

Portal Considerations

University of Massachusetts Portal Strategy Discovery Report



February 26, 2004
Version 1.1

Prepared for UMass by Niteo Partners, Inc.
An NEC Solutions (America) Company



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1 Considerations Overview

1.1 Purpose and Approach

Over the course of the past four months, the Portal Strategy project team has been investigating the possibilities for a portal environment across the University of Massachusetts system. In the process of this investigation, the team has endeavored to understand:

- The current state of online business services offered across the various campuses of UMass.
- The current state of portal or portal like offerings across the various campuses of UMass.
- Active initiatives to deliver or enhance portal-related functionality.

In addition, the team has examined leading portal offerings within higher education to construct a picture of the services that a robust, compelling portal must offer.

This document aims to apply the research and findings of the assessment activities described above, as well best practices for portals in higher education, to create a “straw man” portal strategy for UMass. In doing so, we will highlight key findings from the *Current State Assessment*, *Constituency Analysis*, and *Best Practices Analysis* documents to identify:

- Commonality and differentiation across the UMass campuses.
- Current strengths to build upon.
- Leading solutions and initiatives that are underway that can be leveraged by a portal.
- Key needs and dependencies for the portal.

In turn, the “straw man” portal strategy intends to:

- Identify options and opportunities for portals at UMass.
- Provide enough specifics so that UMass constituents can discuss portal next steps and requirements in a meaningful way.
- Provide enough specifics so that UMass can estimate resource needs, people and financial, as part of the budgeting process.

Finally, it is important to note that the intent of this “straw man” strategy is to present a series of considerations, rather than recommendations. While Niteo believes that the ideas presented in this document provide meaningful direction for UMass and conform to best practices for portals in higher education, we acknowledge that there are multiple valid perspectives for portals at UMass and that additional consideration and debate of these ideas will be necessary to ensure consensus moving forward.

1.2 Opportunity and Vision

The portal initiative provides UMass with an opportunity to improve and enhance its relationship with its constituents: students, faculty, staff, alumni, etc. If the university takes this opportunity to innovate its approach to web-based offerings, then the portal has the potential to:

- Improve the services UMass offers.
- Encourage a collaborative environment across the university system.
- Aid UMass in developing a life long relationship with its students, from prospect to alumnus.
- Position UMass as a leader in online services in the higher education space.
- Help UMass utilize some of its resources more effectively.

1.3 Considerations Highlights

To help realize the opportunity that the portal initiative presents, there are a number of items for UMass to consider as it moves forward: user needs, the portal user experience, existing information system assets, technical readiness, organizational readiness, and the implementation approach. Following is a high level summary of the major engagement findings and suggestions for a portal framework at UMass:

- No UMass campus currently offers a personalized portal comparable to leading offerings within the higher education environment.
- The different constituencies across the various campuses agree that a portal can provide value to them as a single online resource that improves communication between the university and themselves.
- Four portal characteristics emerge as being of high importance to each constituent group: information aggregation, single sign on, personalization, and customization.
- Constituents across the campuses expressed concerns regarding the realization of a portal at UMass because of resource constraints, perceived inadequacies in current IT service levels, and the need to reflect campus and department uniqueness and individuality. These concerns have been addressed in the governance and implementation models discussed in this document.
- The UMass system has made a number of investments in technology systems and infrastructure relevant to a portal. On a system level PeopleSoft is a strategic asset. Additionally there are campus specific initiatives such as SPIRE (Amherst), Dartmouth's directory services, Dartmouth's content management, and Worcester's intranet. Note that SPIRE implements the PeopleSoft Portal product.
- UMass must define a portal governance model that addresses the issue of resource and budget constraints. Universities like Indiana University and the University of California have implemented or defined strategies based on centrally managed services for initiatives like a portal. This central approach provides the ability to create a rich offering at a reduced cost.
- Up-to-date and accurate campus specific content is critical to the success of any portal and regardless of the governance model should remain at the campus level. Still, there should be an allowance for a small content channel for the occasional and judicious communication of University-wide news/announcements of common interest.
- UMass would do well to agree upon and apply best practices and open standards for the portal to ensure consistency of design and implementation. Note that this is *not* the current practice for web-based development at the university.
- UMass should plan its portal user experience (e.g. navigation, look and feel). Portal users should not feel as though they are using multiple disparate applications. Still, the portal should allow for campus specific (and potentially even department level) branding with different color schemes, logos, and even fonts that reflect the

appropriate context for the user. Furthermore, the portal user experience should reflect the user's role and personal attributes.

- UMass will need to address three key areas of dependency for the portal: PeopleSoft integration, security including directory services, and content management.

Some campuses (at least Amherst and Worcester) have made the decision in the past to tie an enterprise portal to the existence of directory services. This is certainly the ideal implementation strategy but may introduce a long delay in the realization of an enterprise portal, as directory services are a non-trivial exercise. This dependency will need special attention as UMass moves forward with any portal initiative.

- UMass should “future proof” its portal framework by adopting current and emerging standards including JSR 168 and WSRP as well as a services oriented architecture (SOA) approach. This will minimize its dependence on proprietary software solutions and maximize the flexibility of the portal for future integration and evolution.
- UMass should define a short list of portal vendors to evaluate to ensure that the chosen platform is capable of supporting an enterprise class portal.
- UMass must define an implementation model that meets the needs of the system and the individual campuses in an effective manner. This model should align with the governance approach, and Niteo believes that a central shared portal framework can provide economy of scale while ensuring a campus specific user experience.

2 Portal Vision

The vision statement below attempts to provide a concise “vision” for a portal at UMass. Its intent is to provide a high-level statement of objectives and goals, and it is based on the engagement interviews with UMass constituents across all campuses, leading portal offerings from other universities, and general industry considerations for a “state of the art” portal. The draft vision statement should be confirmed or revised as UMass moves forward to ensure that it accurately reflects the goals of the portal initiative.

2.1 Vision Statement

The University of Massachusetts portal will serve as the single starting point for university constituents to obtain information and to access system and campus based information systems. The portal will provide a personalized web-based vehicle for delivering communications and services across the entire enterprise that promotes the university, highlights the diversity of the individual campuses, and respects the campus affiliation of its various users.

UMass seeks to deliver a portal that exceeds contemporary portal offerings in higher education, improves the level of service offered to students, faculty, staff, and other university affiliates, encourages a collaborative culture across the university, and promotes cost-effective use of resources.

