

Building MnSCU's Capacity for Innovation and Excellence in Enterprise IT Services

**Final Report on the Enterprise IT Investment Strategy Project
Conducted for the Minnesota State Colleges and Universities**

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A separate Insight report, *Enterprise and Campus IT Investment Survey of Selected Higher Education Systems*, is also available from MnSCU's Office of the Chancellor.

Building MnSCU's Capacity for Innovation and Excellence in Enterprise IT Services

Executive Summary

The Strategic Imperative of Continued Innovation

After eight years of intensive innovation and technical engineering, MnSCU's Information Technology Services Division (ITS) now operates and maintains a highly sophisticated and complex "enterprise IT infrastructure" that is used daily by well over 400,000 students, faculty, administrators, and others throughout the state. While the current enterprise-level IT systems provide important benefits to institutions and to centralized administrative functions, they are only a beginning, a foundation for on-going innovation to better harness the power of information technologies in support of System Strategic Plan goals.

Recognizing the instrumental role of technology in educational delivery and administrative operations, MnSCU's executive leadership has established some broad IT service objectives for the near future, including a "seamless" student experience in online interactions with their institution(s), continued rapid growth in e-learning and other technology-mediated educational services throughout the System, and reliable access by all MnSCU campuses to the benefits of emerging technologies such as wireless communication. ITS is making incremental progress in pursuit of these objectives, but much more work is needed if enterprise systems are to provide maximal support for the System's response to competitive challenges and strategic opportunities. A faster pace of innovation is required in order to meet the business requirements and competitive realities of the 21st century, dramatically improving both educational outcomes and administrative efficiency.

Growing Operational Needs Displace Innovation

However, ITS is not presently funded at a level that allows it to sustain the level of innovation that produced the current generation of enterprise systems. ITS's annual budget has held steady at around \$20 million over the last several years despite a rapid increase in the scale and complexity of the enterprise IT environment. The job of operating and maintaining this burgeoning infrastructure has grown so great that more than 90% of the Division's steady-state budget is now consumed by that challenge alone, leaving only a very limited capacity for continued strategic innovation toward next-generation systems.

Moreover, at the present funding level, ITS's quality of daily operational service to campus and OOC system users is itself inadequate – and declining. The Division has been unable to add operations and user support staff as its scope of services expands, and it also lacks the funding required to upgrade the technical infrastructure quickly enough to keep pace with growing capacity demands and inevitable hardware obsolescence.

The Consequences of Under-Funding

Chronic under-funding of the enterprise IT function is costly to MnSCU in several ways, and the costs will continue to grow if no action is taken.

The consequences of an unstable operating environment for current services include, for example:

- Costly campus business interruptions, some lengthy, due to server failure or unacceptable response time. Some campuses have already experienced the havoc caused by a lengthy disruption of their ISRS access at the height of student registration. Others are likely to experience such a costly debacle in the future, until ITS has the resources to upgrade obsolescent hardware, implement “fail-over” backup servers, and increase the depth of its operations staff.
- Institutional image erosion due to student frustration with off-hours outages in online administrative or learning services which they expect to be available 24/7/365.
- Data security risk exposure, including legal liability for theft or illegal disclosure of personal identity information; potential malicious or inadvertent destruction of data; unauthorized access to business-sensitive data.
- Lower staff productivity due to inadequate training and documentation and long delays in obtaining help desk assistance. Degradation of data integrity due to improper data entry, leading to ill-founded administrative and executive decisions.

The slow rate of innovation also has major strategic and economic consequences, including:

- Foregone increases in the efficiency and effectiveness of campus and central administration.
- Foregone improvements in recruiting, retention, on-time graduation, and career placement.
- Reduced competitive appeal to the fast-growing number of students and faculty who expect high utility and convenience in online interactions
- Slow progress toward making MnSCU a well-integrated, *collective* higher education resource for the people of Minnesota.

Taken in sum, the magnitude of these actual and potential costs suggests that failure to fund enterprise IT appropriately is a false economy for MnSCU institutions and the State of Minnesota.

Other Higher Ed Organizations Invest Significantly More in Enterprise IT

A recent industry survey by Gartner, Inc. revealed that, on average, higher education institutions devoted “between 4% and 5%” of their total annual budget to enterprise-level IT operations in 2004. In contrast, ITS’s FY2005 budget of \$17.7 million was just 1.3% of the System’s overall budget of \$1.4 billion.

Insight Solutions Group surveyed four state higher ed systems to obtain IT spending information on enterprises that are similar in some respects to MnSCU: the University of Minnesota and the state-funded systems of Wisconsin, Pennsylvania, and Missouri. MnSCU’s FY2005 expenditure of \$47 per student on enterprise-level IT services was by far the lowest among these organizations. The next-lowest among those surveyed, the Pennsylvania State System of Higher Education, spends more than twice that much per student.

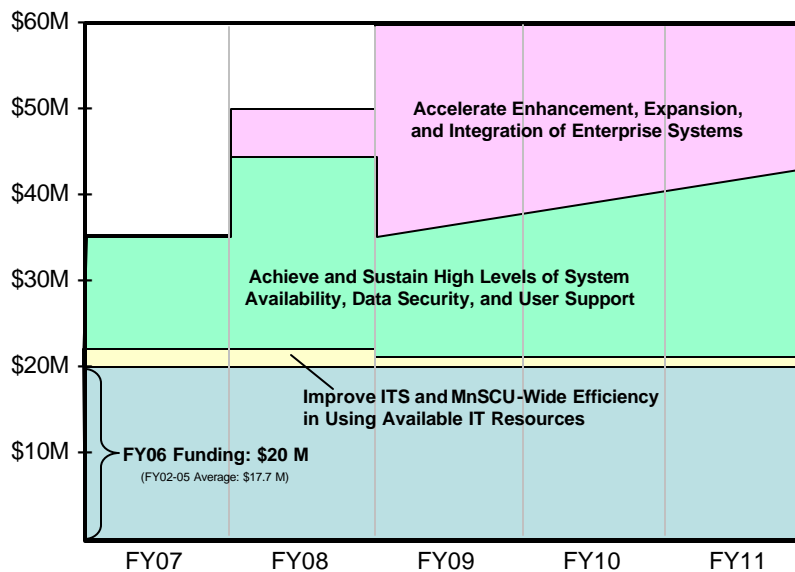
Investing in the Capacity for Excellence in Innovation and Operations

Figure ES-1 presents a recommended capacity building program to achieve ITS excellence in both innovation *and* stable operational service to current users. The program entails increasing annual budget from the present \$20 million to \$60 million within three years. An annual investment of \$60 million would equate to 4.3% of a \$1.4 billion operating budget, bringing the System within Gartner’s benchmark range for higher education investment in enterprise-level IT: “4% to 5%” of total operating budget.

The chart also shows a strategy for allocating the funding increase to achieve three critical capacity building objectives:

- Achieve and Sustain High Levels of System Availability, Data Security, and User Support
- Accelerate Enhancement, Expansion, and Integration of Enterprise Systems
- Improve ITS and MnSCU-Wide Efficiency in Using Available IT Resources.

Figure ES-1. A Scenario for Increased Investment in Enterprise-Level IT Services

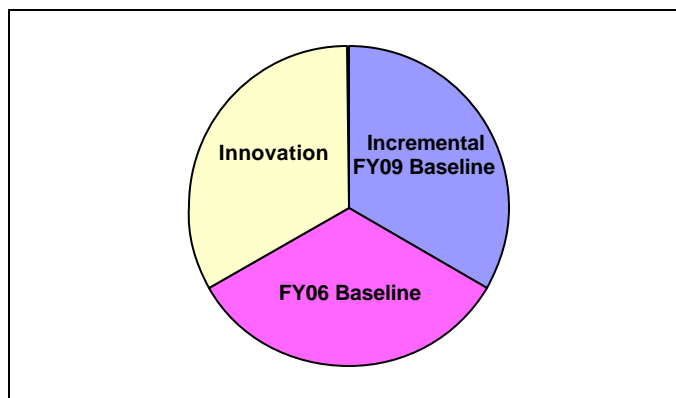


Financing Strategy

The most practical categories of consistent, reliable funding for the recommended increase are: cost reductions, internal user fees, and additional appropriations.

