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ACUTA’s Core Purpose is to support higher education information communications technology professionals in contributing to the achievement of the strategic mission of their institutions.

ACUTA’s Core Values are:
- Encouraging and facilitating networking and the sharing of resources
- Exhibiting respect for the expression of individual opinions and solutions
- Fulfilling a commitment to professional development and growth
- Advocating the strategic value of information communications technologies in higher education
- Encouraging volunteerism and individual contribution of members
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Unify campus communications

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"We absolutely see traditional voice on campus dying over time. It will be just another application on the network."

—Doyle Friskney
University of Kentucky
Mass Notification Insanity

It is said that one sign of insanity is “doing the same thing over and over and expecting different results.”

It appears that hundreds of mass notification tests have been executed on large campuses using text messaging, e-mail, sirens and other casual communication devices. These have all been virtual failures. The sponsors will assert claims such as: “We sent 40,000 messages in 3 minutes.” But, how many were received and, of course, the important question is: READ — within a few minutes — maybe 400?

Why the focus on electronic devices? We like our texting and our PC’s, and yes, everyone is looking for the least expensive solution. It is important in life safety matters to select from solutions that work.

In a true crisis situation, when events are happening very quickly, SECONDS DO COUNT! Those first few minutes can make a major impact on outcomes. While the casual communication devices are important in the total emergency communication solution, they do not provide dependable instant communications.

There truly is only one method of instant communication to large numbers of people on a campus. That method is Loudspeaker Voice Notification Systems. Does anyone seriously question that?

Loudspeaker Voice Notification Systems have been very expensive in the past. The cabling of systems was an overwhelming cost component. That is not necessarily true any longer. Visions of expensive and disruptive trenching of cables for miles and miles across a campus are no longer applicable.

Today we distribute voice across the campus data network to amplified speakers in hallways and key outside areas. Some campuses opt for additional speakers in rooms and/or emergency call buttons in dorms and classrooms. Call buttons connect directly to the campus police, eliminating delays that are common when someone dials 911. All these devices are now network end points allowing fast, inexpensive deployment.

Yes, even Loudspeaker Voice Notification Systems are high tech and are a critical and probably the most important component of any campus mass notification solution.

Instant communications can SAVE LIVES.

“There truly is only one method of instant communication to large numbers of people on a campus. That method is loudspeaker voice notification. Does anyone seriously question that?”

When Seconds Count!

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There truly is a lot of conversation about unified communications—what it is, what it means, and how it is advancing. I thought I would take the opportunity to share with you what people are saying.

- **CIO Magazine** (Jan. 5, 2009)

Gartner’s Top 10 Strategic Technologies for 2009: Hype Overload

Gartner’s top 10 strategic technologies for 2009, defined as having the “potential for significant impact on the enterprise in the next three years”:

1. Virtualization
2. Cloud computing
3. Servers (beyond blades)
4. Web-oriented architectures
5. Enterprise mash-ups
6. Specialized systems
7. Social software / networking
8. Unified communications
9. Business intelligence
10. Green IT

- **Cisco Unified Communications Primer**

According to a 2005 study by Sage Research most workers use an average of 6.4 communications devices (PC, laptop, office phone, IP [Internet Protocol] phone, mobile phone, pager, teleconferencing equipment) and 4.8 communications applications (voice, voicemail, e-mail, SMS, audio conferencing, fax). (Cisco IP Communications Applications Survey, Sage Research, Sept. 2005.)

Fifty-two percent of workers use multiple methods to reach coworkers each day. Thirty-five percent are unable to reach coworkers on the first try.

- **Horizon Watching** (Techworld, April 20, 2009)

According to Gartner, during the next five years, the number of different communications vendors may be reduced by at least 50 percent.

- **TechTarget**

According to the International Engineering Consortium, unified communications is an industry term used to describe all forms of call and multimedia/cross-media message-management functions controlled by an individual user for both business and social purposes.

