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Students: The Real Angel Investors

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Overview

As Richard Katz states so eloquently in the Foreword to *The ECAR Study of Undergraduate Students and Information Technology, 2006*:

> We take it to be self-evident that college-bound digital natives are in fact *digital cognoscenti, sophisticates*, and perhaps even *digital connoisseurs* who will arrive at our nations' institutions of higher learning with digital gadgets of every imaginable shape and function, with insatiable appetites for all things digital....[1]

When it comes to satisfying the technology cravings—and requirements—of our students, information technology (IT) administrators often stumble just at the threshold of technology innovation, though perhaps with good reason. Tested on a daily basis by the time-consuming reality of maintaining existing operations and services, confronted with competing interests for limited funds and human resources, distracted by policy or security matters, and held back by those resistant to change, IT organizations often possess the will, but not the framework or stamina, by which to proceed to rapid adoption of new—and especially cutting-edge—technologies. Indeed, as Katz continues:

> A great unspoken fear in the halls of higher education is that these digital sophisticates will come to our institutions to find aging technologies, legacy systems, congested (or bandwidth-shaped) networks, and decidedly unsophisticated purveyors of institutional information technology (IT) services....

How then, in the face of a multiplicity of barriers, can colleges and universities make tactical, if not strategic, selections and investments in innovative technologies? One answer is implicit in the very presence of the *digital cognoscenti*: the students themselves. By acknowledging and embracing students as participants in envisioning, planning, and funding investments in progressive technologies, institutions can hope to optimize a number of institutional goals. At Louisiana State University (LSU), as well as at other institutions of higher education, student advisory groups play an important role not only by engaging students in conversations about technology but also in the identification, testing, and final selection of particular tools and services, which may sometimes be deployed or provided solely for students. When students become early adopters of and then proponents for innovation, the critical mass or tipping point for overall campus acceptance and adoption is often reached more quickly and gracefully than when students are not involved. This research bulletin explores the ways in which LSU and other institutions have sought to overcome the challenges and barriers inherent in new technology adoption by including students in relevant conversations and stakeholder processes. Also explored are linkages between strategic planning for IT, strategic investment using student technology fees as one vehicle for investment, and inclusion of students in IT governance as an expression of core values of the academy.

Any science or technology which is sufficiently advanced is indistinguishable from magic.
—Arthur C. Clarke

Technology is like fish. The longer it stays on the shelf, the less desirable it becomes.
—Andrew Heller, IBM

Strategic planning for IT is an implied if not explicit goal of higher education as reflected by data from the EDUCAUSE Core Data Service, which reveals that 80.1% of campus strategic plans include strategies and direction for IT, while 73.4% of all institutions have a stand-alone IT strategic plan.[2] Fortified by the best strategic plan, however, institutions must still navigate the rapids of competing interests for the time and investments required to proceed from *strategic planning* to actual *technology adoption*, especially technology adoption that is progressive, leading-edge, and perhaps perceived as risky for the institution. Distractions appear in the form of the latest worm, virus, or hack, or the rather more attractive array of new commercial services and products that tempt our IT palates but which also must be evaluated for scalability, compatibility, long-term value, and a host of other criteria before integrating them into the campus IT environment. In short: there are many "barriers to entry" for investing in innovative technologies, and if nothing else, it is best to "know thine enemy" if one is to slay the dragon.

Keeping the Tires on the Road

Those responsible for daily IT operations, or at any level of IT administration, understand the struggle involved in simply funding generally needed infrastructure updates while maintaining existing services (maintenance mode). Measures of success in keeping basic infrastructure up-to-date include staying "on plan" with desktop computer and equipment replacement and having a funding model that includes renewal of the IT capital plant. Although most institutions report having a desktop computer replacement plan, according to the *EDUCAUSE Core Data Service: Fiscal Year 2006 Summary Report,* it is still instructive to note that over 30.3% of institutions are behind on their expressed plan for computer replacement and that an even larger percentage (45.9%) lack a funding model that includes renewal of the IT capital plant.[3]