The recommended financing strategy is to use internal funds and resources through FY2007 and to take immediate action to initiate stabilization and organizational efficiency-seeking activities within the next six months. These actions require identification of \$15 million in existing Office of the Chancellor and campus resources for one-time use. A legislative request for \$30 million could then be made as a part of the FY2008-09 biennial budget. The balance of the FY2008-09 financing requirement could be met by identifying other existing system wide resources (Figure ES-2).

Figure ES-2. Target Composition of Funding by FY2009



Cost Reductions. The cost reducing/efficiency-seeking activities (including process re-engineering, organizational restructuring, and outsourcing) will be more clearly defined as one of the first initiatives undertaken in the capacity building program.

Internal User Fees. Increased fees, while not a first choice, do present the opportunity for a predictable, reliable and straightforward method of funding. By assessing a System-wide enterprise technology fee, the System can fairly and equitably allocate the shared costs of technology to all of the beneficiary users. The fee could be assessed as a campus charge with the campus then having the discretion to identify funding sources. A System-wide charge of \$20 million equates to 1.43% of the \$1.4 billion System annual operating budget, or 2% of the \$1 billion general funding budget.

Assessing a fee of this type would constitute a major policy decision for MnSCU, and additional analysis and widespread consultation will therefore be required before such a decision can be made.

Additional Appropriations. The proposed investment scenario calls for an additional \$20 million in the next biennium (FY2008-09). It is recommended that it be addressed through additional legislative appropriation. If a legislative appropriation in this amount is not secured, the only practical option is to continue increasing the System-wide enterprise technology fee.

Summary

The magnitude of under-funding to date has been significant, and MnSCU’s enterprise-level IT staff and resources are stretched dangerously thin, allowing neither a strategically sound rate of innovation to create next-generation online services nor an acceptably high level of stability in current operations. The innovational stagnation and infrastructure instability will continue to increase without prompt attention.

Simply stabilizing the delivery of current-generation services will require doubling the FY2006 funding level. To also accelerate the pace of next-generation innovations – critical to attracting and retaining tomorrow’s students, faculty, and staff – the present level of enterprise IT investment will need to be tripled.

Building MnSCU's Capacity for Innovation and Excellence in Enterprise IT Services

Introduction

The Information Technology Services (ITS) Division in MnSCU's Office of the Chancellor was formed in 1998 to achieve System-wide* efficiency and consistency in automation by providing shared computer systems that are capable of meeting a large proportion of each institution's data management and transactional needs. After eight years of intensive innovation and technical engineering, ITS now operates and maintains a highly sophisticated and complex "enterprise IT infrastructure" that is used daily by well over 400,000 students, faculty, administrators, and others throughout the state. Major components of the current online environment include:

- The Integrated Statewide Records System (ISRS), a set of integrated computer applications that serves more than 20 campus business areas, encompassing both student services and "back-office" administrative functions
- An online "Data Warehouse" that consolidates campus-specific ISRS information for use in standard reports and ad hoc queries
- D2L, a state-of-the-art commercially-developed system for creating and delivering online courses
- More than a dozen other computer applications pertinent to specialized student and administrative needs, including the Course Applicability System (CAS); the Degree Audit Reporting System (DARS); e-Folio, a product used to create personal "electronic portfolios"; and iSeek, a career development and job-seeking system that also serves many non-MnSCU users
- A state-wide, Internet-based data network that connects all users to the shared databases and other online services.

The ambitious effort to quickly construct and expand MnSCU's shared technological infrastructure inevitably has placed strains on the central IT organization. As the challenges of providing a stable operating environment for the present enterprise systems have grown, ITS's pace of innovation has slowed. Concern is thus mounting in many quarters that MnSCU is not moving quickly enough to address a wide array of still-unmet automation needs and to create "next generation" online services with high strategic value.

In response to these concerns, MnSCU's Chancellor directed that an assessment be performed to identify actions needed to ensure that the System can continue to use information technology maximally to support the goals set forth in the System Strategic Plan. In September 2005, Insight

* Throughout this report, the capitalized word "System" denotes the MnSCU system of higher education institutions, while the uncapitalized "system" typically refers to computer technology.

Solutions Group was retained to assist in conducting that analysis and preparing the present summary report.

The assessment employed a broadly participative approach, seeking information and opinions from numerous MnSCU institutions as well as from the Office of the Chancellor (Appendix A). An essential contribution was made by members of an Ad Hoc Advisory Group formed expressly for this purpose. This workgroup of Presidents, campus CFOs and CIOs, Vice Chancellors, and others met several times during the course of the project to discuss enterprise-level issues and concerns and to shape many of this report's recommendations.

Insight also convened several other workgroups within the Office of the Chancellor and interviewed many OOC managers and staff individually to obtain additional details on current challenges and future needs in the enterprise IT arena. During this same period, MnSCU's Systems Development Steering Committee conducted a series of regional meetings at which nearly 250 system users discussed current problems and envisioned the ideal online environment of the future; the comments collected in those sessions have added a useful campus-staff perspective to the present analysis.

Campus IT organizations – responsible for local area networks, non-enterprise hardware and software, and technical support – play a very important role in the System's overall use of information technologies. This assessment did not examine in depth the capabilities and resource needs of these groups, focusing instead on the enterprise-level services managed by the central ITS Division. The campus-based members of the Advisory Group did, however, emphasize the important need for closer collaboration and expertise sharing between IT specialists at the two levels.

The Strategic Imperative of Continued Innovation

While MnSCU's current enterprise-level IT systems provide important benefits to institutions and to centralized administrative functions, they are only a beginning, a foundation for on-going innovation to better harness the power of information technologies in support of System Strategic Plan goals, especially:

- *Goal 2: Maintain an affordable cost for Minnesota residents*
- *Goal 3: Work with other organizations to prepare all young people to graduate from high school and enroll in college ready for success*
- *Goal 6: Provide multiple delivery options for learning programs and student services*
- *Goal 10: Build organizational capacity for change to meet future challenges*
- *Goal 12: Identify and remove barriers to innovation and responsiveness*
- *Goal 14: Promote accountability for results through a system of accessible reports to the public and other stakeholders.*

Innovation means much more, of course, than catching up on a backlog of enhancements and extensions to existing systems. The technological advances of the Internet Age are reshaping the higher education landscape, and institutions must respond promptly and effectively to avoid losing ground to more innovative competitors, including a growing number of accredited "online

universities” In particular, three trends in MnSCU’s environment are creating pressure for *transformative* changes to the present generation of enterprise systems.

Profusion of technology-mediated learning. The near-ubiquity of portable computing and communication devices is opening the door to numerous electronic extensions of the learning experience beyond the traditional lecture hall and classroom settings, offering great promise for enhancing educational effectiveness. Online courses, the vanguard of this movement, accounted for about 5% of MnSCU-wide student credit hours in 2005, and this proportion will grow swiftly over the next few years as faculty and students gain experience with the medium. The same period will also demand incorporation of a host of other technological tools into the learning experience, including chat-room communities, virtual whiteboards, online games and simulations, interactive presentations, weblogs, and podcasts, to cite only a few examples.

Growing student expectations of online convenience. Today’s teenagers have come of age in the midst of a revolution in personal computing, messaging, and online services. Many students now bring to college a set of sophisticated expectations about the way online transactions and information access should work. Use of commercial web sites has conditioned them to expect instantaneous, around-the-clock, access to services that are easy to use and targeted to their individual needs. Institutions that cannot meet these expectations will be judged less attractive by a fast-growing segment of their customer base. The Western Cooperative for Educational Telecommunications (WCET) warns: “[*Highly convenient online*] services will become one of the key distinguishing factors among institutions in an electronic environment where students can move to a competitor with the click of the mouse.”