- **Data & Voice Networking Interviews** (July 14, 2008)

“I think there are technologies you don’t know you need until you use them... You could think of the very first fax machines, for example, or email, or even TiVO,” says Mark Swendsen, Shoretell’s European managing director.

- **Computer Weekly** (July 22, 2008)

Unified communications might describe a genuine technological advance, but the term is wide open to abuse.

- **CIO Insight.com** (March 4, 2009)

Finding a Happy Medium

This evidence of IT’s role in reducing costs is critical to understanding the IT market today because while it’s still true that many more firms are focused on revenue growth than on cost-cutting, the number in the latter camp has increased dramatically since last year.

- **eWEEK.com** (Feb. 15, 2009)

How to Build a Successful Unified Communications Strategy

A successful unified communications implementation involves an intense focus on planning and testing.

Step 1: Evaluate and plan
Step 2: Upgrade the infrastructure
Step 3: Utilize voice and data together
Step 4: Educate and measure the results
CDW-G Survey: Unified Communications Gains Momentum. It has been touted for years as the Next Big Thing, yet unified communications has loomed along virtually under the radar while it gathers fans and converts alike.

CDW-G’s survey found the biggest challenges among organizations implementing unified communication are the impact on the existing infrastructure (44 percent), training requirements (42 percent), time required to implement (40 percent), capital costs (40 percent), and network security (39 percent).

Keeping UC Deployments on the Business Track

For instance, when targeted for only a subset of your employee base, hosted UC solutions may become an attractive alternative.

Focus on Managed Services: Unified Communications: What’s the Score?

Most organizations are just starting out.

Advanced Uses of Unified Communication Apps Shine at VoiceCon

Avaya CEO Kevin Kennedy showed how the platform, meshed with Facebook, could be used to create an online sales-support tool. In the scenario, a person seeking a flat-panel TV connected via Facebook video to a salesperson at the TV store.

Unified communications is here to stay. There are almost as many definitions of UC as there are companies that provide the component technologies—and there’s no such thing as “one size fits all.”

Credit Union Journal (Dec. 15, 2008)

IT Executives’ Christmas Wish List

“I want a system that knows to send the message to an office PC, office phone, cell phone, IM client, e-mail, or other means without having to read and delete the same message on each vessel.”

Rich Tehrani, President, Group Editor-in-Chief

“Cheap broadband has made possible everything from ‘triple play’ residential service bundles to enterprise-class tele-presence. Try using a unified communications suite with a 56 kbps analog dial-up connection. It isn’t pretty.”

Mark Deakin, manager for unified communications at Microsoft, said, “As long as they see enough advantage, people will adopt the new technology.”

As you can see, unified communications is a lively topic, and in this issue of the ACUTA Journal we will discuss this topic further. I hope you find it useful.

I would also invite you to ACUTA’s Summit on Unified Communications and Collaboration to be held in Denver July 12–15, 2009. Let’s continue our conversation.

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I am pleased to have this opportunity to report on some of the highlights of activities by the professional staff in the ACUTA office during the 2008–09 administrative year. The ACUTA professional staff remains focused on providing outstanding service to our members and the many corporate entities we work with on a daily basis. We have also had the opportunity to complete a number of exciting new projects.

Transition of Annual Conference to Spring

The decision to change the time of year for the Annual Conference to the spring was based on feedback from ACUTA members. This change created the need to adjust many internal schedules, including the elections, committee appointments, conference-related publications, annual report production, and many others. It also required the committees and board to adjust their business year, with projects and year-end reports focused on completion by the April board of directors meeting rather than by July. All of the committees and staff have successfully made this transition. Two of the committees were impacted the most—the Program Committee, which is responsible for planning the educational programs at the Annual Conference, and the Higher Education Advisory Panel, which is responsible for planning content for the Strategic Leadership Forum. I would like to thank both of these committees and their staff liaisons for successfully completing their tasks on a compressed planning schedule.

Strategic Planning

This year, our strategic planning efforts were focused on working with committees and staff teams to implement the strategies and action items in the new Strategic Plan.

