



Business Challenges and Innovative Application of Technology in Higher Education

Student Services System – Next Generation

Transforming and modernizing the administration of your institution and taking costs out of the system

Abstract

Another inflection point has been reached in the evolution of student systems. A combination of factors, such as open standards, open-source application software and extended services powered by Internet technologies, is shaping the next generation of application systems.

The next generation student system will be centered on services. It will be open-source and based on an open architecture that will facilitate the quick and easy addition of improved functionality within applications. Standards-based integration middleware will provide secure, seamless connectivity with extended and disparate resources and services in the creation of innovative, student-focused business processes.

Colleges and universities planning to replace or upgrade their student system should cast an eye toward the future while looking for answers to questions such as, Should we continue to follow a single-vendor, ERP strategy? Will the consolidation of application software providers be beneficial or more costly in the long run? Should we investigate open-source alternatives for major business applications?

This paper is designed to provide institutional decision-makers with an insight into the next generation student system – a *services* system -- that promises to reduce costs and provide agility, flexibility and vendor independence.

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Executive White Paper Series

Executive White Papers provide valuable insights into the innovative application of technology to solve business problems that are confronting colleges and universities. The papers should serve as a helpful resource to aid Chief Financial Officers (CFOs) and Chief Executive Officers (CEOs) in discussions with institutional Chief Information Officers (CIOs) in the exploration of new methods and processes for reducing administrative costs.



Business Challenges and Innovative Application of Technology in Higher Education



*Student Services is
the next generation*

*Development will
follow the community
source mode*

*Student Services Bus
will turn the SIS into a
Student Services
System*

*Student Services will
support seamless
integration and
remove boundaries*

*Community will shape
the ecosystem*

*Cost of participation is
low and risks minimal*

Executive Summary

The name, Student Services System, reflects the evolution from a *records* system to an *information* system to a system designed around the *services*. The Student Services System will be made up of two major components: first, a Student Information System (SIS) with a complete set of integrated business modules (e.g., Admissions, Student Accounts, etc.) and, second, integration middleware, which we are proposing be referred to as the Student Services Bus (SSB).

The fully functional Student Information System will be built on an open, modern architecture -- e.g., open standards, platform independence, Web-based, Java with J2EE -- and will be freely available as open-source code. The SIS base code will be seeded by a commercial software house, an institution, or both. Development will follow the successful community source model for obtaining funding, creating a governance structure and providing date-driven project management.

The Student Services Bus will be a standards-based enterprise services bus customized for higher education. The SSB will utilize open standards and leverage the extended capabilities of the Internet to interconnect the SIS with disparate applications and student-related services, internally and externally.

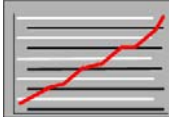
The Student Information System in combination with the Student Services Bus will provide a platform for integrating new services with core functions. The open integration design will free institutions to think and act beyond the boundaries of traditional student systems and beyond the notion that all functionality must be delivered by one provider.

An open-source student system needs both a viable business model and an active developer community. The community will act as an ecosystem, developing mechanisms for pooling resources from like-minded institutions, service and support companies, standards groups and partners that share a vision of the next generation student system.

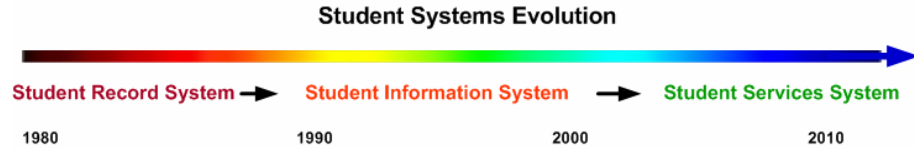
An open-source Student Services System community is now forming. The cost of entry and the risks in participating will be minimal. But the benefits may be significant. The Student Services System has the potential to solve the "integration issue" and to provide the flexibility, vendor-independence and cost reductions that colleges and universities are seeking.



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Vision -- Student Services System



First Generation Student Records

First generation student systems were “record” systems designed to support back-office functions. In order to ease the issues of data integration, institutions sought a shared, common data model and purchased integrated software suites from a single provider.

Second Generation Student Information

By the mid-1990s, colleges and universities started implementing enterprise resource planning (ERP) solutions to improve business processes, share information across the institution and solve the Y2K problem. They also started exploiting the features of the Internet and the Web as a foundation for new student “information” systems that gave students and faculty self-service access to online information and personal transactions.