2.2 Opportunity for UMass

As part of this engagement, Niteo had an opportunity to present the Portal Primer and Best Practices information to President Wilson. In turn, President Wilson stated his desire not just to play “catch-up” with a portal but also rather to “leapfrog” the competition and become a leader. Indeed, the portal initiative does provide UMass with an opportunity to innovate how it approaches web-based offerings, from both business and technology perspectives. If given the proper attention and care, the portal initiative can help UMass enhance its image, improve its services, and gain efficiency in its use of resources.

2.3 Scope of a UMass Portal

While not downplaying issues such as university philosophy and a detailed portal definition, this document proposes a centralized portal framework that can meet diverse needs amid a climate of some ambiguity. To provide some scope context, however, the current portal vision is focused, at least initially, on providing a personal portal to university constituents rather than a “portalized” home page for UMass. There is currently some controversy in the academic community as to the value of providing a personalized university home page, and unfortunately in the process of arguing against that concept the idea of any university portal has been dismissed as well. Niteo believes, however, that universities with leading portal offerings are seeing demonstrable value from these applications.

Universities with robust portals such as Indiana and Wisconsin are still using “static” HTML sites for the general university site. Their portals are considered to be a separate site with a separate purpose. Indeed, current best in class university portals serve “internal” constituents such as current students, faculty, and staff while the general sites tend to be targeted towards a broader audience including those who do not have a current relationship, or at least no frequent interaction, with the university. The internal facing portals are experiencing increased adoption and use and therefore universities are continuing to invest in these portals. Likewise, UMass has the opportunity to enhance and improve constituent services, and by extension the university’s reputation and image, as well as improve operational efficiency via a personal portal.

3 Portal Considerations

The following section provides a list of items for UMass to consider as it moves forward with its portal initiative. Collectively they provide UMass with an understanding of:

- The needs, desires, and concerns of the portal user base
- The existing university and campus assets that can be leveraged by a portal
- The organizational and operational challenges that need to be addressed for a portal
- Aspects of the user experience that need to be addressed in a portal
- The supporting systems required by a portal
- Scenarios for implementing and realizing a portal

3.1 Current State Implications

This section summarizes key findings from the current state assessment activities and examines their implications for portal strategy and planning.

3.1.1 Key Business Drivers

Based on the findings documented in the Constituency Analysis, a great degree of consensus exists both across the different constituent groups and across the different campuses. This consensus applies to:

- The benefits a portal can provide.
- The key functionality that a portal should contain.
- The concerns in realizing the portal.

3.1.1.1 Portal Benefits

The different constituencies across the various campuses agree that a portal can provide value to them. Primarily, constituents perceive that a portal will allow the university to improve its level of service to them via:

- Improved communication

A portal can provide constituents with easier access to information as well as providing constituents with information that is more relevant to them.

University constituents no longer have to hunt for information in various locations, whether online or offline. And, the university no longer has to reconcile and disseminate information through so many channels. In addition, constituents no longer have to wade through extraneous content to get to information pertinent to them.

- Single online resource

A portal provides constituents with a single online destination from which they can receive content, perform tasks, and access other online systems. As a result, users no longer have to remember multiple logins or multiple URLs.

- Greater efficiency and potential cost savings

This value was emphasized by university leadership at both the campus and system levels.

By providing more relevant and accurate content online as well as unified access to typical constituency tasks, common processes can take place online. For example, if tuition payment is handled online, the potential then is to free up staff for more valuable tasks, reduce processing costs such as check processing, and make the process more convenient for the student or parent paying the tuition.

If a unified approach to the portal framework is adopted, it will also provide the opportunity for better service at a reduced cost. Such an approach will provide efficiencies in the form of shared infrastructure and a single technology stack to support. Additionally, with appropriate service level agreements (SLAs) enhanced service such as 7 x 24 support can be realized at reduced cost.

Note that a more detailed cost analysis was beyond the scope of this engagement and would be necessary to develop a detailed ROI for the portal framework.

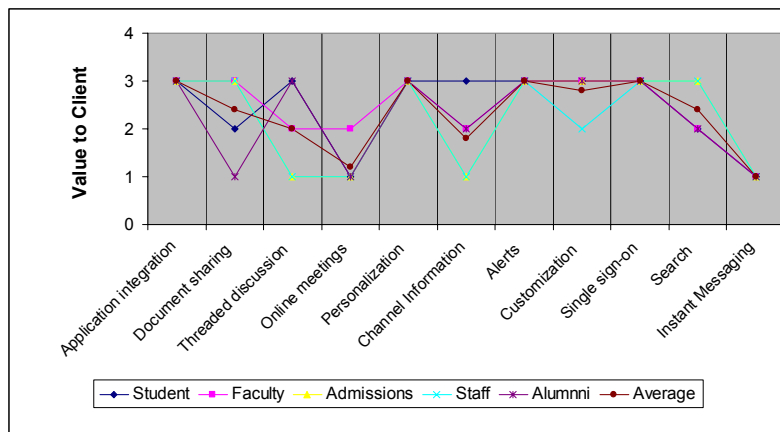
Note that the PeopleSoft web self-service initiatives, both planned and underway, are critical to achieving this value, as the portal will serve as an aggregation and access vehicle to these services.

These benefits are very much inter-related and reinforce one another, and all can be realized through a robust portal implementation. The next section takes a look at the functional elements necessary to achieve that value stated above.

3.1.1.2 Functional Priorities

When looking at the findings from the Constituency Analysis four portal characteristics emerge as being of high importance to each constituent group: information aggregation (or application integration), single sign on, personalization, and customization. Perhaps this should not be surprising as these characteristics are core elements of “state of the art” portals and are highly inter-related. Still, the emergence of these functional elements as priorities for development is a positive sign that the different university constituents find value in what a portal can provide.

Therefore, when defining scope and requirements for the first phase or two of the portal, it is critical that these functional elements are addressed.



Functionality Ranking Chart

Single Sign-On

Constituents expressed unanimous interest in the ability to access the various online systems that they use via a single login procedure. Users find the current state of logging into four, five, or six different systems, each with its own username and password, to be cumbersome and awkward. Certainly users dislike having to remember a list of different login credentials.

The ability to use one set of authentication (login) credentials would greatly improve the user experience for university constituents. Anecdotally, it may also have the added benefit of inciting users to be more guarded with their username and password.