Increasing numbers of multi-institutional students. Internet-based learning aids relax the constraint of geography on education. In 2005, more than 11,000 students were simultaneously enrolled in two or more MnSCU institutions, nearly three times the 2002 number, and this steep rate of growth will continue as the System-wide catalog of online courses expands and collaborative learning tools become commonplace. Multi-campus learning will be increasingly popular as a way of gaining schedule flexibility and accelerating degree progress. In this way and many others, technology holds promise of facilitating the integration of MnSCU institutions into a truly *collective* resource for the people of Minnesota.

Recognizing the challenge posed by these and other trends, MnSCU’s executive leadership has established some broad IT service objectives for the near future, including a “seamless” student experience in administrative interactions with their institution(s), continued rapid growth in e-learning and other technology-mediated educational services throughout the System, and reliable access by all MnSCU campuses to the benefits of emerging technologies such as wireless communication. ITS is making incremental progress in pursuit of such objectives, but much more work is needed if enterprise systems are to provide maximal support for the System’s response to competitive challenges and strategic opportunities. Indeed, a *second wave* of intensive innovation is now required, similar in creative vision and level of effort to the first wave that produced ISRS. The strategic imperative now confronting MnSCU is to move as quickly as possible toward a “next generation” enterprise IT environment that meets the business requirements and competitive realities of the 21st century, dramatically improving both educational outcomes and administrative efficiency.

Appendix B synthesizes many comments heard during this study about what such a next-generation environment might look like.

Growing Operational Needs Displace Innovation

After several years of rapid and in some cases ground-breaking work, ITS is now at the point where it can no longer sustain the level of innovation that produced the current generation of enterprise systems. Under the present circumstances, only slow and incremental progress can be made toward a next-generation environment such as the one sketched in Appendix B.

The reason for this innovation slow-down is an inescapable dynamic in all IT services organizations: The fruits of innovation bring new operational obligations, and if funding does not increase in step with this expanding burden, the imperative to “keep the lights on” for current users claims a larger and larger share of available resources. In a zero-sum game, innovation always loses.

Funding for ITS has remained flat over last several years (Table 1) despite a rapid increase in the scale and complexity of the enterprise IT environment (Table 2). The job of operating and maintaining this burgeoning infrastructure has grown so great that more than 90% of ITS’s steady-state budget is now consumed by that challenge alone, leaving only a very limited capacity for continued innovation.

Table 1. ITS Funding, FY2002-06

(\$ millions, rounded)

	FY2002	FY2003	FY2004	FY2005	FY2006
Budget Base	16.4	17.7	16.7	16.2	16.5
Initiative Funding	0	0.02	2.4	1.5	3.5
Total Funding (rounded)	16.4	17.7	19.1	17.7	20.0

Table 2. Rapid Growth in Enterprise IT Scale and Complexity

	FY2000	FY2006	% Change
Enterprise Software Applications	9	17	89%
Production Database Rows of Data	400 M	1.2 B	200%
Lines of ISRS Programming Code	2.5 M	4 M	60%
Central Servers With Critical Functions	30	112	273%
Servers with 24/7 Operations	15	90	500%
Network Bandwidth	24 Mbps*	300 Mbps	1,150%
Network Hardware Devices	100	350	250%
ITS Staff Positions	121	115	(5%)

* Megabits per second

Moreover, at the present funding level, the quality of operational service that ITS can provide is itself inadequate – and declining. The Division has been unable to add operations and user support staff as its scope of services expands, and it also lacks the funding required to upgrade the technical infrastructure quickly enough to keep pace with growing capacity demands and inevitable hardware obsolescence.

The problem is exacerbated by periodic mandates to develop or acquire computer applications without accompanying resources to support their operation over the long run. ITS must therefore spread its already-inadequate resources even thinner.

The Critical Capacity Deficit and Its Costs

The consequences of this predicament are experienced every day by thousands of users of ISRS, the Data Warehouse, D2L, and other enterprise applications, and also to campus-based IT staffs. In November and December 2005, hundreds of participants in regional “visioning” sessions sponsored by the MnSCU-wide Systems Development Steering Committee voiced many complaints and concerns about ITS’s mounting shortcomings, both in the quality of current services and the pace of ISRS enhancement and next-generation innovation. This general dissatisfaction is echoed in the customer satisfaction surveys conducted periodically by MnSCU’s System Technology Strategy Council and also has reached the executive level, as demonstrated by the comments of the Presidents, institutional CFOs and CIOs, and Vice Chancellors who comprised the Ad Hoc Advisory Group for the present analysis. And, of course, ITS managers and technical supervisors, who are committed, service-oriented professionals, are acutely aware of the deficiencies and frustrated at their group’s inability to serve MnSCU as it must.

Tables 3 and 4 list examples of current ITS under-capacities, collected from all of the sources just mentioned. These lists do not provide a fully detailed inventory of the current shortfalls, but they demonstrate the range of weaknesses that exist in both critical capacities – innovation and operations.

The two tables also note the costs of allowing the current situation to persist and worsen. In particular:

- Service outages due to network or central server failures cost campuses heavily in terms of lost productivity and work-around expenses, plus an inestimable loss of good will among students, faculty, and staff. Some campuses have already experienced the havoc caused by a lengthy disruption of their ISRS access at the height of student registration. Others are likely to experience such a debacle in the future, until ITS has the resources to upgrade obsolescent hardware and implement “fail-over” backup servers.
- The slowed rate of innovation postpones important improvements in institutional efficiency and educational effectiveness and may also erode competitive appeal to increasingly tech-savvy students and faculty. These are longer-term and less-visible costs than those due to operational problems, but they are no less substantial, ultimately translating into lower enrollments, reduced revenues, and a slow attrition of educational quality.

Taken in sum, the magnitude of these actual and potential costs suggests that failure to fund enterprise IT appropriately is a false economy for MnSCU institutions and the State of Minnesota.

Table 3. Slow Progress in Beneficially Enhancing Current Systems and Creating a Next-Generation Environment

Areas of Insufficient Progress

With only about 10% of current staff-hours available for systems development, and much of this consumed by ISRS code-maintenance tasks, ITS can make only very slow progress in:

- Making user-requested system enhancements (many high-priority campus requests for changes to ISRS modules have gone unaddressed for at least four years)
- Developing or acquiring new ISRS modules for unsupported campus business functions, e.g., prospect management and communication, business workflow, graduate tracking, development, parking
- Creating full-featured web interfaces for ISRS services to allow 24/7 access (many modules are now web-enabled to only a cursory extent)
- Improving integration between ISRS and other enterprise systems
- Developing new capabilities that promote a “seamless” user experience when using separate applications or interacting with multiple campuses, e.g., web portals that organize and personalize the user’s online experience; also a “single sign-on” capability
- Adding useful new online services that support institutional outreach to K-12 students and other community constituencies

Costs of Continued Underinvestment

- Foregone increases in efficiency and effectiveness of campus and central administration
- Foregone improvements in recruiting, retention, on-time graduation, and career placement
- Reduced competitive appeal to the fast-growing number of students and faculty who expect high utility and convenience in online interactions
- Slow progress toward making MnSCU a well-integrated, *collective* higher education resource for the people of Minnesota

Table 4. Unacceptable Levels of System Availability, Data Security, and User Support**Areas of Current Undercapacity**

- Failure of obsolete network equipment blocks access to mission-critical systems
- Undersized D2L servers fail due to overloading as usage volume continues to rise
- Central servers lack “fail-over” backup that can be switched to upon failure
- Inadequate and untested processes for ensuring service continuity in the event of natural disaster or criminal destruction of facilities
- No third-shift or weekend operations staff to restore web-based service in the event of off-hours failure
- Slow response to server failures due to under-trained operations staff and absence of software for problem diagnosis
- No well-qualified backup staff in critical areas of expertise, leading to extended service outages if the primary responder is unavailable
- Too-slow migration of ISRS from its obsolescent technical environment to “best of breed” software that is assured of on-going vendor enhancement and support
- Inadequate campus-based provisions for protecting sensitive data from unauthorized access (ITS is mandated to lead campus responses in this area)
- No formal training program for new or less-experienced ISRS and Data Warehouse users; inadequate communication to orient experienced users to significant changes in new software releases
- Slow updates to ISRS documentation; no documentation on the business process an ISRS module supports
- Frequent delays in ITS (“Tier 2”) help desk response due to understaffing; no evening or weekend staffing to serve off-hours users of web-based systems

Costs of Continued Underinvestment

- Campus business interruptions, some lengthy, due to server, software, or router failure or unacceptable response time; extended outages for off-hours users of web-based services due to lack of 24/7 operator coverage
- Data security risk exposure, including legal liability for theft or illegal disclosure of personal identity information; potential malicious or inadvertent destruction of data; unauthorized access to business-sensitive data
- Lower staff productivity due to inadequate training and documentation and long delays in obtaining help desk assistance
- Degradation of data integrity due to improper data entry, leading to ill-founded administrative and executive decisions
- Institutional image erosion due to frustration of students and parents who cannot obtain off-hours help desk assistance

Other Higher Ed Organizations Invest Significantly More in Enterprise IT

Though little data for direct comparison is available, MnSCU appears to be spending considerably less on enterprise IT services than many other higher education organizations.