Third Generation Student Services

The next generation student system also uses the basic principles of a common data model, self-service access and integrated information sharing. However, the next system will be defined with a service-oriented architecture (SOA) that includes a standards-based integration platform for interoperability. Institutions will be able to respond quickly to new business opportunities made possible by the new availability of extended “services” within the institution and externally via the Internet.

Service-Oriented Architecture – Universal Strategy

All the major applications-software providers have adopted SOA as a strategic direction -- e.g., Oracle with Project Fusion. This design transition reflects the providers’ recognition of the fact that, increasingly, not all functionality will be provided within the confines of the core student system. With all functions treated as services, colleges and universities can integrate with resources beyond the campus and find opportunities to create cooperative business processes that extend their supply chain.

Future – student- centric applications and extended services

Beyond improving business efficiency, the next generation student systems will focus on the student as the center of the learning experience. Today’s personalization and aggregation of information by means of by portals and electronic student portfolios is the first stage in creating student-centric business processes that will exploit an extended set of services.



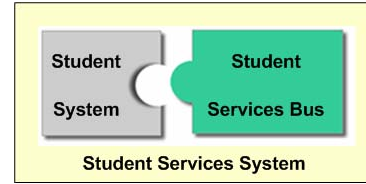
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SIS + SSB = SSS

Student Services System

The Student Services System has two major components. The first is a Student Information System (SIS) with a complete set of business modules. The SIS becomes a Student Services System with the attachment of integration middleware, referred to as a Student Services Bus (SSB).

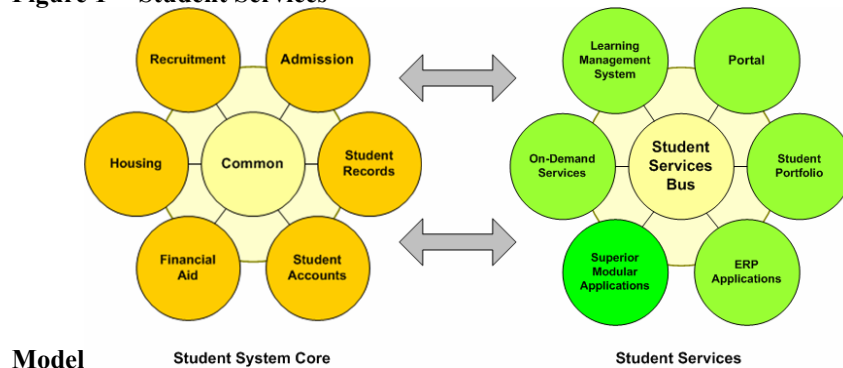


The core student system could be an institution's existing legacy SIS (packaged or home-grown), an ERP solution, or an open-source student system. The SIS application modules are designed in a traditional manner around a common data model and provide basic functionality in an integrated manner within the application suite.

Functional services will reside on and off campus

In the future, not all student-related functions will be managed within a single SIS, and not all functional services will reside within the same computing environment -- or even remain resident on campus computers. Instead, the new student services model will support functionality in the most appropriate and cost-effective manner.

Figure 1 -- Student Services



Customers will receive customized, superior functionality and value

Figure 1 illustrates the core student system's integration with externally based services. For example, of the need to integrate the Student Records module with scholarly applications, such as Learning Management, may be more urgent than the need to integrate with business sub-systems, such as Housing. It is also reasonable to expect that modules, such as Housing, will be provided as external "superior applications" and seamless integration with the core student system accomplished via the Student Services Bus.



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I want to be able to select the best course registration system knowing it will work with my current student system
Rita Owens

Extended Services – Wave of the Future

Widely used applications such as Google, eBay and Amazon are all available as services that reside out on the network. Users select these services because of convenience, superior business functionality and a compelling value proposition.

Today, specialty companies are developing superior, highly focused applications as services delivered on the Internet. A *services* platform allows choice -- “best-of-breed” functionality can be obtained from many sources and at an optimal cost point. To functional customers, such as Rita Owens, Associate Academic Vice President for Technology at Boston College, that means, “I want to be able to select the best course registration system knowing it will work with my current student system.”