Note that the realization of this functionality is a non-trivial exercise. Please refer to *Section 3.4: Dependencies* for more information.

Information Aggregation

Information aggregation goes hand-in-hand with single sign-on, and constituents universally found a high degree of value in being able to go to a single location to view information and perform tasks that currently reside across multiple applications.

As a representative example, let's look at how one senior administrator at the Boston campus utilizes technology as part of his daily routine. At any given time, he typically has at least the following different applications running on his computer:

- Email
- Campus web site
- Student records
- Online course tool
- Daily campus news and announcements (via email)

This individual expressed that a portal that aggregated this disparate information in one location would greatly enhance his ability to access the data that he needs to do his job.

Personalization

Personalization provides users with information and functionality relevant to “who” they are. In other words, what the portal displays will be based on what role, or group, a user belongs to as well possibly other attributes specific to that user. For example a student might be able to view his or her course schedule, degree progress, account balance, and see a reminder that a library book is due.

While role based personalization exists to a degree today, it is more implicit by forcing users to log into different systems based on who they are. The portal should at least make this role-based personalization explicit by aggregating content and system access via single sign-on and application integration.

Customization

Customization is the ability for portal users to tailor what content they see and how that content is displayed. While UMass constituents expressed interest in both aspects of customization, the former seems to be the most important.

For example, many university constituents feel that news and announcement communication is currently so broad as to be irrelevant. As a result on many campuses, constituents often ignore or delete general newsletters. In some cases, constituents receive email digests from departments with which they have no affiliation. The ability to filter out a majority of the extraneous content means those users are likely to read the important and relevant communications.

Other Functionality

It is worth noting two additional functional areas that constituents valued highly: alerts and self-service. Alerts provide timely announcements relevant to groups or individuals. Self-service allows users to perform tasks or access information online at their convenience. These two types of functionality exist to varying degrees today across campuses and constituent groups; however, constituents indicated that they would value this functionality in the context of a portal.

3.1.1.3 Constituent Concerns

Across the campuses and across the constituent groups, people consistently expressed three main concerns regarding the realization of a portal at UMass:

- Resource constraints

Budget cuts have imposed resource constraints at every level on each campus. Current staff is already stretched thin with their present responsibilities. Therefore university constituents are concerned as to how many resources will be necessary to develop and maintain a portal and its supporting systems (e.g. content management) and how these resources will be funded.

- Inadequate service level

A significant group of constituents at each campus perceive a lack of responsiveness to their needs and issues during previous and current technology initiatives (e.g. PeopleSoft). The stated issues concern application functionality, usability, and development time frames as well as ongoing support. While it is outside the scope of this engagement to evaluate what has and hasn't worked in the past, it is clear that some credibility gaps exist between the user community and the system implementation/support teams. As it concerns the portal initiative, these constituents have expressed their concern that a portal will suffer from the same problems.

- The need to reflect campus and department uniqueness and individuality

In general, constituents at each campus agreed that content specific to the campuses needs to be controlled at a campus level. In this way, portal content, as well as look and feel, will reflect the individuality and uniqueness of each campus. Additionally, some constituents would like to extend content ownership down to the department level for the same reason of ensuring the individuality of the content and its presentation. At the same time, system level constituents expressed the need to have the ability to promote some amount of university-wide news and content.

These concerns will need to be addressed in subsequent portal planning to ensure that both organizational and operational aspects of a portal are thought through in a manner that will satisfy the expectations of the university constituents. Both the operational considerations (*Section 3.2*) and the implementation considerations (*Section 3.5*) below offer thoughts on how UMass might approach some of these issues.

3.1.2 Existing Assets

No UMass campus currently offers a personalized portal comparable to leading offerings within the higher education environment. The different campuses do, however, offer a variety of web based applications with "portal like" functionality. Additionally, the UMass system has made a number of investments in technology systems and infrastructure relevant to a portal. Moving forward, UMass should leverage these systems to help realize its portal.

3.1.2.1 PeopleSoft

UMass has made a significant investment in the PeopleSoft platform and applications over the past few years. As a result, the majority of constituent data now exists, or soon will, within a PeopleSoft system. The functional areas supported by PeopleSoft applications and the data stored within PeopleSoft are critical to many of the functional areas that should exist within a university portal.

A brief summary of the current PeopleSoft landscape:

- PeopleSoft HR and Finance systems contain data relevant to faculty and staff members. These applications have been implemented on a common infrastructure across the entire university system. Currently, these applications run on the PeopleSoft 7.6 platform hindering web access and incorporation of this data and functionality into a portal.
- Three different implementations of PeopleSoft Student are underway. Amherst and Worcester plan to roll out their respective individual implementations in February 2004. Boston, Dartmouth, and Lowell are implementing a shared system scheduled for roll out in February 2005. All three implementations are on the 8.1 platform and will make use of the PeopleSoft Portal product to provide web access for users.
- Boston, Dartmouth, and Lowell have implemented a PeopleSoft based Admissions application that allows prospective students to apply and check their application status online. In addition, online payment is both implemented and required in conjunction with online applications.
- UMass owns an enterprise license for the PeopleSoft Portal product that runs on the PeopleSoft 8.1 platform.

As a result it is clear that any UMass portal will at minimum need to integrate with PeopleSoft. More on the technical implications of this is included in *Section 3.5: Implementation Considerations*.

3.1.2.2 Campus Initiatives

Each campus has been taking its own approach to portal and portal like functionality with varying degrees of progress. Here we highlight the leading campus initiatives that should be examined as part of any future portal development:

- SPIRE
SPIRE is Amherst's application for class registration, checking grades, verifying account balances, financial aid, and personal data. Geared primarily towards students it does provide faculty members with class rosters, grade rosters, and instructor schedules. The next version of SPIRE will use the PeopleSoft Portal product.
- Redesign of campus web sites
Scheduled for launch in spring 2004, the Amherst Communications department is developing a new version of the main campus web site with a portal-like layout of news, events, and other content. The Dartmouth campus has already launched a web site whose user experience has these characteristics.
- Dartmouth directory services
The Dartmouth campus is currently implementing unified directory services, and it appears that Dartmouth will have the first implementation in production. This will provide the foundation for implementing simplified, or even single sign on, authentication services.
- Dartmouth content management
The Dartmouth campus has begun to pilot a content management system for updating and publishing web site content.