A recent industry survey by Gartner, Inc. revealed that, on average, higher education institutions devoted “between 4% and 5%” of their total annual budget to enterprise-level IT operations in 2004. In contrast, ITS’s FY2005 budget of \$17.7 million was just 1.3% of the System’s overall budget of \$1.4 billion.

Gartner’s analysis includes but does not isolate large multi-campus systems, whose IT challenges of course differ from those of single-campus institutions. Therefore, Insight Solutions Group surveyed several state higher ed systems to obtain IT spending information on enterprises that are more similar to MnSCU.* Four respondents provided sufficient data for comparison: the University of Minnesota and the state-funded systems in Wisconsin, Pennsylvania, and Missouri (Table 5)

Table 5. Spending on Enterprise-Level IT by Five Higher Education Systems

For each system, data are for the latest completed fiscal year for which data were available (MnSCU: FY2005)

	MnSCU	Univ of Minnesota	Univ of Wisconsin	Penn State Sys of HEd	Univ of Missouri
Campuses	53	5	13	14	4
Students (headcount)	373,115	65,489	160,895	106,000	63,384
Total Operating Budget	\$1.4 B	\$2.6 B	\$3.7 B	\$1.0 B	\$2.036 B
Enterprise-Level IT Expenditures	\$17.7 M	\$70.0 M	\$75.0 M	\$12.3 M	\$15.5 M
% of Total Operating Budget	1.3%	2.7%	2%	1.2%	0.8%
Per Student	\$47	\$1,069	\$466	\$116	\$245
Per Campus	\$0.32 M	\$14 M	\$5.8 M	\$0.88 M	\$3.9 M

These systems differ greatly from MnSCU in their number of campuses and total enrollment, and thus comparisons must be based on normalizing ratios such as expenditure per student and per campus. By these measures, MnSCU is investing much less in its enterprise-level IT services than the other systems. For example, MnSCU’s \$47 per student in FY2005 was by far the lowest of the higher ed systems surveyed. The next-lowest among those shown in Table 5, the Pennsylvania State System of Higher Education, spends more than twice that much per student.

One additional benchmark is pertinent to this analysis. A recent EDUCAUSE report recommends that higher education institutions reserve 20% of their budget dollars for *unplanned* innovation, due to the extremely fast pace of technological advancement. This cushion allows flexibility to move quickly in response to fast-emerging needs and opportunities that have high strategic value. At its present static funding level, ITS has no such flexibility for rapid response and, in fact, can devote less than 10% of its resources to *planned* innovation.

* The full survey results are presented in a separate Insight Solutions Group report, *Enterprise and Campus IT Investment Survey of Selected Higher Education Systems*, available from MnSCU’s Office of the Chancellor.

Investing in the Capacity for Excellence in Innovation and Operations

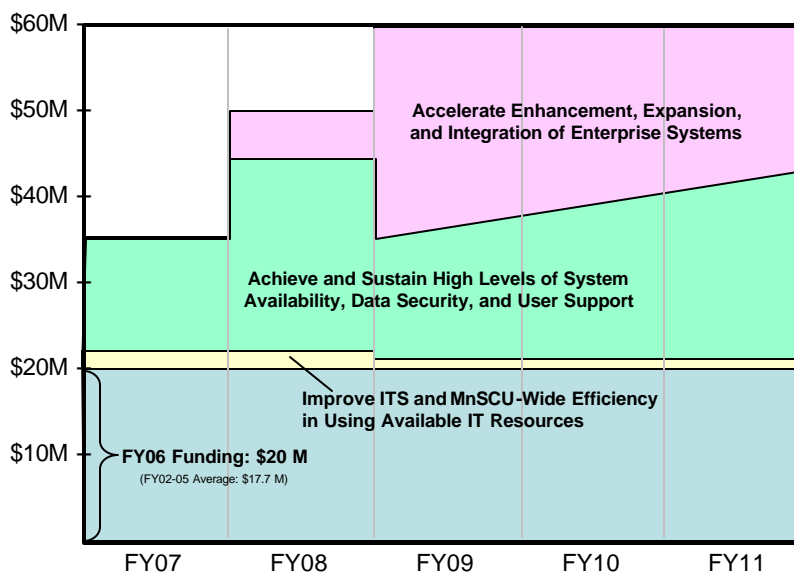
The interplay between innovation and operations has been a primary theme of this analysis. Inexorably, innovation begets additional operational obligations. If resources don't increase accordingly, the inevitable result is a zero-sum game that diminishes the quality of service to current users or reduces emphasis on innovation or, in MnSCU's case, both. As noted, the consequent enterprise-wide costs and risks are great, and they will continue to grow as long as the situation is allowed to persist.

The fiscal climate of the past few years has forced all government organizations to find ways to “do more with less,” and thus it may be tempting to attribute ITS's situation to its own failure to leverage its resources better. While additional efficiency is surely possible and worthy of pursuit, as discussed in the next section, the mismatch between ITS's funding and the task at hand is far greater than “absorbing the difference” and “working smarter” can accommodate. ITS's problem is *everyone's* problem, and MnSCU as a whole must participate in its solution.

Inescapably, the principal element of that solution must be to dramatically increase annual funding for the enterprise IT function. MnSCU must now quickly make up the ground that has been lost during several years of static investment in an extremely dynamic domain. The goal should be to build and *sustain* a level of ITS capacity that allows both continuing innovation *and* a stable technical environment for current users. The window of opportunity for redressing the balance is narrow – immediate, decisive action is required to keep MnSCU institutions from falling behind competitors who are investing more heavily toward a new generation of student and administrative services.

Figure 1 presents a scenario for this capacity building program, postulating an increase in ITS's annual budget from the present \$20 million to \$60 million within three years. An annual investment

Figure 1. A Scenario for Increased Investment in Enterprise-Level IT Services



of \$60 million would equate to 4.3% of a \$1.4 billion operating budget, bringing the System within Gartner's benchmark range for higher education investment in enterprise-level IT: "4% to 5%" of total operating budget. (MnSCU's FY2005 percentage was 1.3%.) The investment per student would rise from the FY2005 level of \$47 to \$162.

Figure 1 also shows a funding strategy for achieving three critical capacity building objectives:

- Achieve and Sustain High Levels of System Availability, Data Security, and User Support
- Accelerate Enhancement, Expansion, and Integration of Enterprise Systems
- Improve ITS and MnSCU-Wide Efficiency in Using Available IT Resources

Each of these objectives is discussed in turn below.

Achieve and Sustain High Levels of System Availability, Data Security, and User Support

The overriding immediate need is to stabilize the current environment, addressing the operational incapacities listed in Table 4. Investment in this objective will reduce the institutional costs of service interruptions, security vulnerabilities, and poor user support, allowing MnSCU to obtain a much higher return on the investment that has already been made in current-generation systems. Table 6 lists some of the individual expenditures required to achieve this objective.