Figure 2 -- Extended Services Model

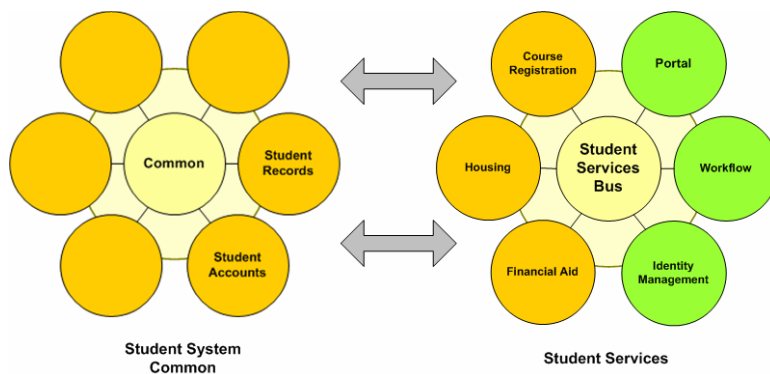


Figure 2 depicts externally hosted services and functions working cooperatively with the core student modules. It also conveys the concept of a base Student Services System, one composed of a common database model, an open architecture, and the limited core tied to the SSB. This base would allow colleges and universities to begin to overcome integration issues that have been holding back adoption of a distributed approach.

Today's extended enterprise needs a fundamentally different technology approach which facilitates customization as well as seamless integration with third-party solutions.
Dave Duffield

We are approaching an important inflection point. We are entering an era that will be characterized by distributed execution of functionality as a means of achieving cost-effective and efficient results. Dave Duffield, founder and past chairman of PeopleSoft, recently validated this view by stating, “Today’s extended enterprise needs a fundamentally different technology approach which facilitates customization as well as seamless integration with third-party solutions.”



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Open-source Application Software

Student Software Application Evolution



*Open architecture,
open standards, open
source --- future of
application software*

To remain viable, ERP vendors are going to have to “open” their applications; adopt an open standards-based development platform, such as Java; migrate away from proprietary development tools and languages, and build applications on SOA architecture. However, vendors have an investment in existing proprietary software and are likely to focus in the near-term on middleware (e.g., Oracle’s Project Fusion) to support integration. The question for clients then becomes, “When will the ERP vendors address the standardization of application software code and at what price to the installed base?”

*Decision time – ERP
or open source?*

Many colleges and universities don’t know what do about replacing their current student system. Institutions have deferred the issue because their existing system works and/or a new system cannot be cost-justified.

For many, the solution will be to stick with a single ERP vendor. Others will contract with a hosting service to reduce the cost and burden of software upgrades. Then there are others, such as the authors, who share a conviction that open standards are hastening the trend toward creation of production-quality, open-source applications.

*Are the restrictions
and costs of ERP
solution still
acceptable?*

Higher education institutions are starting to question continued reliance on a single ERP vendor. The major reasons are the following:

1. Perceived high implementation costs
2. Student systems are not a core competency of the provider
3. A desire to escape dependence on a single vendor
4. The promise of open-source applications.

Initially, the next generation Student Services System may not compete for market share with established ERP vendors. However, the existence of the option will put additional pressure on ERP vendors to address issues such as licensing agreements, mandated upgrade cycles, support costs and their systems’ inability to accommodate the offerings of an extended network of third-party service providers.



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*SWaS – shift to
software-as-a-service
business model*

Student Services System – Extended Vision

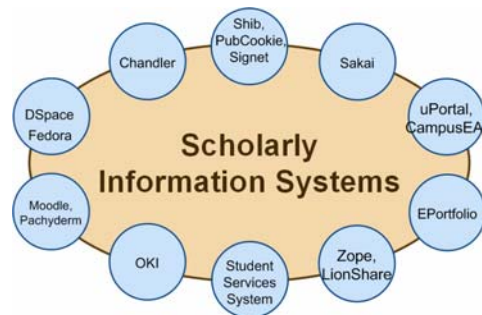
The new open-source Student Services System will allow institutions to think and act differently; to break out from the limitations imposed by rigid system architectures. Everything should be up for grabs – how business models are designed, how new applications are cobbled together, and how new functionality is created and implemented.

The development from scratch of open-source enterprise applications, such as a Student Services System, will be difficult to accomplish due to the complexity of the software. However, we will see application software being donated as open-source code by institutions and smaller commercial software providers. These entities recognize that the best way to compete in this era of consolidation and market domination is to contribute code to an open-source community and shift their business model to software-as-a-service (SWaS).

With a SWaS business model, software providers will sell an annual subscription service to support an open-source application. The software will be free, and institutions will be able to purchase support from an array of service providers. The advantage for the donor of the open-source software will be familiarity with the code and continued involvement in product development within the community.

*Building unique
applications with
open-source
components*

Institutions will be able to take component pieces and build their own special systems. At Educause 2004 Dave Lambert, VP, University Information Services, and CIO of Georgetown University, provided his vision of a scholarly system, of which the Student Services System would be a component along with a whole series of open-source applications being developed by the Higher Education community.