- Worcester intranet

The Medical School campus provides a restricted access intranet with a number of tools including campus calendar, personal schedule, and campus announcements (alerts). Additionally, the intranet provides some basic content management functionality via the capabilities built into the Cold Fusion platform.

These initiatives have all implemented important aspects of a more comprehensive portal solution. As a result, the portal solution should look to build on or integrate with these applications and technology solutions. At minimum, these initiatives can provide learnings that should be shared and applied to future work.

3.2 Operational Considerations

UMass faces operational and organizational challenges that should be addressed to ensure the successful realization of a portal. Although Niteo recognizes the inherent complexity in addressing these items, it is important for UMass to be cognizant of the challenges and their implications.

3.2.1 Governance Model

As mentioned earlier, each campus is resource constrained. Yet, many constituents at each campus have indicated the desire to own the portal at a campus level. Certainly these two sentiments are at odds with each other.

Many university systems (e.g. University of California, Indiana University) are looking to gain efficiency and avoid redundancy of cost and effort by centralizing development and ownership of common applications and infrastructure. UMass leadership is also wrestling with this topic. Niteo believes that a portal framework, and the resources to develop and support it, lends itself to a common, shared governance model. Among other benefits a shared model will ensure consistency of approach, the ability to create a single highly skilled team, and the opportunity to provide enhanced service at a reduced cost by avoiding redundancy and duplication of effort.

3.2.1.1 Steering Committee

Any complex initiative needs to have strong leadership that is representative of the different constituents and departments that will be affected. In the case of an enterprise portal, there is a broad range of roles and offices that need to be represented. This is especially so if the portal scope spans multiple campuses. Based on other successful higher education portal initiatives, UMass may want to consider including representation from some constituent areas (e.g. Faculty, Admissions, Registrar, Library, Finance, Alumni, and Continuing Education) on the portal steering committee in addition to representatives from the information technology organizations.

3.2.1.2 Portal Resources

From a resource perspective, the key is to use a resource model that results in an adequately staffed, skilled, and responsive team. A core, shared portal team can provide a high level of specialized skills that benefit all campuses. The team should include a product manager who can manage input from the different campuses and constituent groups and coordinate across those groups. If desired, each campus could potentially contribute resources to the common team helping to facilitate communication between the portal team and the campus.

While not all university constituents have been satisfied with how this model has worked on the PeopleSoft initiatives, it is Niteo's view that the resource model is not flawed. Rather, all parties (campus and system level) must work to define and execute a service level agreement (SLA) that ensures that a high quality level of service is provided by the portal team.

3.2.1.3 Collaborative Approach

The suggested governance and resource model is dependant on a collaborative approach. This type of approach already exists amongst the Boston, Dartmouth, and Lowell campuses for the PeopleSoft Student initiative as well as between other campuses for different initiatives. The ability to share effort and knowledge across the campuses will help make a portal initiative more successful on all campuses; even if a shared model is not implemented.

3.2.1.4 Notes on Model

The shared model suggested applies to the portal framework and related portal infrastructure services. It is not Niteo's intention to state or imply that underlying systems such as content creation and management are part of the portal team's mandate. As seen immediately below, content creation and management is best handled at the source of the content.

Additionally, the technical implications of a shared portal framework are discussed in *Section 3.5: Implementation Considerations*.

3.2.2 Content Management

Up-to-date and accurate content is critical to the success of any portal. If content is "stale," "empty," or inaccurate, then users will abandon the portal as their source for information.

As mentioned in the Governance Model above, content publishing responsibilities should remain at the campus level. This will ensure that content reflects the uniqueness and individuality of the campus. In addition content publishing should be pushed out to the sources of the content, thereby distributing the workload and removing intermediaries from the process.

Niteo recommends that UMass examine, in parallel or as part of the portal initiative, the current mindset and approach to content management at each campus. Constituents at each campus, who are responsible for the campus web site, consistently mentioned this as a critical item. Some campuses, notably Dartmouth and Worcester, are farther along in tackling this issue.

3.2.3 Enterprise Standards

In the course of our investigation, we were surprised to discover the apparent lack of CTO or Enterprise Architect roles within the university. These roles do not appear to exist at either the system or campus levels. The result is a lack of common approaches, accepted internal standards, or adherence to industry standards.

Instead, individual application teams are empowered to solve specific tasks without guiding principles or direction. Further complicating matters is the fact that many applications are created by students who are no longer available to maintain the applications they created. This in turn has created an environment where applications are siloed and difficult to integrate.

Given that one of the primary purposes of a portal is to aggregate information, the ability to integrate other applications is critical. Moving forward, UMass would do well to agree upon and apply best practices and open standards to ensure consistency of design and implementation. The benefits of this approach include:

- Easier application integration
- The ability to share learnings across projects, teams, and campuses
- The potential to reuse services or applications across projects and campuses

Even outside of the portal context, an organizational recognition of enterprise application development philosophies, approaches, and standards can benefit UMass.

3.3 User Experience Considerations

The user experience on any web site is a key aspect of that site's effectiveness and success. Users of the site need to be able to locate and consume content on the site in an intuitive manner. Owners of the site need to communicate their message as well as a coherent brand and image.

In the context of a portal framework, where content aggregation is combined with the reuse of application services, a defined user experience (e.g. navigation, look and feel) should be planned from the beginning. This section highlights some of the items that should be taken into consideration as UMass moves forward with designing its portal.

3.3.1 General

3.3.1.1 Unified Look and Feel

Even though one of the main characteristics of a portal is to aggregate content from different sources and applications, the user should not feel as though they are using multiple disparate applications. Rather, the content and data from the different sources should be presented in a common manner with the same look and feel. In this way, users will have access to the information they need while the underlying mechanisms for storing and generating that information are hidden from them.

3.3.1.2 Branding

A unified experience does not mean that the portal cannot be branded appropriately for each campus, or even for a specific department or office. Indeed, the portal should and can allow for different color schemes, logos, and even fonts that reflect the appropriate context for the user. Campus specific branding in combination with campus driven content can convey the individuality of the different campuses, even via a shared portal framework.

3.3.1.3 Information Architecture

Portals tend to have fairly uniform approaches to content organization. Indeed some products such as uPortal more or less dictate the user experience such that universities that use that product will generally have the same look and feel to their portals. And while that level of uniformity may not be desired, it is fair to state that the types of content and functionality that would be offered within an UMass portal do not differ significantly across the campuses. Therefore, it would be possible to define a common information architecture (i.e. navigation and content organization) as part of the portal framework. Certainly there seems to be no reason for each campus to reinvent the wheel on this issue.