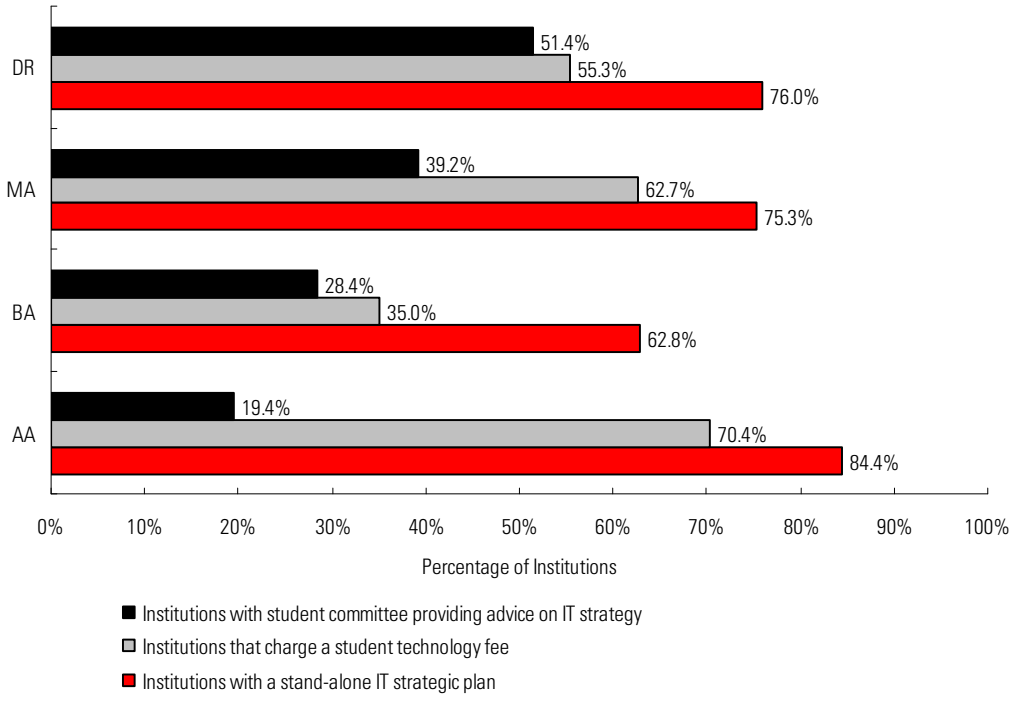
Additionally, many challenges arise from managing the campus IT environment and its use. Without engaging in the debate about whether music, video, online games, or any other online activity qualifies as a "legitimate" academic pursuit, it is nonetheless instructive to note that most campuses practice some sort of bandwidth tracking and shaping, with fully 73.0% of campuses shaping by *type* of traffic, 71.4% managing bandwidth *utilization*, and 52.6% shaping by *location* on campus. Fewer than 7% of institutions don't practice any sort of bandwidth management.[4] Add to this an ever-increasing vigilance required to secure both wired and wireless networks via 802.1x, PKI, or other methodologies; deploy or maintain antivirus, antispyware, and computer health monitoring software; develop or implement ERP systems (roughly 31% of all institutions report being in the process of, considering, or deploying a new ERP system); update student information systems (the mean age of all student information systems is now 12 years)[5]; and respond to DMCA and RIAA complaints; along with local student

ethics/judiciary matters...in sum, the list of demands and priorities requiring urgent attention, not to mention funding and human resources, is extensive, and collectively these challenges can persist as obstacles in proceeding toward adoption of innovative technologies.

Assessing the Gap

Apart from the daily IT challenge of keeping the proverbial trains running, an absence of effective IT governance (ITG), and in particular the absence of a student voice in ITG, may turn out to be a significant deterrent to adoption of progressive and innovative technologies. The current literature on university ITG stresses the need to build "mutual trust between all IT units and their clients" and "educate constituents, communicating to them the vision, opportunities for involvement, annual objectives, and results."[6] A report from the 2007 EDUCAUSE Information Technology Governance Summit suggests that there is a gap between governance theory and practical politics (see Figure 1): "ITG usually works differently in practice than in theory. ITG works, or does not work, because of relationships between people, not because of structure or process. At the same time, good processes and structure can insulate ITG from obstructionism or the loss of key individuals."[7] Curiously, however, there is a dearth in the literature about ITG and, in particular, students as clients or stakeholders in formal governance structures and processes. This is particularly interesting when over 50% of all institutions charge a student technology fee,[8] and for those institutions that do assess a technology fee, student technology dollars constitute a funding source ranging from about 7% to 16% of funding for central IT. At the same time, fewer than half of all institutions having a stand-alone IT strategic plan also report that there is a student committee providing advice/feedback on that strategic plan.[9]