This scenario shows a significant jump in investment devoted to achieving operational stability – an additional \$15 to \$20 million perhaps in each of the next two fiscal years. This "bulge" is necessary to merely catch up in several areas that ITS has been forced to neglect in recent years, including addressing the backlog of equipment replacement/upgrade and expanding staff capacity to ensure service quality in server operations, user support, and technical assistance to campus IT groups. After this burst of urgent remedial activity, the rate of increased investment in this area can be reduced, though it must continue to rise somewhat each year in step with the expansion and alteration of the technical environment resulting from continued innovation.

Accelerate Enhancement, Expansion, and Integration of Enterprise Systems

The second capacity building objective, which must be pursued in parallel with the first, is to restore the rate of innovation to a level that allows much faster progress in enhancing current systems and moving toward a next-generation environment with characteristics similar to those posited in Appendix B. Table 7 lists some of the specific needs for additional investment toward these ends.

The Figure 1 scenario shows only moderate increases in innovation funding during the next two years, when ITS must focus most heavily on the operational stabilization tasks discussed above. Once that remedial "bulge" is cleared, however, investment in innovation must increase rapidly to accelerate progress in creating next-generation services. The rate of increased investment depends on the *speed* with which MnSCU desires to move toward the envisioned future.

Table 6. Examples of Investment Areas to Achieve and Sustain High Levels of System Availability, Data Security, and User Support

<p>System Availability</p> <ul style="list-style-type: none"> • Upgrade or replace obsolete network routers, which are prone to age-related failure and lack adequate throughput capacity • Increase network bandwidth to accommodate projected exponential growth in D2L usage and the very large data packets resulting from video and graphics • Implement a redundant “fail-over” capability for all mission-critical enterprise systems • Establish a complete disaster recovery backup site, as recommended by the State of Minnesota’s Office of the Legislative Auditor • Upgrade the D2L hardware infrastructure to accommodate the projected growth in online learning without hardware failures or inadequate capacity • Expand Data Warehouse storage capacity and processor speed as volume and usage increase • Provide 24/7 operator coverage for all systems to ensure prompt restoration of service in the event of an off-hours failure <p>Data Security</p> <ul style="list-style-type: none"> • Create a more robust and “granular” approach to granting user access rights to ISRS, the Data Warehouse, and other systems • Develop and disseminate best-practice procedures to promote data security System-wide • Purchase upgrades to campus firewalls to ensure state-of-the-art access control • Purchase and install campus-based servers to implement an encrypted, fully secure data warehouse reporting environment • Create an on-going security awareness training program <p>User Support</p> <ul style="list-style-type: none"> • Increase staffing depth, and breadth of expertise, for the ITS “Tier 2” help desk • Establish a comprehensive user training program encompassing all ISRS applications, the Data Warehouse, D2L, e-Folio, and other enterprise-level tools • Create user documentation that shows how the system/module is best used to support each administrative area’s overall business process

Table 7. Examples of Investment Areas to Accelerate Enhancement, Expansion, and Integration of Enterprise Systems

ISRS Enhancement and Expansion

- Address all high-priority ISRS user change requests within the next two years
- Rapidly address Business Practices Alignment Committee recommendations to reduce cross-campus variability in ISRS functions and associated business processes
- Enhance web interfaces for all ISRS modules; apply a unified “look and feel” across all web-enabled student services modules
- Develop or acquire new ISRS modules for campus business functions not supported now
- Improve the ISRS accounting and financial management modules, or replace them with a more suitable externally-developed alternative
- Improve the ISRS human resources management module, or replace it with a more suitable externally-developed alternative
- Develop web-based tools for employee self-service in HR administration

Management Reporting

- Create additional enterprise-level and campus-level management reports
- Develop an Accountability, Performance, and Planning System for tracking System-wide progress toward strategic goals

Next-Generation Services

- Create a “single sign-on” capability, enabling users to provide a username and password only once during an online session, regardless of the number of separate applications or data domains they access during that session
- Design and implement web portals that organize and filter each user community’s online interactions and provide proactive, “smart-system” assistance in accomplishing immediate objectives
- Create a unified online catalog of all MnSCU courses (classroom-based and online)
- Integrate ISRS, D2L, MnOnline, CAS, DARS, e-Folio, and emergent technologies (e.g., online collaboration tools, e-community tools) to create a highly convenient and effective “teaching, learning, and advising infrastructure”
- Develop a “one-stop” career information system that integrates information from MCIS, MnCareers, iSeek and relevant state agencies including DEED and OHE
- Re-architect and enhance current systems to create highly-convenient and “seamless” user services of the type prefigured in Appendix B

Improve ITS and MnSCU-Wide Efficiency in Using Available IT Resources

Significantly increased funding, though essential, is not the full solution. MnSCU should also address several organizational and business process factors that currently make it more difficult to deploy IT investments to greatest effect throughout the System (Table 8).

In particular, MnSCU urgently needs an effective organizational mechanism to ensure that all stakeholders jointly and rigorously assess the impact of proposed new projects or commercial software acquisitions on ITS's ability to sustain desired levels of operational service and innovation. In many organizations, public and private, this takes the form of a cross-functional standing body with formal processes and dedicated staff support for evaluating and prioritizing all new-work proposals above a certain size threshold. A culturally appropriate "doorkeeper" discipline of this type will be instrumental in avoiding future recurrence of the pell-mell overextension that now plagues ITS, to the detriment of all.

A second area listed in Table 8 also merits special emphasis here. ITS presently has only a minimal capacity to pursue activities that encourage System-wide efficiency in the use of IT resources. The Division's enterprise perspective and technical expertise place it a unique position to lead collaborative efforts to promote cross-cutting economies, for example by:

- Promoting multi-campus resource sharing, e.g., of server capacity, to minimize duplication of under-utilized resources;
- Securing economies of scale in purchasing of hardware, software, and vendor services;
- Promulgating standards that encourage beneficial consistency and cross-compatibility among campuses, e.g., email and calendaring, document imaging systems.

The cost-saving benefits to MnSCU as a whole of activities of this sort far outweigh the minor investment in capacity to pursue them.

Indeed, the incremental investment required to address all of the factors listed in Table 8 is very modest compared to the other two areas of the capacity building program. The scenario in Figure 1 shows a \$2 million increment dedicated to the efficiency-seeking objective during the first two years, mainly for consulting assistance in establishing best-practice processes and for a small number of non-technical staff positions to provide the necessary internal capacity. Thereafter, the level of investment in this area will decline, as the new processes settle into routine operation. This is a very high-leverage investment, however, enabling the enterprise as a whole to achieve more for its overall IT investment. As such, this third element of the capacity building program should be pursued aggressively regardless of the ultimate magnitude of investment increases in the other two areas.

Table 8. Examples of Investment Areas to Improve ITS and MnSCU-Wide Efficiency in Using Available IT Resources

Invest in IT management consulting studies and Office of the Chancellor staffing to achieve effective on-going execution of efficiency-producing activities, including but not limited to:

- Institute a more effective organizational mechanism and best-practice processes for ensuring that decisions to undertake new enterprise IT projects are based on adequate analysis of staff skills and availability, infrastructure capacity, security implications, and availability of funding for on-going maintenance and user support. This “Project Portfolio Management Board” should be a cross-OOC structure with campus representation.
- Reduce the time needed to fill ITS vacancies with appropriately qualified staff, allowing more rapid response to emerging needs. This might entail, for example: adding an IT specialist to OOC’s Human Resources staff with the experience necessary to understand the unique needs of enterprise-level IT organizations; and fundamentally rethinking the relationship between enterprise IT positions and current civil service job classifications.
- Accelerate the pre-bid approval process for procurement requests above \$50,000, shortening the interval between identification of a need and issuance of an RFP for goods or services, including leases, software licenses, hardware, contractor support. This might entail, for example, adding a dedicated IT procurement and contracting specialist within OOC, an almost universal practice in large higher ed organizations according to a recent EDUCAUSE report.
- Institute and consistently adhere to best-practice IT management processes within ITS, including but not limited to: a sustainable methodology for developing *annual enterprise-level IT plans* that are accorded proper strategic weight in OOC’s budget decisions; *lifecycle and capacity planning* to ensure appropriate capacity, reliability, and cost effective support for all hardware/software/ network technologies in operation; and a *change management process* applied to all mission critical applications and technologies to ensure that all changes are approved, communicated, and documented.
- Re-architect the present many-bodied IT governance structure to streamline the process of reaching System-wide decisions that affect ITS’s rate of progress in innovation or operational upgrades, e.g., decisions on user requirements, technical specifications, and priorities. Rationalize the structure to remove redundant or overlapping responsibilities among committees and councils, which currently necessitate layers of review and approval.
- Dedicate sufficient technical staff and project managers to System-wide efficiency/cost-saving activities, such as multi-campus hardware sharing initiatives, enterprise procurement to achieve economies of scale, and establishing standards that encourage consistency and inter-compatibility among campuses.
- Develop an effective capacity for sharing technical expertise across the System, allowing ITS and campus expertise to where it’s needed, when it’s needed (e.g., rapid deployment teams, regionally-sited “circuit riders”). Emphasize collaboration in ITS’s relationship with campus IT groups.