3.3.2 Adaptive experience

At minimum the portal user experience should adapt based upon the user and his or her role and personal attributes. For example, a student at the Lowell campus would log in to the portal and see branding, content, and functionality specific to the Lowell campus as well as his or her role as a student. This type of personalized experience is what the campus constituents expect, and it can be created regardless of whether the portal framework is run in a centralized model or locally at the campus.

However, a portal framework has the potential to provide a broader and richer user experience. A comprehensive portal framework that is capable of displaying both system and campus content can adapt the experience as the user navigates through the site. For example, if a user visits the UMass system site the portal could initially display more general information and system branding. However, if the user begins looking at a campus specific degree program, then the portal could display content and branding specific to that campus.

- Note that this example does not preclude a campus specific user from logging in directly to a campus branded version of the portal.
- Note that this example makes use of "anonymous" or "guest" access functionality that does not necessarily require a login. Guest access can be the default mode and make the portal site appear just like any other static web site.

Finally, it is worth noting that a portal could make use of implicit personalization. With this type of functionality, the portal tracks the user selections within the site and begins to display content or navigation items based on those selections. This type of functionality may be useful for prospective students. For example, if the user arrives on the portal home page and then navigates to information for prospective students, the portal could make some rules based assumptions and begin to display relevant information such as application deadlines, admissions policies, etc.

- Note that this example also uses guest access and the attributes assigned to the guest account will only last for the duration of that user's session on the site. To pick up where they left off, the user would need to create a profile within the portal. This could, however, be an interesting way to incent people to register and create an account within the site without the hurdle of requiring registration right from the beginning.
- Note as well that Admissions staff at most campuses expressed interest in the concept of a prospective student being registered via the application process and then being able to return and see admissions status as well as targeted recruiting information.

The following diagrams provide a schematic view of how a portal might adapt based on who the user is. Please note that these schematics are illustrative only and not intended to indicate actual information architecture or page layout.

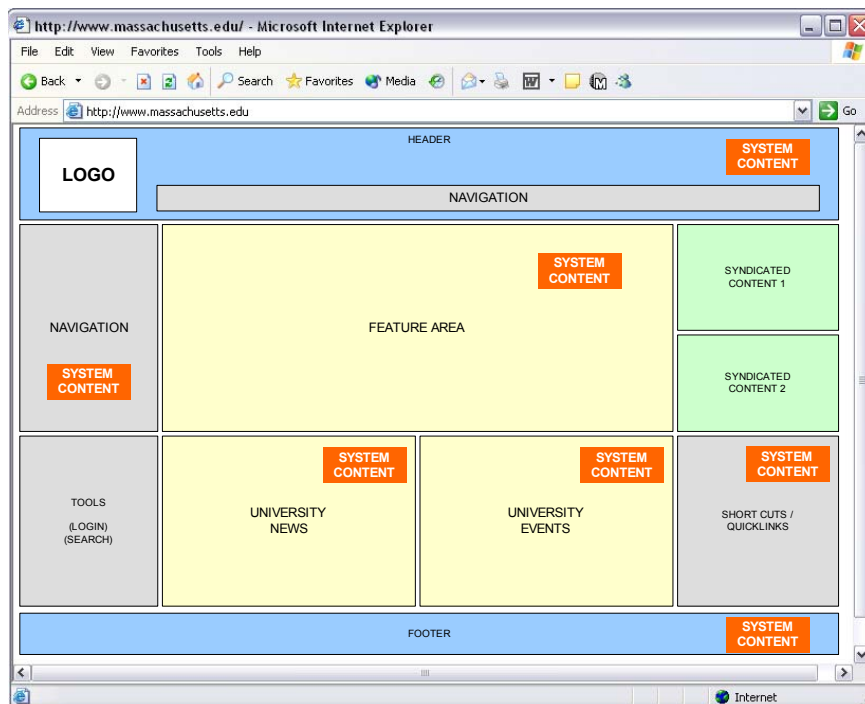


Figure: System Portal Page Schematic

The first figure, *System Portal Page Schematic*, presents the type of web page that a guest user might see. The branding and content is system oriented as the “System Content” tags within the content areas indicate. The second figure, *Campus Portal Page Schematic*, demonstrates how branding and content might change if a student logs in to the portal. In this case, most content areas display campus specific information and images.

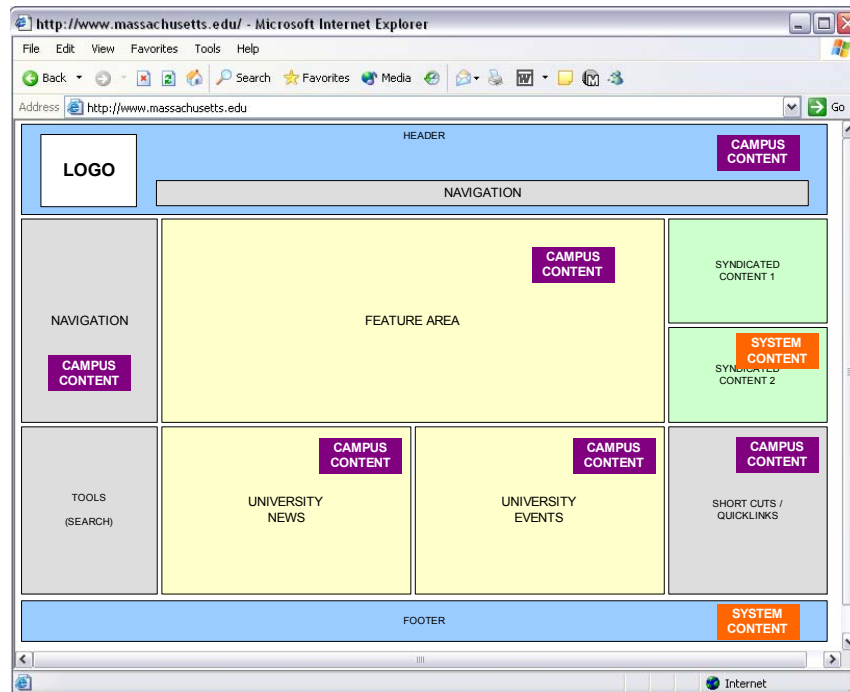


Figure: Campus Portal Page Schematic

3.3.3 University Web Presence

While not necessarily tied directly to the portal initiative, UMass should consider its strategy for its web presence and how users get directed to the system and campus web sites. For example, a search for “UMass” or “University of Massachusetts” on Google will always bring up the Amherst campus site first. The system web site is only search result forty-four when using “UMass” as the keyword. In addition, there is no consistency in URL naming across the UMass campuses and system:

- Amherst – <http://www.umass.edu>
- Boston – <http://www.umb.edu/>
- Dartmouth – <http://www.umassd.edu/>
- Lowell – <http://www.uml.edu/>
- Worcester – <http://www.umassmed.edu/>
- UMassOnline – <http://www.umassonline.net/>
- President’s Office – <http://www.massachusetts.edu/>

Primarily this is a philosophical issue that must be decided by the university leadership. However, in the course of this engagement's interview process some members of the university leadership expressed the desire for the portal to aid users in navigating through the UMass system. If this is an objective of the portal, then it is appropriate to tackle the larger web presence strategy in conjunction with the portal initiative, as it will affect the design of the portal user experience.

3.4 Dependencies

Given a portal's role as an aggregator of content and functionality from disparate applications and data sources, it logically follows that a portal will only be effective if the underlying supporting systems are robust. As UMass moves forward with its portal initiative, it will need to address three key areas of dependency: PeopleSoft integration, security, and content management.

3.4.1 PeopleSoft Integration

The scope of which applications to integrate into the portal can expand very rapidly, and depending on the variety of application technologies and standards so can the complexity. Regardless of the final scope, it is clear that access to PeopleSoft self-service functionality will be a critical element of the UMass portal framework. Even if the initial release of the portal primarily targets students, getting access to course registration, schedules, grades, transcripts, account balances, etc. will require that the underlying PeopleSoft Student implementation be complete and in production. Therefore, both project planning and technical architecture and design will need to account for the PeopleSoft implementation schedules and technology standards.

3.4.2 Security

A number of different elements comprise security in the context of a portal including policies, directory services, and application security.

3.4.2.1 Policy

As access to different applications is unified via the portal, the security policies for those applications will need to be reconciled. It is highly likely that the rules and guidelines for accessing data in one application differ from those for accessing data in a second application.

A consolidated security policy should be created for the portal. As applications, existing or new, are integrated into the portal, the consolidated portal policy should be updated to address the application(s) being added. Integration of any application into the portal will be dependent on this step.

Note that in some cases, additional development within the portal framework may be required to handle special requirements demanded by a given application.

3.4.2.2 Directory Services

As mentioned previously, two key functional elements of a portal are application integration and single sign-on. The resulting implication is that the portal will have to facilitate single sign-on in some form:

- Ideally, the portal would leverage directory services for authentication and authorization.
- Alternately, the portal will need to construct its own set of services or components to conceal the multiple system logins from the user.

Note that some campuses (at minimum Amherst and Worcester) have made the decision in the past to tie an enterprise portal to the existence of directory services. This approach, while ideal, may introduce a long delay in the realization of an enterprise portal, as directory services are a non-trivial exercise.

This dependency will need special attention as UMass moves forward with any portal initiative, as the scope and timing of portal development will be impacted by the scope and timing of directory services development. Therefore, it will be critical to coordinate and manage the inter-dependencies of the portal and directory initiatives. This includes:

- Technology standards to ensure smooth integration.
- Timing of development and system releases.
- Technical architecture and design to facilitate migration of functionality from portal to directory services and vice versa.

3.4.2.3 Application Security

At this time neither portal platform nor architecture has been determined for UMass, however when making technology decisions for a portal, including package selection and technical architecture and design, UMass must take appropriate steps to ensure the overall security of the application. These steps may vary depending on the technology in question but will certainly include examining security:

- For the network that the portal runs on and across.
- For the session between the portal client (e.g. web browser) and the portal server.
- Within the software platform running the portal.

These days many sophisticated web-based applications, including many portal solutions, are based on a Service Oriented Architecture (SOA) approach and incorporate Web Services technology. Applications using Web Services have some specific security considerations briefly noted here:

Web Services solutions leverage the core SOAP and WSDL specifications from the W3C that in turn define the basic elements of messages, aggregation of messages into services, message patterns, and how services can be described in terms of message patterns. However, these specifications do not describe how messages can be made appropriately secure or reliable.

Niteo has identified these gaps as key to adoption of Web Services in Partner and Customer interactions. No business will replace their current proprietary, but secure transmission mechanisms until they can be assured of secure and reliable communication. The core standards specifications that seek to address these challenges are XML Signature, XML Encryption, WS-Security, WS-Reliable Messaging, and WS-ReliableMessaging. (Note that the last two items are *different*, competing specifications.)

3.4.3 Content Management

As explained previously, content management processes and systems are essential to displaying accurate, up-to-date information on the portal. UMass should examine content creation and dissemination processes at each campus as well as at the system level. While a more sophisticated automated system may ultimately provide the most efficient approach to content management, the portal will at minimum require manual processes that ensure that the different content owners are maintaining their content and are able to publish it on the portal in a timely manner.