The Strategic Plan Report Card was made available at the Annual Business Meeting and posted on the Web at http://www.acuta.org/2517. It shows that, of 69 total action items, 28 are already completed and ongoing, and 30 are underway. I believe this is a significant achievement for the first full year of the new plan.

Committee Restructuring

As part of the realization of our Strategic Plan, a task force of ACUTA officers and past presidents undertook the first comprehensive examination of our committee structure in many years. A new structure has emerged that will position us to accomplish many of our goals and objectives, meet the current and emerging needs of members of the organization, and provide more opportunities for member involvement. I have worked closely with the task force throughout the year, under the leadership of our president-elect. The new committee structure was presented at the Annual Business Meeting, and recruitment for phase 1 of the new structure is under way.

Public Policy and Regulatory Affairs

As the staff liaison to the Legislative/Regulatory Affairs Committee, I continued to spend a large percentage of my time monitoring and analyzing regulatory proposals and actions at the U.S. federal level, and working with the committee and legal counsel to plan our advocacy efforts. It has been another very active year, but despite a lot of activity there were few major changes in telecommunications laws and regulations. Due to the elections, turnover at the FCC, and the economic situation, many of the important legislative and regulatory policy issues remain unresolved. These include the adoption of a national broadband policy, peer-to-peer file shar-
ing, universal service reform, emergency notification requirements, net neutrality, taxation of company-owned cell phones, and others.

One significant development was the enactment of the Higher Education Opportunities Act, and the appointment of negotiating committees for the rulemaking process. ACUTA submitted comments to the Department of Education, and we also submitted two nominations for negotiators, one of which was accepted. Matt Arthur of Washington University in St. Louis is an alternate negotiator specifically on peer-to-peer file sharing issues. Other higher education representatives are negotiating on student identity verification and emergency notification, the other two issues of most interest to ACUTA members. We will keep you informed as the rulemaking process is completed, targeted for next November.

Another major development was the adoption of the economic stimulus package in February, which allocates $7 billion for broadband deployment. We are closely following the development of rules for distributing this money, submitting comments to the appropriate agencies, and keeping ACUTA members informed through a new section on our legislative/regulatory website.

The ACUTA Legislative/Regulatory Affairs Committee continues to monitor all relevant federal policy areas, providing input on behalf of the association to federal agencies when appropriate and keeping members updated through the Web, e-mail alerts, and a monthly electronic newsletter.

ACUTA continues to collaborate with other higher education and networking organizations on public policy issues, and this is reflected in a high-priority strategy in our Strategic Plan. I continued to represent ACUTA on the Network Policy Council (NPC). This is a group within EDUCAUSE that is analogous to the ACUTA Legislative/Regulatory Affairs Committee and includes representatives of Internet2, higher education institutions, state and regional networks, consultants, and EDUCAUSE national policy staff. The NPC meets biweekly, in addition to several meetings in Washington that have involved visits to members of Congress and federal agencies. ACUTA has taken the lead in coordinating several issues at the national level, including universal service.

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This group has been a tremendous help to us, allowing us to rely on the expertise and resources of our fellow higher education associations in accomplishing common goals.

Finally, we have been pleased to work throughout the year with Dow Lohnes, ACUTA’s new legal counsel. The firm’s expertise on communications technology and higher education issues has been a tremendous benefit to our organization.

Media and Industry Relations

It has been another successful year for ACUTA in the media, with a steady flow of requests for comments by and interviews with ACUTA officials. This continues to be a positive contributor to our long-term strategic goal of positioning ACUTA as the preferred resource on communications technology in higher education.

Collaborations

ACUTA members benefit from our collaboration with other organizations with common goals and values.

In addition to our federal policy collaborations with EDUCAUSE, Internet2, and other organizations mentioned above, we worked with a number of other groups in various ways.

• We worked with ITERA (the International Telecommunications Education and Research Association) on their student paper competition and other projects. We were very happy to have the ITERA conference collocated with the ACUTA Annual Conference this year, and hope to work with the association for many years to come.