*Everything needs to
happen quickly*

The open, standards-based architecture and integration platform should encourage the creation of both commercial and open-source applications modules with well-defined interfaces. Instead of worrying about the entire system, open-source developers at institutions and commercial companies should be able to respond to new requirements quickly, and be able to create and test smaller, specialized modules quickly.



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Building a Student Services System Community

The proposed Student Services System addresses the issues of cost reductions and the provision of modern application integration architecture. But before a group of institutions can begin to consider the creation of an open-source, student system alternative, an active open-source community needs to form.

It is going to happen!
Carl Jacobson

The first step has been taken; a representative group of colleges and universities met at Educause 2005 in Orlando. The first comment at the meeting was by Carl Jacobson from the University of Delaware, "It is going to happen!" The other 40 or so attendees agreed.

*Shared vision of best
of breed capabilities*

These institutions share a vision and interest – a student system that will replace the current system with "best of breed" capabilities, will leverage the combined resources of a community of institutions, and will be based on open-source, free software.

*Community is equally
important as code*

But we have learned a valuable lesson from prior open-source initiatives such as uPortal and Sakai: "Community" is as important as code, and the community must extend beyond the technical contributions of a group of dedicated and talented developers. An active open-source community will not sprout up over night; rather it will gain members and capabilities as an ecosystem evolves around the project.

*Two Major Issues:
Leadership and
Code Evaluation*

Very soon the Student Services System project is going to have to collectively deal with issues such as organization, leadership, funding, sponsorship, pooling of resources, role of commercial service companies, determination of standards, involvement of trading partners, open-source licensing model and so on. The first two major issues that must be addressed are formation of a leadership team and the evaluation of potential code contributions.

*Code contributors
have stepped forward*

Starting with existing code is the easiest and best way to jumpstart the project and to shorten the time to reality. In the two weeks following the initial meeting in October 2005 in Orlando, two commercial software providers and two institutions have come forward offering their Java code for the base system. Other institutions have offered to contribute modules.

*Project to follow
community source
model*

The project leadership and direction will come from institutions, not commercial partners, and funding should follow the community source model. That means a significant contribution of personnel and financial resources will come from a small core group of institutions with a larger group of schools making smaller financial contributions.



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Student Services System Partner Network

With the open architecture and open integration capabilities provided by the Student Services System, increasingly functional components and extended services will be provided by a partner network. As requirements for new services arise, both institutions and partners will have a mutual interest in avoiding sinking more resources and costs into proprietary code to achieve interoperability.

Third-party commercial partners will be key players

New beneficial partnership arrangements will develop with third-parties that produce and support superior, functional capabilities for the Higher Education market. Instead of depending on one, large, application vendor to solve the integration issues that preclude additional functionality, institutions will find new opportunities for orchestrating the business process with a variety of third parties.

New breed of intermediary service brokers will emerge

Intermediary service brokers will probably emerge to act as a conduit for certifying services, managing service level agreements, enforcing and managing service deliveries and ensuring compliance with trust requirements between parties. They may charge on a "per drink" basis or with an annual license, and will negotiate with suppliers out on the supply chain.

For example, today many institutions have already outsourced portions of their student billing systems. Students and parents can query student accounts and make payments using their preferred method. The billing agency in turn synchronizes information with the core student system, handles the interaction with the banking system and provides customer support.

The modularity of design facilitates easy substitution of functions

The Student Services System architecture addresses extended integration requirements directly. Design modularity allows colleges and universities to select from a number of providers without being constrained by proprietary requirements. Thus, one provider can be substituted for another rather easily.

Today, when we buy something over the Web we are often provided a functional service for tracking delivery of the product. The tracking service is offered on the merchant's Web site but is performed elsewhere by a third-party. In the same fashion, an externally sourced service could appear within an application of a particular institution.

Partners can create superior, customizable modules

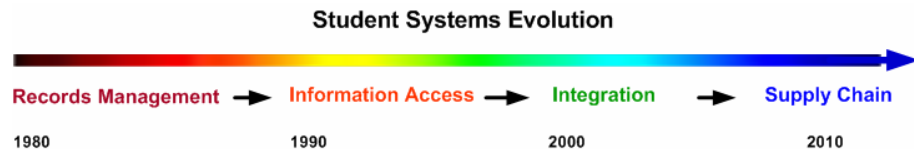
In other words, partners, including open-source community members, can create superior, customizable modules that are designed as "services" to be plugged into the open, standards-based application framework.