3.5 Implementation Considerations

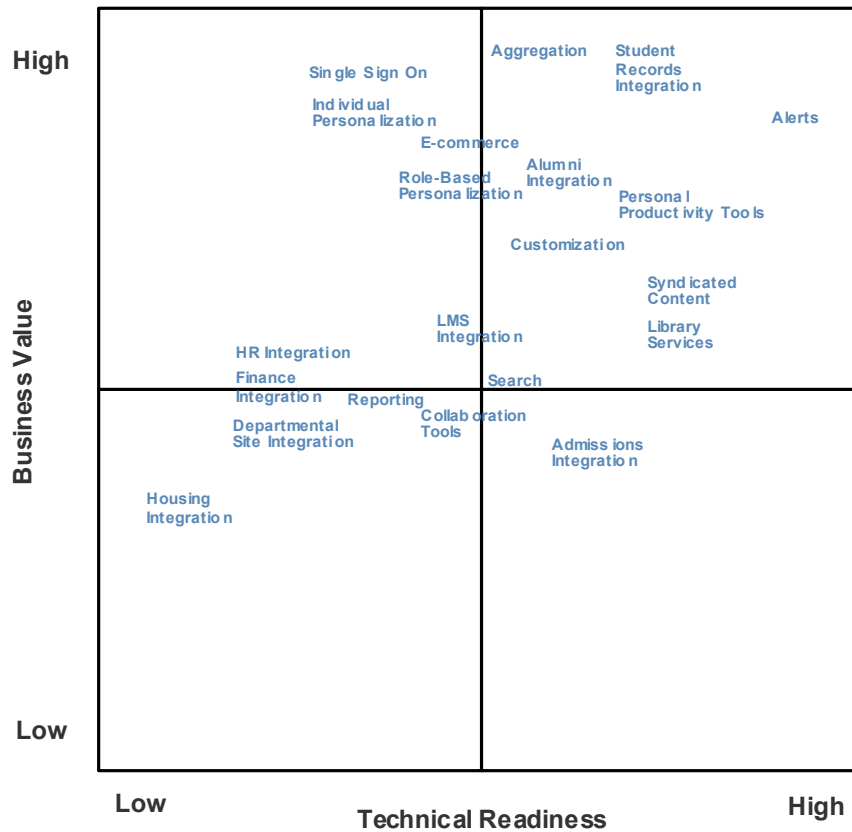
3.5.1 Scope

As has been mentioned in the *Best Practices Analysis*, an iterative approach that evolves and extends the portal over time is vital. Trying to do too much in any given release can add significant risk, as it increases the complexity of the system development and can add unnecessary delays to the rollout. When determining the scope for any given release it is important to examine:

- What core services and items are required by the portal framework.
- What business services are desired by the users.
- The technical readiness, or capability, for implementing the services.
- The organizational readiness to support and utilize the services.

The core items for any portal are fairly standard. They include an underlying security infrastructure to handle directory services and single or facilitated sign on, content management, and user experience (visual design) standards. They also include application architecture and design standards (addressed immediately below in *Portal Architecture*).

The scope of this engagement, via the Current State Assessment activities, provided us with a good understanding of the business services desired by university constituents as well as the technology landscape and readiness to support those services. The chart on the following page plots key portal functional areas by business value and technical readiness. The items that appear in the upper right quadrant provide high business value and UMass already has technology in-place or in-progress to support those items. They are good candidates for inclusion in the first release or two of the portal.



Business Value and Ease of Implementation

While some data was gathered on the aspect of organizational readiness, detailed organizational analysis was not part of the scope of this engagement. Therefore, Niteo has not plotted the functional items against organizational readiness. Although we could make a judgment call in this area, this document includes a number of considerations that will impact organizational readiness. As UMass moves forward and makes decisions regarding its governance and implementation model(s) for the portal, organizational readiness can be evaluated with greater clarity.

3.5.2 Portal Architecture

As UMass moves forward with its portal framework, one of the next steps will be to create the portal’s technical architecture. Given its role as an aggregator of data and functionality, a portal requires integration with a number of supporting back-end applications and data. Unfortunately such integration can be complex, and the ability to get away from proprietary integration approaches is critical. Therefore, Niteo recommends that UMass “future proof” its portal framework by adopting current and emerging standards. By architecting the portal solution with appropriate standards, UMass will minimize its dependence on proprietary software solutions and maximize the flexibility of its system for future integration and evolution.

Key standards and approaches that should be examined for the UMass portal framework include:

- Java Specification Request 168 (JSR 168)

JSR 168 is a specification developed in the Java Community Process (JCP). It defines a Java-based Portlet API that extends the existing J2EE Servlet concept in wide use today. The key benefit of the portlet standard is that it allows the creation of transportable portlets as well as interoperability of portlet code. JSR 168 portlets should be able to be deployed on multiple Portal products without change.

- Web Services for Remote Portlets (WSRP)

WSRP is a standards-based approach to integrating content and applications into portals. WSRP instances are user facing, interactive web services that include presentation, not just data. WSRP should allow for plug and play administration, simpler integration strategies, and eliminate the need for custom local presentation code.

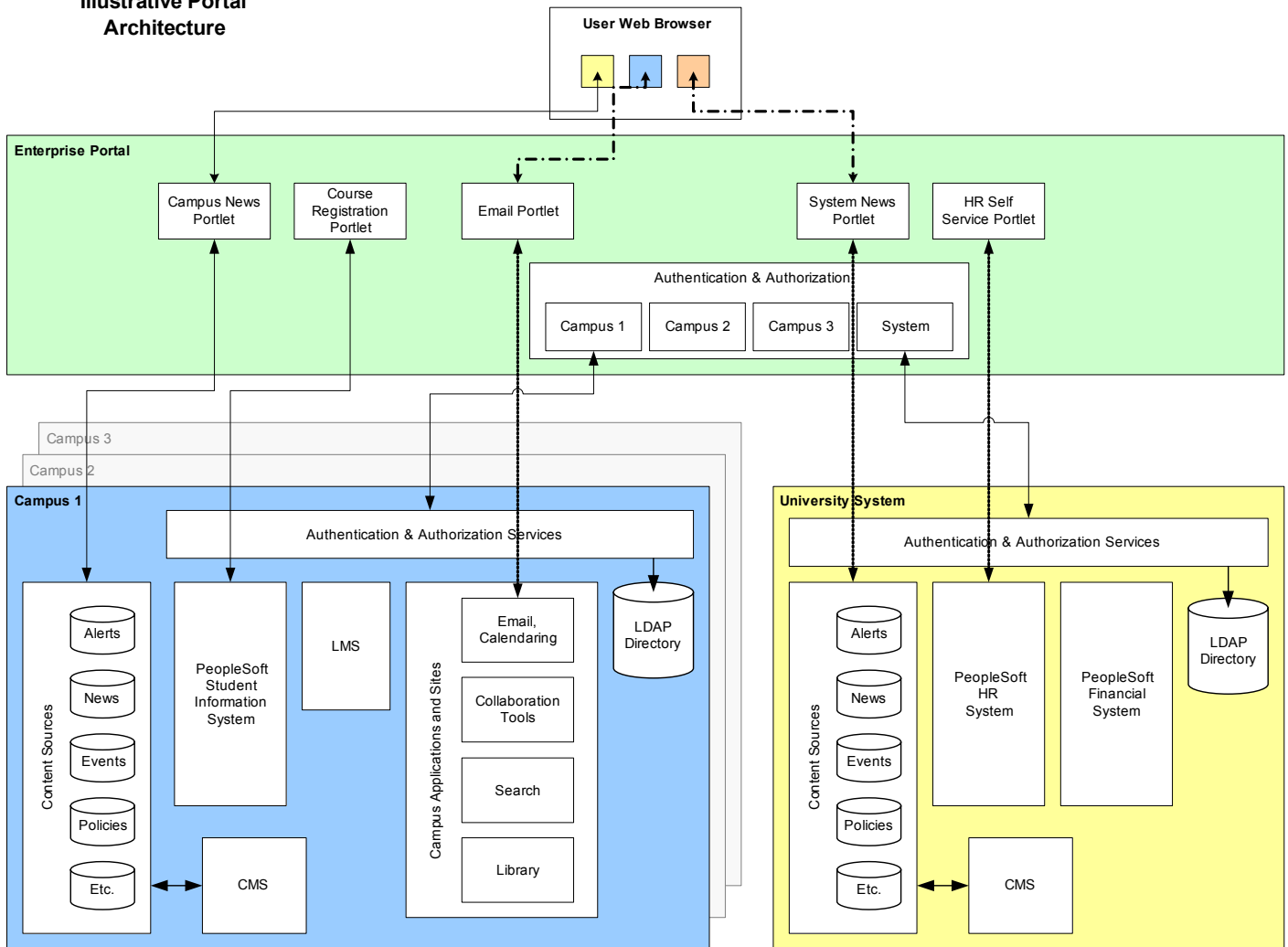
- Services Oriented Architecture (SOA)