• We were active members of CHEMA, the Council of Higher Education Management Associations, participating in research projects and programs designed to improve communication among association leaders in higher ed.

• We maintained communications with APLU, the Association of Public and Land Grant Universities (formerly NASULGC), on federal policy issues.

• We met with NENA, the National Emergency Number Association, to discuss the association’s model legislation on e911 for multi-line telephone systems.

• An ACUTA representative participated in an FCC workshop with the hearing-impaired community on advances in Telecommunications Relay Service (TRS).

All of these collaborations have been positive for ACUTA and our members, and we intend to continue to reach out to other professional and industry organizations with mutual interests.

ACUTA Conferences and Seminars

The 2008 Annual Conference and Fall Seminar in Boston had excellent attendance and corporate support. Beginning with the Winter Seminar in January 2009, we began to feel the effects of travel restrictions at our member institutions, with reduced attendance, although exhibit and sponsor support remained strong. Registration numbers for the Annual Conference and Strategic Leadership Forum were also

Unified Communications and Collaboration

This must-attend event showcases how widely unified communications and collaborations are deployed on campus and the challenges and benefits they present.

In addition to plenty of opportunities for interaction among participants, these are our Featured Presenters:

• Jay Lassman, Gartner

• Gary Audin, Delphi, Inc.

• Phillip Beideman, WTC Consulting, Inc.

Get Details or Register at www.acuta.org
less than projected, due to the widespread economic downturn. (However, the evaluations from attendees and exhibitors who did attend were very high—among our highest ever—proving the value of the meeting for those who could attend.)

In response to this new reality, we are currently developing new options for our members to benefit from the educational sessions at our conference and seminars via distance education. We are also adding to our schedule of audio and Web-based programs.

Economic Issues
As mentioned above, we have begun to feel the effects of reduced attendance due to travel restrictions at member institutions. At the same time, we continue to have a steady stream of colleges and universities, and companies, join as new members. Our membership numbers are actually ahead of last year’s numbers for the same time. That is a good indication that ACUTA remains a strong and relevant organization. In addition, during the past year we successfully leased out all of the excess office space in the ACUTA office building, and our mortgage on that excellent facility will be completely paid off within the year. Our financial position remains solid, due to substantial reserves. In the meantime, the ACUTA board and staff are taking measures to control expenses and develop new forms of revenue. I am confident that we will weather this current economic cycle and come out stronger on the other side.

Conclusion
None of these actions could have been accomplished without the dedication and energy of every member of the ACUTA staff and volunteer leadership team. I would like to thank all the staff members for their professionalism and commitment to the continued success of ACUTA—and for the extra effort involved in making the transition to a spring Annual Conference with a compressed planning timeline. I would also like to thank our elected and volunteer leaders—our board of directors, committee chairs, and committee members—who continue to devote tremendous energy to guiding the association toward the accomplishment of its goals.
The Rollout That Will Never End

Curt Harler
Contributing Editor

There is no single definition of unified communications (UC). Talk to six vendors and six consultants and you'll end up with a dozen different definitions—all valid. Some are based on services available today. Others are based on the promises of tomorrow. All predict change in the way communications drives our lives and work.

"Network administrators need to realize that telephony is fundamentally changing on campus," says Doyle Friskney, associate vice president of information technology and chief technology officer at the University of Kentucky (UK). UK is on the forefront of the move to UC, serving as a beta test site for Microsoft Office Communications Server 2007 R2. UK tested R1, as well.

"Either you lead the change or the users will lead it," Friskney says. "But it is your responsibility to lead it."

For many colleges the question is: Just what is UC?

"The concept of UC is to eliminate the legacy stand-alone services that you would traditionally provide—things like voice, data, LAN/WAN, IM, and e-mail—and put them into a shared environment," says Steve Parrott, Sprint's portfolio manager for managed services. Consultants at the Yankee Group prefer to refer to UC as a vision of becoming an Anywhere Enterprise. It is a parallel view.