Figure 1. Apparent Gap between Student Funding, Student Governance, and Strategic Planning



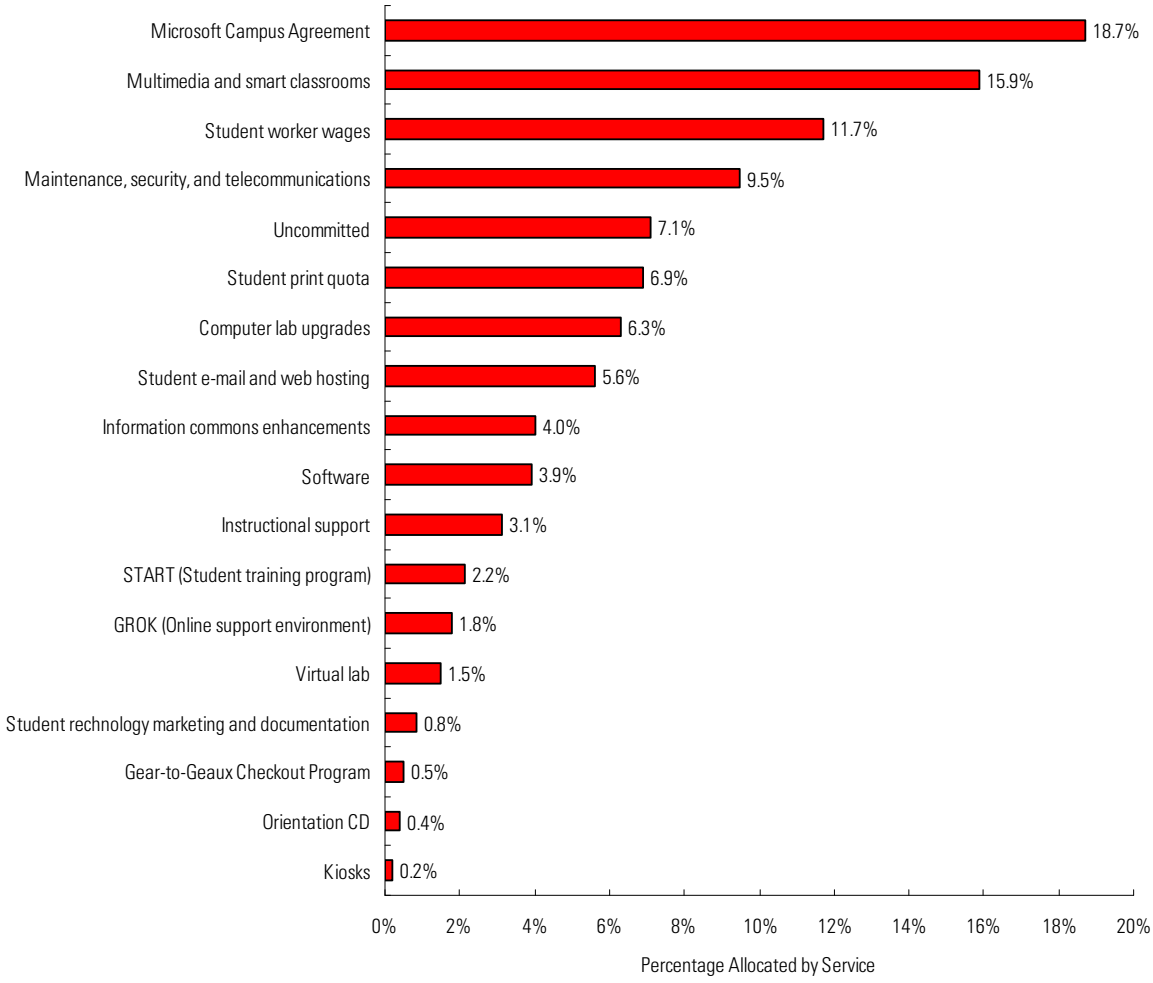
At LSU, as at slightly more than half of all universities surveyed in the most recent EDUCAUSE Core Data Service survey, students pay a general technology fee. LSU's Student Technology Fee (Tech Fee) was enacted by state legislation and is currently assessed at the rate of $5 per credit hour per semester, with a ceiling of $75 per semester. By comparison, of those institutions assessing a technology fee, about 43% charge a flat fee per semester, while another 31.0% charge by credit hour.[10] At LSU's current student enrollment of approximately 28,000 students, the Tech Fee generates about $3.9 million in revenue annually.

