

Choice and Empowerment

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- 01/19/05

Given the diversity of software now populating the eLearning environment, the authors pose the question whether end users, and IT managers, are better served by service-oriented architectures or fully integrated system architectures for their campus infrastructure. They explore the question, paying special attention to an environment of heterogeneous repositories and service modules and the growing demands proposed for these components of the eLearning landscape.

The CMS is increasingly described as a mission-critical component of the academic technology infrastructure, supporting both classroom-based and distance learning. However, other more specialized learning technologies have emerged on the scene. The University of Minnesota has coined the term "virtual identity management" to describe the ePortfolio, used for reflection, career management, and personal and institutional assessment on a timescale longer than an academic semester. Blogs serve as personal publishing systems organized chronologically. Wikis have a slightly higher entry threshold (i.e., one has to learn some markup elements), but offer great flexibility for organizing group work and building rich group concept maps.

At some level, it is not important to define or delineate each of these tools into functional compartments. Rather, it is worth noting that each of these tools provides learners and instructors two important, complementary features: choice and empowerment. Learning is no longer "confined" to the CMS environment, but can flow into other environments that support different modes of spatial and temporal interaction. This blurring of boundaries reflects the reality that learning, research, and reflection represent intertwined and mutually reinforcing activities--and perhaps frustration within a stand-alone CMS. With a new found sense of empowerment, our students and faculty are choosing more specialized and effective tools often "outside" the institutionally supported or mandated software. Academia is not the only environment with such developments; the recent blog-based coverage of the Asian tsunami provides an interesting point of comparison from the perspective of news coverage. The Sakai Project's collaboration and learning environment offers another interesting and worthwhile development effort in this regard. It seems that a diversity of tools will be required to support the spectrum of learning (and research) needs, and that we at institutions should empower our users in these endeavors.

One possible approach to supporting the total learning environment would focus on the CMS as the "core" application and consider other tools as "add-on" components. This approach, while tempting, would probably suffer from "feature creep" that often leads to monolithic systems that result in long-term support challenges and require reliance on a single (or a few) vendor(s). Alternately, there is growing interest in service-oriented architectures (SOA), which emphasize layers of content and services within an open, modular framework.

From the perspective of digital libraries, the highest-level description of an SOA includes a repository layer that provides the storage function that, in turn, supports both a services layer for functionality and an interface layer for presentation or views into the content. The concept of an institutional repository has gained tremendous support in many universities and colleges. Institutions have chosen Dspace, Fedora, ContentDM, (add your flavor here) as the "institutional repository." For-profit vendors now offer fee-based repository services. These developments are noteworthy and worthwhile, but it remains unclear whether institutions or vendors have considered the SOA concept.

The same temptation to "simplify" the services layer also applies to the repository layer. Content comes in a variety of forms, with corresponding diversity of management needs. DSpace may be "best" for text (e.g., articles), yet unproven for other types of media content. Fedora offers strong utilities for presentation and rendering, but doesn't possess the workflow features of DSpace (at least not yet).

At Johns Hopkins, we are advancing the idea of being "repository agnostic." That is, it seems likely that institutions will support multiple repositories for multiple content types and needs. Our collaboration with the Virtual Observatory provides evidence that some content (in the form of raw astronomy data) will never reside in the "institutional" repository, but the library should still provide curation services for data releases. With funding from the Mellon Foundation, we will evaluate multiple repositories and service modules that support learning, research, scholarly communication, and preservation, with an eye toward interoperability and modularity.

Repository systems and service modules designed from various perspectives will be evaluated against a series of use cases. The result will be a set of best practices, functional requirements, and recommendations. These efforts will result in a typology of repositories and repository users, and support the development of an interface layer that would facilitate the integration of modules from various applications. Through this R&D effort, we hope to further the argument that one should focus on content and service needs, and only then choose an appropriate combination of repositories and services connected through appropriate interfaces. The OKI OSIDs, IMS DRI, and JSR-170 specifications offer potential for interoperability between various systems and heterogeneous repositories through standard interfaces.

This approach relies upon open standards to ensure modularity and choice. If a vendor supports an open standard, then it is possible to use a vendor-supplied module. With appropriate compliance and support, WebCT could be used with Open Source Portfolio. However, it is essential that vendor support for the open standard be demonstrable, rather than only in the abstract. Open source software development is not the only path for supporting open standards, but it does make transparent the opportunity to ensure actual use and implementation of the standards.

With dwindling IT budgets, and growing user expectations, it might seem odd to propose additional research and development, and commitment to in-house expertise and resources. Choosing a vendor who promises to address the full range of potential content and service needs seems quite soothing--at least in the short term. However, the pace of technological change is not diminishing; rather, it is accelerating and the nature of learning and research is likely to change even more in the next decade than it has since the advent of the Web.

Our students and faculties are enjoying the benefits of choice and empowerment. Should not IT administrators and managers demand it for their communities, and for themselves?

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