"The world of UC is changing rapidly, as so much in IT does. A sustainable UC platform needs to be flexible, allowing for 'best choice' technologies to be included as the options and opportunities change," says Lonnie D. Harvel, PhD, who is CIO and vice president of educational technology at Georgia Gwinnett College, Lawrenceville (GGC). (Note: Georgia Gwinnett College is the first public, four-year liberal arts college to be founded in the United States in the 21st century according to the American Council on Education. It is also the first four-year college to be founded in Georgia in more than 100 years.)

The Migration Begins

Migrating from traditional trunk line to SIP trunking is a simple, cost-effective start. It will open doors to other advanced services that can enhance a UC deployment, according to the February 2009 report from Yankee Group. The report says SIP trunking will bring colleges the following benefits:

• Dramatically lowering the overall cost of communications
• Extending UC to software-as-a-service (SaaS) applications and other cloud-based options
• Accelerating UC deployments through the simplification of network design
• Easing migration to other advanced services such as mobile integration and MPLS networks

UK has gone to SIP. It allows all its communications to be based on the same standards and use the same networks. UK worked with multiple suppliers to implement SIP-based telephony, conferencing, video, and IM.
Other colleges have taken the first steps to UC by moving their network to VoIP. The question, now that they are VoIP enabled, is: What next? A host of companies, including Avaya, Cisco, Microsoft, RIM, and Sprint, all have their own visions and plans for implementing UC.

GGC has a commitment to using technology to make the learning environment as well as business processes more efficient, Harvel says. “UC fits into that overall vision,” he continues. “By integrating the various ‘channels’ of communication used by faculty and students, we simply provide the mechanics of interconnecting faculty with students and also students with students,” Harvel explains.

GGC is currently exploring both Cisco and Microsoft as well as the native integration that has rapidly become a part of many communication platforms. Whichever route a college like GGC chooses, the important thing to remember is that this is just an extension of familiar technology. The idea is to make UC work for you...not to create another management headache.

“Don’t be afraid of it,” Friskney says. “Manage the core and educate your end users just as you would for any program.”

If anyone had reason to worry, it was Friskney. “My staff was supporting about 10 video conferencing systems and multiple instant-messaging systems,” he says. “It was clear that we needed to establish a standard that would be easier to support, secure, cost-effective, and easy to use.” The IT staff also wanted to extend communications to the many portable devices proliferating on campus.

UK’s goal, simply stated, is to bring the world of Web 2.0 together with the legacy applications that touch all segments of the community. Students love their Hulu, Facebook, LinkedIn, and MySpace. A forward-thinking administrator will want to be able to tie class registration or whiteboarding to those familiar apps.
"We absolutely see traditional voice on campus dying over time," Friskney says. "It will be just another application on the network."

The user, Friskney says, should be paramount in any UC plan. The goal is to allow the user to move simply and transparently through the communications environment. A professor of archaeology might be across the world on a dig. She still needs to receive phone calls and access the campus network so she can participate in conference calls and update the department head on her work. A teaching hospital might have doctors who are not full faculty members but who use the operating theaters regularly and want to see data at offices across town or on the golf course. And don't forget the coach who is waiting for that call from his five-star recruiting prospect and wants the call to find him whether he is in his office, out on the football field, or on the road.

UC can do it all...once technology catches up with the vision.

"It's the blending of mobility into the mix that makes UC exciting," agrees Michael Flood, education segment manager for Sprint in Atlanta.

Georgia Gwinnett Goes UC

"As options for communication have grown, so too has the complexity of our communication protocols—how you communicate with whom about what," Harvel says. He says that UC allows for communication recipients to have more control over how they interact with different communication modalities and channels of communication (office phone, cell phone, home phone, text, e-mail, chat, video chat, teleconference, blog, RSS, etc.).

"It creates a fundamental shift from the communication instigator attempting to determine how to communicate as the sole control to a more distributed control between the instigator and the recipient," he says. The idea (or theory) is that, by allowing for more direct management over communication, an individual can increase personal productivity.