Perhaps the most unique aspect of LSU's Tech Fee is that its use and expenditure are governed entirely by a Student Technology Fee Oversight Committee that comprises 10 voting members: the vice chancellor for finance and administrative services, the vice provost–academic affairs, the chief information officer, one faculty member appointed by the Faculty Senate, and six students, including the president of Student Government, the speaker of the Student Government Senate, the president of the Graduate Student Association, and three other students nominated by the president of the Student Government with Senate ratification. Other non-voting members—for example, the deputy CIO for user support, and managers of student labs and the help desk—also act as technical resources and advisors to the committee. Because students compose the majority of the Tech Fee Oversight Committee, as a voting bloc they effectively control the expenditure of all $3.9 million in funding. The Tech Fee Oversight Committee meets on a regular basis throughout the academic year to determine allocation of funds.

Historically, and for the current academic year, nearly 70% of the LSU Tech Fee has been allocated to meet the ongoing costs of running public computer labs, life-cycling information kiosks, lab hardware and furniture, and funding campus-wide software agreements for students (see Figure 2). No professional staff salaries are paid from the Tech Fee, but the Tech Fee does provide for the wages necessary for student hardware technicians and lab monitors, help desk consultants, and so forth. The student Tech Fee also funds 156 multimedia classrooms located throughout campus.

About $275,000–$300,000 is left for discretionary or one-time expenditures, and this is where we see students taking a proactive stance. In fact, when Student Government elections are held in the spring, it is not merely typical but expected that each candidate and party's platform will include several technology measures that they intend to fulfill during their term. Given that the newly elected Student Government will then populate the student membership of the Tech Fee Oversight Committee, and given the track record of past achievements, a party platform including identifiable—and usually far-reaching—technology proposals is not merely perfunctory but rather an outstandingly thoughtful and progressive approach to achieving campus IT innovations.

Figure 2. LSU 2008 Student Tech Fee Allocation



What Exactly Is an Angel Investor?

Although the term *angel investor* was originally used to portray wealthy individuals who invested in theatrical productions in Great Britain, it was University of New Hampshire Professor William Wetzel who popularized the term in his classic 1978 study of nontraditional venture capitalists. According to Wetzel, angel investors represent "an invisible segment of risk capital markets" and are "often the most likely source of funds for technology-based investments." Angel investors are those who invest in businesses because they are looking for a higher return than found in traditional investments and because they want to give something back to the community. "The influence of nonfinancial factors is a characteristic that distinguishes angels from professional venture capitalists.... These nonfinancial returns fall into several categories; some of them reflect a sense of social responsibility."[11] Significantly, angels usually provide bridge capital, taking a business from the self-funded stage to the point where the business potential is sufficient to garner the interest of professional venture capitalists. Although student "angel investors" do not meet all of the criteria of this term as used in a free-market context, they embody enough of the attributes to have earned the moniker

at LSU, investing in technologies well ahead of peer institutions and accelerating the tipping point for overall campus adoption.

Outsourcing E-Mail

Ten years ago, at the onset of the fall semester of the 1997–98 academic year, LSU introduced Personal Access Web Services (PAWS), a web-based one-stop shop to university services.[12] At the time, LSU's portal, which now delivers over 50 broad-based applications via a customized, dynamic, role-based interface, was still relatively rare in the higher education enterprise environment. The LSU portal subsequently garnered the EDUCAUSE 2000 Exemplary Practices in Information Technology Solutions Award. E-mail was, predictably, one of the first single sign-on applications to be delivered through the new university portal.

