable elements such as customization, role-based models, and workflow.

In general, a portal should have a single secure log-on procedure. Users should be able to define and select channels, search contents; and to access chat rooms, message boards, and personal e-mail. For prospective students, they should be able to submit and track admission, scholarships, and financial aid applications. Current students should be able to view the course catalog, schedules, and register; check account balance and pay bills; submit requests for campus resources; communicate with peers; read announcements, news, and headlines; and change personal information. Faculty should be able to post course material and grades, view schedules and rosters, and conduct other administrative tasks. For alumni, the portal should assist them with continuing to be a part of the campus community, keeping in touch with events, staff, and faculty.

Regardless the portal is used to support learning and collaboration, course delivery or daily administrative functions, planning starts by defining the mission critical activities that need to be provided online. Furthermore, the value of these activities should be concrete and well defined. Can the portal really improve efficiency and productivity? Can it provide better value and added service to the users? What institutional goals can be achieved by exercising the e-busi-

ness model? Are these requirements valid, or are they hype and we are reacting to the "me-too" syndrome? It is most crucial to have a clear understanding of the business value of the portal. A clearly defined value helps to justify continued project expenditures, and obtain consensus amongst different constituent groups.

The requirement acquisition process should start from top down with several deliverables breaking down into business, technical, and creative requirements, deriving in a logical sequence (Quirk, 2002). The process should be designed to answer the key questions: Who are the users? What functionality does each constituent group need? What content is available, and what more is needed? How does one define quality and how will one measure the return on investment? Projects that do not start out with a big picture view usually languish or provide only marginal value to the organization.

The analysis process focuses primarily on business requirements, as technical and creative requirements play only a supporting role. A portal will only provide as much value as the function and content delivered through it. The required functionality and content should be identified and cataloged; and this process will be most time-consuming and must be thorough. Based on business requirements, technical requirements can be concluded via the selection of portal tools and platform. Finally, creative requirements define user experience: the look, feel, and usability of the portal. Other issues that should be determined during this stage include the quality assurance plan, logistics for training and rollout, user and content maintenance, and the security policy. With a clear vision, and well-defined needs, the university can create a portal embraced by all constituents. Proper planning based on needs and priority enables the project to reach beyond its initial phase, leading to smooth implementation without costly changes in direction at midstream.

Design and Architecture

Web architecture follows a multitier model that evolved from the traditional two-tier client-server model. In a multitier architecture, a middle tier is introduced to essentially create a client-broker-server connection. In typical three-tier architecture, the front-tier is a user interface layer. The middle-tier acts as an intermediary allowing clients to access different backend resources, and pull together information from disparate systems. The back-tier interfaces with business applications, databases, content repositories, and search engines (see Figure 1).

The component interface between and within tiers should be platform independent and interoperable. The front-tier interface should be implemented using eXtensible HyperText Markup Language (XHTML), Javascript, Java applets, and eXtensible Markup Language (XML). Communication between tiers should be implemented using Web service,

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