Finally, while the scenario presented here suggests a near-term approach for building ITS's capacity in both innovation and operations, it leaves unaddressed the matter of longer-term investment. In an era of rapid technological change and intense innovation throughout the higher education sector, continual evolution may be expected in MnSCU's aspirations regarding the role of shared online services in promoting educational and administrative excellence. The System must remain committed to providing the funding required to ensure that its enterprise IT function can capably support those strategic aims.

Financing Strategy

This section presents a recommended approach for financing the ITS funding increase that will be required to ensure both a strategically healthy pace of innovation *and* a stable operating environment for current users of enterprise systems.

A variety of potential sources of funds were evaluated in developing this financing strategy:

- Existing Office of the Chancellor and campus funds
- New legislative appropriation
- Cost reduction (e.g., streamlining, outsourcing)
- Student contributions
- General obligation bond/revenue bond/debt financing
- Financing/refinancing of equipment and software purchases
- Internal user fees/chargebacks
- Grants
- Private sector investment (public/private partnership)
- Revenue from sale of software/services

However, these various sources are not equally viable as elements of a *dependable, on-going* funding stream of the sort that will be required to build and sustain enterprise IT capacity. For example:

- The State's bond counsel has for many years maintained that most technology equipment and all software costs are not eligible for financing with State of Minnesota general obligation bonds, so the general obligation bond option can be eliminated outright.
- Financing/refinancing of hardware and software, and any other forms of debt financing, ultimately require a source of revenue to pay off the debt, and this would also likely require statutory changes. Also, it is reasonable to expect a fee to be associated with transactions of this type.
- Options such as grants, private sector investment, and revenue from sale of MnSCU software or services represent the "beautiful lie" – i.e., they are appealing because they require no taxpayer funds or tuition increases – but the "ugly truth" is that they require a significant investment of time and resources in pursuit of an uncertain return. Even though some of these sources may have a high benefit-to-cost ratio, their low probability of becoming a regular funding stream disqualifies them from additional consideration here. In the event that funding from one or more of these sources were acquired, however, they could certainly contribute to the overall financing strategy.

Thus, after considering the cost of funds and the probability of acquisition, just three of the potential sources listed above seem to hold practical promise for predictable, on-going funding for enterprise IT activities:

- Cost reductions
- Internal user fees/chargebacks
- Additional appropriations

Simply stated, the System only truly possesses the money at the Office of the Chancellor and on the campuses, either in existing resources or through student charges. This is the primary funding with which the System controls its own future.

Recommended Financing Strategy

The scenario outlined earlier in this document calls for a tripling of the System’s enterprise IT investment by the end of the next biennium (FY2009), from \$20 million to \$60 million. Table 9 on the next page summarizes the recommended approach for financing that funding increase.

The new baseline requires an additional annual investment estimated at \$40 million to ensure the stability of existing systems, beginning in FY2007. Innovation initiatives and increased operational stability investments add an additional \$10 million in FY2008, increasing to an additional \$20 million in FY2009, bringing the total annual investment for FY2008 through FY2011 to \$60 million. This total ITS budget would represent 4.3% of a total System budget of \$1.4 billion, placing MnSCU within Gartner’s benchmark range for higher education investment in enterprise-level IT services – “4% to 5%” of total operating budget. The System’s investment per student would rise from the FY2005 level of \$47 to \$162.

The recommended financing strategy is to use internal funds and resources through FY2007 and to take immediate action to initiate stabilization and organizational efficiency-seeking activities within the next six months. These actions require identification of \$15 million in existing Office of the Chancellor and campus resources for one-time use. A legislative request for \$30 million could then be made as a part of the FY2008-09 biennial budget. The balance of the FY2008-09 financing requirement could be met by identifying other existing system wide resources. (See Figure 2.)

Figure 2. Target Composition of Funding by FY2009

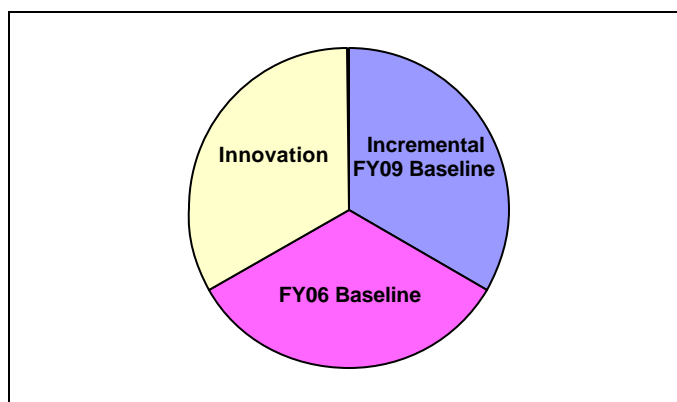


Table 9. Recommended Financing Strategy to Build the Capacity for Innovation and Excellence in Enterprise IT Services

Fiscal Year	Funding Amount and Source
FY2006	<p>\$20,000,000 FY2006 Base funding</p>
FY2007	<p>\$20,000,000 FY2006 Base funding</p> <p>New \$15,000,000 Office of the Chancellor and campus sources</p> <p>Total: \$35,000,000</p>
FY2008	<p>\$40,000,000 Base funding and Office of the Chancellor and campus sources</p> <p>New \$10,000,000 Legislative Appropriation</p> <p>Total: \$50,000,000</p>
FY2009	<p>\$40,000,000 Base funding and Office of the Chancellor and campus sources</p> <p>New \$20,000,000 Legislative Appropriation</p> <p>Total: \$60,000,000</p>
FY2010	<p>\$40,000,000 Base funding and Office of the Chancellor and campus sources</p> <p>New \$20,000,000 Legislative Appropriation</p> <p>Total: \$60,000,000</p>
FY2011	<p>\$40,000,000 Base funding and Office of the Chancellor and campus sources</p> <p>New \$20,000,000 Legislative Appropriation</p> <p>Total: \$60,000,000</p>

Cost Reductions

The cost reducing/efficiency-seeking activities (including process re-engineering, organizational restructuring, and outsourcing) will be more clearly defined as one of the first initiatives undertaken in the capacity building program.

It must be noted that private industry practice and trends dictate that outsourcing be seriously considered when the function is not a core competency, does not provide a differentiator against competition, and does not negatively impact the end customers. Both the merits and the disadvantages of outsourcing must be carefully taken into consideration when evaluating this alternative.

Internal User Fees

Increased fees, while not a first choice, do present the opportunity for a predictable, reliable, and straightforward method of funding. By assessing a System-wide enterprise technology fee, the System can fairly and equitably allocate the shared costs of technology to all of the beneficiary users. The fee could be assessed as a campus charge, with the campus then having the discretion to identify funding sources. A System-wide charge of \$20 million equates to 1.43% of the System's \$1.4 billion annual operating budget, or 2% of the \$1 billion general funding budget.

Assessing a fee of this type would constitute a major policy decision for MnSCU, and additional analysis and widespread consultation will therefore be required before such a decision can be made.