Students quickly took to the new portal. In fact, in the spring of 1998, LSU Student Government passed an unprecedented Student Government Resolution to have all faculty and staff use the PAWS portal and urged central computing to continue to develop applications to interface with the portal. Student government representatives worked closely with central computing throughout the spring to introduce students to PAWS.

It came as no surprise when, in the spring of 2003, Student Government began expressing dissatisfaction with the web-based, Lotus Notes e-mail application. The Lotus Notes application lacked many features such as spell-check, calendaring, and an address book. E-mail quotas were insufficient. Moreover, the application was dreadfully slow due to an aging hardware infrastructure. Students actively called for a subsequent requirements assessment to replace the existing system. When it became clear that the projected life-cycle infrastructure costs for an e-mail upgrade would exceed $300,000, students were receptive to suggestions from central IT that *one* of the options might be to outsource student e-mail.

Student leaders participated in all aspects of the e-mail request for proposals (RFP) and subsequent replacement project, including the initial request, initial research and pilot, bid specification, funding acquisition, marketing, and ongoing migration. In the spring of 2003, students, via the Tech Fee Oversight Committee, voted to underwrite the student portion of the e-mail replacement. In the summer of 2003, Student Government worked in close partnership with central computing to pilot the new software, testing the new features and promoting completion of an online survey regarding their experiences. The results of the survey indicated overwhelming support for the outsourced solution. In spring 2004, LSU contracted with the Outblaze company to provide student e-mail services, and Student Government voted to fund student e-mail as an ongoing investment. In fall 2005, students again voted to increase the individual storage quota from 50 megabytes to 1 gigabyte, to underwrite IMAP/POP3 connectivity, a backup service, and web hosting services, also from Outblaze.[13] Although other universities, including Arizona State University, Northwestern University, and Ball State University, among others, have recently elected to outsource student e-mail to third-party providers, LSU students were early adopters in this area, demonstrating proof-of-concept to other institutions.

Microsoft Select and Tigerware Distribution Server

At LSU, departments and schools have historically managed their own software budgets and purchases independently of the purchasing department and of central computing. Until a few years ago, many departments at LSU chose Corel WordPerfect to satisfy their word processing requirements, while other departments used the Microsoft Office Suite. While both products were available in the public computing labs at LSU, no campus-wide agreements existed such that students could download either WordPerfect or the Microsoft suite for their personal computer or laptop use. Moreover, the lack of centralized campus software agreements led to redundant contracts, wasted financial resources, and an unfortunate have-and-have-not situation.

In 2005, LSU entered into its first Campus Select agreement with Microsoft, providing the Microsoft desktop operating systems, Professional Office Suite, and OneNote for all students, faculty, and staff. Although there is nothing particularly unique about LSU's signing a Microsoft Select agreement, what is perhaps remarkable is that it was the student leaders, via the Tech Fee Oversight Committee, who determined that they would invest their tech fee dollars in funding the student portion of the campus-wide agreement. Because students obviously constitute the largest segment of the campus population, they effectively became the angel investors in this agreement, providing bridge capital and allowing other campus funds to be freed up for other investments, including the licensing of an online software distribution system developed at Indiana University (IUware).

LSU adapted the Indiana University software and now provides its own online software distribution system called Tigerware. During the past year, the LSU user community downloaded over 400,000 licensed, open source, and freeware software programs from Tigerware, including over 20,000 copies each of Windows XP and Windows Vista and the Microsoft Office Professional Suite. The Microsoft products alone would exceed $20 million at individual educational pricing and an amazing $25 million at retail pricing.

GROK and Wireless Infrastructure

In the spring of 2006, LSU students, via the Tech Fee Oversight Committee, approved $72,000 to begin development of GROK, a sophisticated distributed-authorship online knowledge base, named in homage to Robert A. Heinlein, who invented the word *grok* in his remarkable novel, *Strangers in a Strange Land*. Grok, a Martian word in the novel, means to understand deeply and intuitively.