SOA based applications have become the standard approach for designing enterprise applications. Service based IT architectures provide the opportunity for greater reuse and ROI as well as integrating traditional “silo” applications. Niteo views portals as the largest natural consumer of services in an enterprise as they are the aggregators of data and transactions for both internal and external users.

Historically application integration has occurred via proprietary dialects and legacy EDI formats. Presently XML and Web Services are allowing SOA-based systems to move from proprietary integration and messaging technologies to open standards. The major software vendors (e.g. Microsoft, IBM, and Sun) have adopted SOAP as the key application integration standard protocol creating a strong case for using SOAP-based services as an alternative to the proprietary integration approaches currently in place.

The diagram on the following page provides a high level illustration of how a portal architecture might be designed. Note that the diagram contents are illustrative and not intended to constitute a final UMass portal architecture.

Illustrative Portal Architecture



Logical Enterprise Portal Architecture

3.5.3 Technology Evaluation

In conjunction with defining the portal architecture, UMass should define a short list of portal vendors to evaluate. Niteo recommends that the short list include vendors that have a recognized leading, enterprise class portal product that has the potential to fit within the existing UMass technology landscape.

Niteo recognizes that PeopleSoft and the PeopleSoft Portal product will be an element of any UMass portal framework. Still, it is unclear whether PeopleSoft Portal is ready to be an enterprise portal platform. It is good news; however, that PeopleSoft has announced support for both JSR 168 (in Tools 8.44) and WSRP (late 2004 or 2005).

We believe that UMass would do well to also consider portal offerings from leading infrastructure vendors such as BEA and IBM as well as education focused vendors such as SCT. UMass may also want to consider the open source portal framework, uPortal, from the Java Architectures Special Interest Group (JA-SIG). It is interesting to note that the SCT Luminis product incorporates the uPortal framework.

3.5.4 Implementation Models

As previously noted, UMass is faced with competing ideas on how to realize a portal framework, and no one solution can satisfy this continuum of approaches and constraints. Yet, Niteo believes that a common, shared portal framework presents the most effective avenue for achieving a portal at UMass. Furthermore, it makes sense that the implementation model would mirror the governance approach and be an extension of that model. Following is an overview of the shared implementation model as well as a decentralized, standards-based model.

3.5.4.1 Common, Shared Framework

This model seeks to maximize reuse and standardization across the entire UMass system by utilizing a common, centralized approach to creating the portal framework. Attributes of this approach include:

- An enterprise portal
 - A single portal implementation that can be used by the entire university system.
 - Implied here is a single software platform.
 - As such the portal architecture needs to be “open” and capable of integrating the various university content and data sources.
 - The portal needs to be built using upon standards including integration interfaces and data formats.
 - The portal will make use of shared portal services.
 - Different types of functionality are delivered as services and are available then for all campuses.
- Enterprise licensing
 - Both portal software and supporting system software licenses are purchased for use across the entire UMass system.
- Shared hosting infrastructure
 - A single hosting solution for the enterprise portal.
- Campus specific content management
 - Individual campuses still own the creation and publishing processes for their content including news, branding elements, announcements, events, etc.
- Shared learnings
 - The common approach will allow each campus to gain experience with the same set of technology. Discussions on the portal between campuses will therefore include significant common ground and facilitate sharing of experience and lessons learned on the various aspects of the portal such as content management, user acceptance, etc.

This model will allow UMass to build one specialized team that can provide development, maintenance, and support capabilities in a single, cost effective manner. The model avoids duplication of effort and allows a more robust offering to be created at less cost than creating five separate, but identical, campus specific frameworks. It is important to note that the shared approach does not preclude the reuse of existing campus specific web assets.

3.5.4.2 Decentralized, Standards-Based Framework

This model seeks to maximize standardization across UMass portals but decentralizes the implementation and ownership of the portals to the individual campuses. Attributes of this approach include:

- An enterprise portal **standard**
 - The portal architecture is designed using standards including integration interfaces and data formats that will be followed by all campuses.
 - A single software platform is chosen for all new UMass portals.

- Enterprise licensing
 - Because the portal and design is standard across the university system, portal software licenses can be purchased for use across the entire UMass system.
- Campus specific implementations
 - Each campus is responsible for implementing its own portal.
 - Related, each campus is responsible for the hosting and maintenance of that portal.
- Campus specific content management
- Shared learnings
 - The common portal standard will still provide a good deal of common ground such that the campuses can share their experiences and lessons learned with each other.
 - Related, because of the common technology standard, functionality that is built for one campus portal may be able to be reused by another campus with minor modification.

This model permits the campuses to maintain control but results in duplicate costs and effort and the need for significantly more resources. Indeed, with this model each campus must create its own portal team with the necessary specialized skill sets for development as well as ongoing support and maintenance. The likely result will be a disparity of offerings across the campuses at a cost greater than a robust, shared offering. Certainly redundant costs will occur as the framework and services are built multiple times.