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Vision -- Student Services Office Business Model



*Internet and Web
have redefined
student service
requirements and
expectations*

During the mid-1990s the emergence of high-speed networking, the Internet and the Web altered the nature and composition of student systems as institutions opened their applications to allow self-service access by students in a unified manner.

*Student services as
functions, not a set of
physical offices*

This led to the adoption of the “student services” business model – access to all student-related functions in one location and online through a single lens – the student portal. As result, customers (e.g., students, parents, applicants) have come to view student functions as a cohesive set of services, not as physical offices.

*The student system is
our face. It has to be
great!*
Candy Fleming

As institutional planners begin discussing the next generation of student systems, there is an important thing to keep in mind -- no system has a greater impact on the day-to-day activities and operations of the campus than the student system. As Candy Fleming, CIO at Columbia University, stated, “The student system is our face. It has to be great!”

*Customization and
uniqueness must be
supported*

Institutions will not be forced to abandon existing software customization, which is often the case with the implementation of proprietary application suites. Instead, efforts will focus on supporting better business processes. It will include major processes that are common to all institutions, but also processes that are unique to special subsets across many institutions. For example, nursing schools may have a requirement that will never find its way into a core student system but could be delivered as an external service.

The new student services organization will need to discard the 80/20 rule – i.e., it only takes 20 percent of the effort and cost to provide high-level service for 80 percent of the issues. The big payoff comes in conceiving how to efficiently serve the remaining 20 percent, referred to as “long tail.” Figuring out how to serve the tail is the next big area of opportunity for the Student Services organization.

*Satisfying the long tail
is the next big area of
opportunity for the
Student Services
organization*

As the student *information* system disappears in favor of a student *services* system, the management of the student services organization must be ready to seize new opportunities and to provide the leadership to continually reshape the support organization to a dynamically evolving set of delivery mechanisms.



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New Student System Considerations

In establishing requirements for selection of a new student system or designing a Student Services System, it is insufficient merely to list system capabilities against a set of existing business practices. The following are some factors that need to be considered.

Cost of Integration

Proprietary integration methods by software vendors have resulted in expensive maintenance costs that are borne by the institution, making the reduction in the cost of integration a top priority.

Departmental purchase of solutions

Departments want to be able to select solutions that best meet their functional needs but also are able to interoperate with other applications within a secure integration platform.

Growth and cost of internal application support

As new services and new business practices are deployed, appropriate support levels must be maintained while lessening the burden on the existing technical staff and reducing overall costs.

Speed of adding business functionality

The pace at which business requirements change is dictating that there must be quicker, simpler, more efficient, and less expensive ways to continuously add new functionality to systems.

Danger associated with vendor lock-in

As software providers consolidate and the number of options shrinks, the dangers associated with vendor lock-in, namely control over price and functionality, need to be an institutional planning priority.

7 x 24 availability

Students and their parents increasingly need to be able to interact with student services from anywhere and at anytime, around the clock and on weekends.

Commercial Sector Best Practices

System architecture must accommodate functionality and cost reduction techniques that have proven effective in other industries.

Customization and the Long Tail

The system must be customizable and able to accommodate every process that has a small user base and institutions of every size, down to K-12 schools and small colleges in developing countries.



Business Challenges and Innovative Application of Technology in Higher Education

*Have a vision, be
demanding.*
Colin Powell

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IBM's Vision of Student Services System

Together, open source, open standards and open architecture form what IBM calls an "open approach" -- a powerful combination for the creation of the next generation of applications. It is IBM's vision that the next generation of *services* applications, such as the Student Services System, will redefine the application software industry.

Adopting an open approach is an important strategic step if colleges and universities hope to gain independence from software vendors and do a better job of managing software costs. With an open framework, colleges and universities will be on an open path toward attaining the flexibility and interoperability they are seeking.

New applications will focus on serving consumer needs (e.g., students), not simply improving institutional business processes. Institutional customers want the ability to control their own destiny and to reduce costs but they also want to be able to employ the best mix of software, open or proprietary, to transform business and learning processes.

Most importantly, they want everything to fit together and work together easily. Open integration standards will make it much easier for small, specialty service providers to participate, and new services will be adopted piecemeal within operating units rather than as a top-down sale.

The Student Services System will allow colleges and universities to adopt a *services* model at their own pace. Real productivity and cost gains will occur with the maturation of process standards and common definitions that will allow interoperability to extend beyond the institution to the end of the value chain.

The Student Services System embodies the technology and business paradigm for the next generation of applications – i.e., open-source and open integration to allow functionality to be added quickly and new business processes with extended services to be created.

IBM believes in open-source business applications and is actively participating in the Open Source Student Services System project.