Initially, both open source and commercial content management and wiki systems were considered as underlying development frameworks for GROK. In particular, Microsoft's SharePoint and the open source MediaWiki, which powers the Wikipedia website, were considered as development platforms. At the time, all wiki packages required that editors learn the wiki markup language. Because distributed authorship by content-area specialists and editors (many of whom are not very technical) was a primary criterion for the project, it was deemed overly burdensome to author content in wiki markup language. In addition, LSU desired a workflow process that allowed for high-level quality control. As a philosophical point, most of the existing wiki applications allowed for fairly

free-form, quality-neutral editing from just about any source, with a rollback mechanism to correct inappropriate edits. LSU wanted to ensure that all information published in the GROK knowledge base had been approved for accuracy and quality, while achieving a balance in the opportunity for distributed authorship.

GROK was developed in ASP.Net with the data stored in an SQL server database. Article content, including images, is recorded in the database. The SQL server full-text index system was used to facilitate article searches. Implementers used the MediaWiki database design as a starting point. An open source, web-based, rich-text editor was incorporated to provide a WYSIWYG interface for the editors.

With the foundation in place, additional features were planned. Recognizing the growing number of web-connected mobile devices, a mobile interface was developed to allow users to view articles while on the move. A multimedia component is also currently in development to allow podcasts and video to be included in the articles. The system implements workflow functionality to allow content owners from any department on campus to author and maintain content and to have that content approved prior to publication.

The GROK Knowledge Base breaks new ground in online support, providing a mobile interface, multimedia content, and distributed authoring workflow coupled with quality control and versioning. While other universities have certainly implemented wikis, knowledge bases, or distributed content-management systems, LSU's GROK not only offers advanced features but also provides a successful model for university-wide content management that reflects the values of the academy with an eye to excellent fiscal management.

A recent technology change on campus demonstrates how well this self-help tool has been integrated into the LSU user community culture. During the spring of 2006, a security audit conducted by the state auditor recommended that LSU move to a more secure wireless infrastructure. (Although the entire LSU campus is now blanketed in wireless coverage, the initial funding for wireless arose from an initiative presented in 2003 by students to the Tech Fee Oversight Committee to fund 200 wireless access points in high traffic areas around campus. In 2004, Tech Fee funded an additional 200 access points to provide more ubiquitous coverage. Today, Tech Fee funds node charges in excess of $86,000 annually). During the summer of 2007, the network infrastructure division, in partnership with user support, formalized plans to do a complete cutover to 802.1x authentication. Fear and trembling ensued because 802.1x requires a fairly complex reconfiguration of the Wireless Network Connection control panel on Windows XP and Windows Vista operating systems. In addition, students and faculty returning to campus after summer break would encounter a rather dramatic change to the campus wireless environment. However, the inspiration came not only to use GROK as the primary educational tool and reference for the configurations but also to set it as the default web page for the new secure wireless environment. Laptops attaching to the wireless network would automatically see a knowledge base article that would guide them through the reconfiguration required for 802.1x. Although the cutover to secure wireless certainly was

not painless, in the end Student Government passed Resolution 1, commending central computing for its excellent work in helping students convert to 802.1x.

Only 18 months after its initial funding by students, the GROK knowledge base contains nearly 6,000 articles and is used widely, not only by the students who initially funded it but also by individual faculty and staff and by departments that are beginning to take advantage of the framework provided for customized content units that reside both stand-alone and within the overall knowledge base. With initial and now ongoing annual funding of $72,000, the incremental cost of adding a new GROK article is now less than 20 cents.

What It Means for Higher Education

At LSU, having a formal IT governance structure like the Tech Fee Oversight Committee, coupled with empowerment to disburse revenue, not only sanctions but effectively guarantees sovereign control of technology fee expenditures by the students themselves. At LSU, the evolution and manifestation of that sovereign control has, happily, been incredibly fruitful and, although we will never know for sure, has likely resulted in the early adoption of progressive and innovative technologies that would not have otherwise made their way onto campus until years later, if at all.