Additional Appropriations

The proposed investment scenario calls for an additional \$20 million in the next biennium (FY2008-09). It is recommended that it be addressed through additional legislative appropriation. If a legislative appropriation in this amount is not secured, the only practical option is to continue increasing the System-wide enterprise technology fee.

Summary

The magnitude of under-funding to date has been significant, and MnSCU's enterprise-level IT staff and resources are stretched dangerously thin, allowing neither a strategically sound rate of innovation to create next-generation online services nor an acceptably high level of stability in current operations. The innovational stagnation and infrastructure instability will continue to increase without prompt attention. Simply stabilizing the delivery of current-generation services will require doubling the FY2006 funding level. To also accelerate the pace of next-generation innovations – critical to attracting and retaining tomorrow's students, faculty, and staff – the present level of enterprise IT investment will need to be tripled.

A \$60 million budget for enterprise-level IT operations and innovation equates to 4.3% of the System's annual operating budget, placing MnSCU within Gartner's benchmark range for higher education investment in enterprise-level IT services – "4% to 5%" of total operating budget.

Appendix A

Project Participants

Ad Hoc Advisory Group on Enterprise IT Investment Planning

This body was formed expressly to provide guidance and input for the enterprise IT investment planning process. To ensure a System-wide perspective for this effort, the group contained broad representation from many campuses as well as the Office of the Chancellor, and it included a diverse mix of administrative and information technology executives. The Advisory Group met monthly from October 2005 to February 2006 to discuss the business issues confronting MnSCU and the envisioned future role of enterprise IT systems in supporting the System's strategic directions and goals.

Linda Baer, Senior Vice Chancellor for Academic and Student Affairs, Office of the Chancellor

Wilson Bradshaw, President, Metropolitan State University

Cathleen Brannen, Vice President Administrative Affairs, Metropolitan State University

Beth Buse, Deputy Director Internal Auditing, Office of the Chancellor

Stan Cram, Vice President of Student Development, Rochester Community and Technical College

Phil Davis, President, Minneapolis Community and Technical College

Mark Johnson, Vice President, Chief Information Officer, Minnesota State University, Mankato

Laura King, Vice Chancellor – Chief Financial Officer, Office of the Chancellor

Patricia Lipetzky, Dean of Extended Learning, Minnesota State University, Mankato

Ray Lou, Provost, Southwest Minnesota State University

Larry Margolis, Director of Administrative Services, Inver Hills Community College

Ken Niemi, Vice Chancellor for Information Technology, Office of the Chancellor

John O'Brien, Vice President of Academic Affairs, Century College

Ken Ries, Director of Information Technology, Pine Technical College

Rubin Stenseng, Director, Center for Information Systems, St. Cloud State University

Rick Straka, Vice President of Finance and Operations, South Central College

Ron Thomas, President, Dakota County Technical College

Bill Tschida, Vice Chancellor for Human Resources, Office of the Chancellor

OOC Workgroup on Enterprise IT Improvement Initiatives

This ad hoc workgroup of Office of the Chancellor staff met three times in December 2005 and January 2006 to discuss ITS under-capacities and identify specific work initiatives needed to alleviate them. Tables 6-8 in the body of this report are based on this group's contributions.

Joanne Chabot, Information Technology Services Division
Jim Dillemoth, Information Technology Services Division
Glen Guida, Information Technology Services Division
Dick Johnson, Information Technology Services Division
Gary Langer, Academic & Student Affairs Division
Mike Lopez, Academic & Student Affairs Division
Mark Malecek, Information Technology Services Division
Linda Skallman, Human Resources Division
Tim Stoddard, Finance Division

Information Technology Management Council

The ITMC ensures System-wide collaboration on information technology matters and promotes alignment of institutional and OOC IT efforts with MnSCU's strategic directions. The Council makes recommendations to the Leadership Council's Technology Committee and the Vice Chancellor for Information Technology. The ITMC devoted its November 22, 2005 meeting, attended by the following members, to a discussion of many issues addressed in the present report.

Beth Adams, Lake Superior College
Joanne Chabot, OOC Information Technology Services Division
Penny Dickhudt, Director, MnSAT
Jim Dierich, OOC Information Technology Services Division
Dick Johnson, OOC Information Technology Services Division
Gary Langer, OOC Academic & Student Affairs Division
Mike Lopez, OOC Academic & Student Affairs Division
Ray Lou, Southwest Minnesota State University
Sharon Mohr, Hennepin Technical College
Robin Raygor, Anoka Ramsey Community College, MSCF
Linda Skallman, OOC Human Resources Division
Tim Stoddard, OOC Finance Division

Systems Development Steering Committee

The SDSC is a MnSCU-wide forum for discussions pertaining to development and acquisition of administrative systems, providing recommendations to the Vice Chancellor of Information Technology. In the fall of 2005, the committee organized and conducted five regional sessions around the state at which 244 campus staff – users of ISRS and other administrative systems – discussed current shortcomings, suggested short-term improvements, and envisioned desirable features of a “next-generation” enterprise environment.

Date	Location	Attendance
10/13/2005	St. Cloud State University	32
10/27/2005	Minnesota State Community & Technical College, Detroit Lakes	27
10/31/2005	Minnesota State University, Mankato	66
11/2/2005	Mesabi Range Community & Technical College, Virginia	27
11/4/2005	Century College	92

The results of these sessions, available at the link below, provided a highly valuable campus perspective to the present report.

<http://www.its.mnscu.edu/governance/sdsc/systemplanningmeetings/findingsrecommendations.html>

Committee Members:

Les Bakke, Minnesota State University, Moorhead

Mike Bruner, Century College

Joanne Chabot, OOC Information Technology Services Division

Scott Erickson (Co-Chair), Minneapolis Community & Technical College

Tim Gilsrud, Rochester Community & Technical College

Glen Guida (Co-Chair), OOC Information Technology Services Division

Chad Haatvedt, Itasca Community College

Mark Johnson, Minnesota State University, Mankato

Mark Malecek, OOC Information Technology Services Division

Sue Raddatz, Dakota County Technical College

Ken Ries, Pine Technical College

Gerry Rushenberg, OOC Information Technology Services Division

Beverly Schuft, OOC Information Technology Services Division

RaNae Thompson, Southwest Minnesota State University

Interviews

Insight Solutions Group interviewed the following individuals singly or in small groups during the course of the project to obtain information on ITS services, under-capacities, and improvement needs. Several of these interviewees also participated in one or more of the larger discussion groups listed above.

OOO Information Technology Services Division

Ross Berndt, Computer Center Director

Joanne Chabot, Deputy Chief Information Officer

Rod Gerads, Production Services & Call Center

Jim Dierich, System Director, IT Infrastructure

Mike Jahnke, Director, Network Services

Dick Johnson, System Director, Instructional Technology

Ken Niemi, Vice Chancellor of Information Technology and Chief Information Officer

Judy Odegard, Help Desk Supervisor

Gerry Rushenberg, System Director, Management Information

Beverly Schuft, System Director, Security Office

Larry Simmons, System Director, Research & Web Services

OOO Academic and Student Affairs Division

Paul Wasko, Director of E-Services

OOO Finance Division

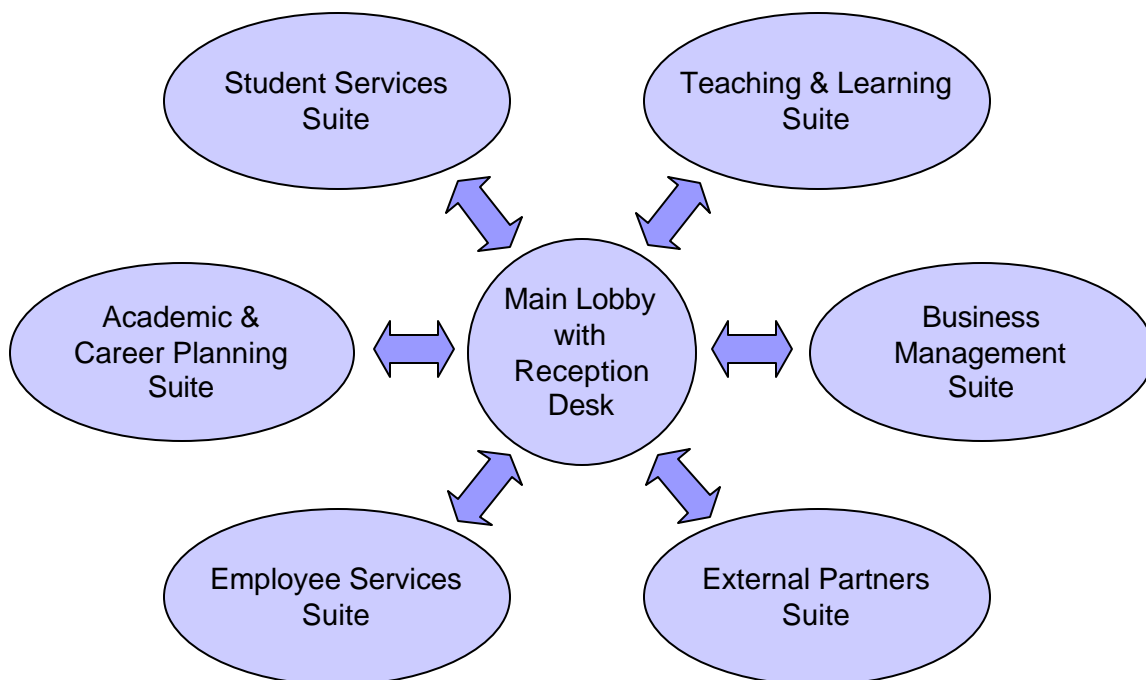
Bill O'Brien, Project Manager, Business Practices Alignment Committee

Appendix B

Next-Generation Enterprise Systems: A Conceptual Model

Many individuals, both on the campuses and in the Office of the Chancellor, have ideas and opinions about the desired future online experience for students and staff. MnSCU must now blend these largely independent minds-eye pictures into one holistic, technically feasible, and widely endorsed description of the target next-generation enterprise IT environment. This collaborative blueprinting process should begin immediately and proceed rapidly. Its product cannot be foreseen now, but for current purposes we can synthesize some commonly-heard themes into a preliminary vision of what the next-generation environment might look like.

The diagram below depicts, in highly schematic form, a concept of a next-generation enterprise systems architecture. The diagram and the discussion following it employ the metaphor of a building consisting of several suites of rooms and a main lobby with a reception desk. The whole “building” is web-based, accessible anytime, anywhere, from any appropriately equipped device.



Each suite is a group of logically related services – i.e., online capabilities for transactions, information access, communications, and so forth. A suite has a “front desk” page that enables the user to quickly find the right “room” for accomplishing his or her immediate objective.

The Main Lobby

You, the user, gain entry to the respective suites via a Main Lobby web page, everyone’s “first-stop” portal into the entire online environment. Features of the Main Lobby include the following:

- You sign in at the Reception Desk, and this is the only time you are asked for a username and password during your entire online session.
- The Reception Desk knows which suites you are pre-authorized to enter and automatically configures your navigational options accordingly, screening out destinations that are irrelevant to you.
- The Reception Desk also anticipates your likely needs of the moment, based on your current stage in the student or employee “life cycle,” the academic calendar, and your personal usage history. Each time you sign in, a personalized list of shortcut links to likely destinations is displayed (“Would you like to ...”), allowing you to jump straight to a room, bypassing the suite’s front desk.
- Every time you enter the Main Lobby, the page also displays time-sensitive reminders and bulletins. For example, “Remember, the deadline for [action] is [date and time].” or “Due to illness, Professor Jordan’s class section for Anthropology 342 will not meet today.” (Such automatically-generated messages might additionally be distributed by email and/or automated phone messaging.)
- You may customize your Main Lobby page to reflect personal content and display preferences and to group frequently-accessed room links in a handy location (“favorites”). If you wish, you may display other useful information in a sector of the page, such as weather, news, and sports scores.

The Suites

The six suites described in this concept are merely illustrative. The optimal way to cluster online services from the users’ point of view must be based on market research and intensive discussion.

In the **Student Services Suite**, students (current, prospective, and past) perform a very high proportion of their administrative interactions with the institution. Administrators also use the suite to enter data not entered by students themselves and to access pertinent information during service-related interactions with students. In both cases, the available capabilities far exceed the current complement of ISRS-based services – in number, ease of use, and cross-integration. Examples include:

- Filling out applications, e.g., for admission, financial aid, housing

- Registering for and dropping courses
- Paying fees
- Accessing information, e.g., student records, grades
- Checking status on in-process transactions

The **Teaching and Learning Suite** organizes access to tools and resources pertinent to the instructional process, including both classroom-based and online learning modes. This suite contains rooms where students and/or faculty members can perform a wide variety of course-specific or cross-curricular functions, such as

- Access an online course segment
- Create an online course or presentation, perhaps drawing on the well-cataloged “Learning Object Repository” of reusable instructional modules developed by others
- Take online exams
- Post or view syllabi and other course materials
- Enter “e-community spaces” – chat rooms, bulletin boards, virtual whiteboards, weblogs, etc. – in which users with similar interests learn from one another
- Manage class enrollment, testing, and grading
- Play single- or multi-user electronic games for instructional purposes
- Access digitized library resources from MnSCU institutions and beyond.

The **Academic and Career Planning Suite** is the institution’s online center for outreach, recruitment, degree planning, retention, and job placement. Its rooms provide tools and information resources useful in helping students make informed decisions in the process of preparing for, selecting, and attending college, and finding employment thereafter. Examples of capabilities available to the various user communities:

- For students and their advisors: tools for determining courses that satisfy remaining degree requirements; degree options, given coursework already completed; degree-progress implications of dropping a particular course
- For advisors: tools for managing the advisee roster and counseling schedule; accessing a student’s complete record, including transfer credits from other MnSCU and non-MnSCU institutions; running an “early warning” analysis to identify students who are at risk of not graduating on schedule
- For K-12 students, teachers, counselors, and parents: easy-to-use online assessment tools, college preparation advice, and career exploration resources
- For job seekers and employers: a one-stop career information system combining information from numerous governmental and private sector sources

- For all users: a continually updated MnSCU-wide course catalog containing classroom-based and online courses and schedules.

The **Business Management Suite** contains capabilities used by operational and strategic managers to:

- Perform the data management functions involved in accounting, budgeting and financial management, procurement, inventory management, and human resources management
- Select and display standard reports
- Create new reports for one-time use or addition to the library of standard reports
- View the “granular” data underlying summary values appearing in reports.

The **Employee Services Suite** contains online tools used by all staff for internal administrative tasks, such as:

- Filling out and transmitting standard forms, including timesheets, expense reports, purchase orders, and many others
- Performing self-service human resources transactions, e.g., making changes to benefits administration options
- Receiving a new-employee orientation
- Finding and registering for internal training courses
- Taking internal training courses online
- Accessing human resources policies and procedures.

The **External Partners Suite** contains online tools designed specifically for direct use by members of outside organizations that transact business or exchange information with the institution, such as corporate training departments, employment offices, foundations, and state agencies and programs.

Within each of these six suites, the “rooms” (task-focused web pages) are tightly integrated in order to provide maximal utility and convenience in meeting the user’s objectives. At the database level, invisible to users and not depicted in the diagram, the suites themselves are carefully cross-integrated so that information from one is seamlessly available to the others as necessary.

Cross-Institutional Functions

The Main Lobby and the suites bear your institution's logo and other brand elements, and thus you perceive yourself to be in your school's "building," not in a generic MnSCU environment. However, from the Main Lobby you may also enter a suite at any other MnSCU institution – for instance, visit their Student Services Suite to register for a course offered there. That suite closely resembles your home institution's corresponding suite: the room layout and furniture are essentially the same, though the wall hangings (institutional branding) are different.

In many cases, you don't have to visit (virtually) another school in order to achieve a cross-institutional objective. Your school's suites have rooms that provide access to MnSCU-wide information right there "on the premises." For example, a room in the Educational and Career Planning Suite allows you to search or browse the course offerings of any or all MnSCU institutions.