The assessment of a technology fee, and the oversight of the technology fee by students, are neither necessary nor sufficient conditions from which to ensure that innovative technologies will make their way onto our campuses. Rather, the key lies more in the degree to which the *digital cognoscenti* are valued for their years of experience as technology consumers and potential prognosticators; the degree to which students are invited into the conversation about IT along with administrators, faculty, and staff stakeholders; and the degree to which students are empowered and have embraced the role of technology stewards for the campus. IT governance notwithstanding, it is the *culture* of stewardship and leadership combined with a drive for innovation that will enable any campus to benefit from student vision and investment.

Even if your university does not charge a technology fee, student involvement can take a number of forms, including, but not limited to, the formal structures of governance. Excellent counsel is given by James Penrod in his chapter “Building an Effective Governance and Decision-Making Structure for Information Technology.” Among other things is the need to understand and clearly articulate to students (and others) the differences between IT governance and IT management and “to define and clarify the roles of the groups and the potential implications of their actions.”[14] Such definitions will enable students to understand the parameters of their participation and help institutions gain clarity on how students can be partners in the processes that concern investments in new technologies and services. Each campus can explore its own ways of involving students, but a sample list includes:

- *Include students in existing campus technology policy and advisory committees.* Most campuses have at least some form and variety of technology groups focused on communication, support, and/or policy. Although students may have less interest in, say, business intelligence, they may have awareness of and

sound input for everything from student information and course management systems to policies regarding fair and facilitative use of network resources.

- *Create a student technology advisory/focus group.* A student advisory group may be bounded to technology issues that directly impact students, but students are more likely to feel empowered when they are primarily among peers. Remember that investments in technology innovations that create real differences in campus life need not entail large expenditures. Examples include student-run/vendor-supported technology fairs, vendor-supplied laptops and mobile devices for check-out programs, security awareness and education programs, and campus video, podcasting kiosks, and displays.

- *Include student leaders in strategic IT planning.* As noted above, although 80% of surveyed colleges and universities report having a strategic plan, significantly fewer campuses report having a student committee providing input on IT strategy.

- *Consider using students as beta/pilot testers for IT projects.* The importance of pilot testing new software or services cannot be overstated, yet rarely are students included in the process. Consider, for example, the number of phone calls that may be generated to the help desk if a new student registration system is less than intuitive. At LSU, students were actively involved in selection and piloting of the web portal and the outsourced e-mail solution. As more institutions make the switch to collaborative services such as Google Apps for Education and Windows Live@edu, the inclusion of students in pilot-testing may be critical to success.

- *Cultivate relationships with student media.* Student media is generally more accessible and more widely read than e-mail and can be your best ally (or your worst detractor) when considering or introducing new services. Though the initial response from student media regarding the proposed cutover to the new wireless authentication at LSU was greeted with vitriol, eventually student media became a vital partner in publicizing the cutover and even distributing printed help documentation. Maintaining an ongoing dialogue with student media provides another valuable avenue of conversation and input about technology innovations.

- *Hire a student liaison for your IT staff.* Akin to maintaining a relationship with student media, but even more direct, having a student liaison on staff can provide a direct feed from student opinion and vision to your office.

- *Leverage residential IT living-learning colleges as advisors.* Many campuses support IT or computer-related living-learning communities or colleges. Self-identified technophiles, students in these communities usually relish the opportunity to be included in technology visioning or testing. As living-learning communities are also associated with higher retention and graduation rates, a small but important side benefit may be to contribute to the overall health of these living-learning communities.

In the long run, campuses will be enriched by including students at all levels of envisioning, planning, and implementing new technologies, if for no other reason than to actualize our commonly held institutional values of inclusiveness, discourse, and critical thinking.

Key Questions to Ask

- How does our campus explore and assess the adoption of new and emerging technologies for the campus?
- What are the key factors driving investment in new, innovative, or cutting-edge technologies on our campus?
- How does our campus make use of a general student technology fee to help fund new technologies?
- If a technology fee is already assessed, how is the use of the technology fee governed? How are the stakeholders involved?
- If a technology fee is not already assessed, should we consider the use of a general technology fee primarily to fund truly student-focused technologies?
- How does our campus encourage and invite student input, discourse, and critical thinking when it comes to the planning, design, and testing of technologies that primarily impact students?

Where to Learn More

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