"As the cost for UC drops as it becomes innate to the communication platforms, the 'profit' from the increased productivity will rise," Harvel predicts. "The few pieces of integrated communications that we have already implemented have resulted in increased productivity for faculty and staff and reported increases in timely communication with students."

GCC's mission statement, in part, calls for the school to be "a model for innovative approaches to education, faculty engagement with students, and highly efficient student, facility, and administrative services." UC fits right in.

Putting the Pieces Together

If you prefer home-brewed UC, the first step is to see the big picture. UC potentially will give the campus data, Internet, e-mail, IM, video, and virtual presence. Notice that none of those services is exactly new...but being able to get them all on a single system that finds users wherever they are is new.

Since many college employees—professors, administrators, and staff—as well as students have moved to mobile devices, it only makes sense to extend the IP-based network over wireless to provide a gamut of services.

Sprint says it is integrating its Global MPLS technology as an enabler for VoIP, and allows IP PBXs to deliver the features and functionality of combined local LEC- and LD-provider services along with class-of-service support of other real-time data. The solution provides connections to Office Communications Server 2007 R2 based on SIP, a signaling protocol for setup and tear-down of voice communications sessions over the Internet. MPLS is the common enterprise technology for VPNs, Parrott says.

UK looked at Cisco (UK is a major Cisco shop). The university had experience with Office Communications Server 2007 R1 and earlier this year completed its beta test of R2.

"We realized that Microsoft was more tightly integrated to where the students and faculty come from," Friskney says.

If voice is becoming an application on the network, then it is important to have that application—and many others, ranging from video to IM—on a familiar platform. In the university’s back shop, Active Directory, Exchange Server, Office Communicator 2007, and other campus programs such as its call-center package from New York–based Cosmocom make Microsoft attractive. The initiative is SIP based. Plus, 96 percent of students and faculty already are familiar with and comfortable with Windows, Friskney figures.

Friskney is leaning toward the software-based solution, although he does not see Cisco going away. This spring UK moved to a robust production environment based on Microsoft and expanded its pilot project to put voice into several departments. "We have 44,000 user accounts enabled, and usage of the system on campus is exploding, really only by word of mouth," Friskney adds.
“The Attendant Console and PSTN dial-in capabilities will end up driving our deployment more than we initially thought,” he continues. “We have an enormous automatic call distributor (ACD). It is an expensive service to offer a department, and small departments generally can’t afford it. Now, when we bring a department on board, we will offer it the option of having a basic ACD based on the Office Communications Server Attendant Console. It is a low-end key system replacement, and we have about 500 key systems on campus.”

Security

Security comes in many flavors. At GGC, UC also allows the formation of what GGC calls its “Emergency Board Room.” A UC-enabled process activates mobile extensions anywhere at any time. It tracks all key members of the emergency preparedness team, either by simultaneous calls to all known team member phones or by cascading to different locations.

Data security is another key consideration, especially at schools with health-care components that fall under HIPAA. No private data can be exposed to the network, and it falls to IT to be sure the network is always secure.

Another security aspect is general user behavior. Everyone is concerned about spam and nefarious malware. However, it is also important to prioritize network use to be sure that key traffic has the bandwidth it needs. “You need to protect and control use of services,” Parrott says.

UC: A Song That Never Ends

Remember the children’s ditty about the song that never ends (it goes on and on my friend…)? That’s the way UC will appear to ACUTA members as the years roll by. Yankee Group says UC can lower a school’s total cost of ownership, increase productivity, create new efficient business processes, and improve user satisfaction. All are noble goals.

Harvel says that, in two years, GGC hopes to complete its current UC deployment.

“This is the first time I won’t need a technician on the end,” UK’s Friskney says happily. “We need a phone with a USB connection and a central installer so we can just plug it into the network.” The resulting presence-enabled applications will boost productivity and, better yet, save UK money.

Despite the benefits of UC, it is unimaginable that any college will do a single move to a totally UC-enabled network. In fact, while the technology is there to allow immediate savings by deploying certain aspects of UC today and to ramp it up in a three-year or five-year plan, the truth is that much of the needed technology for a truly UC-enabled campus is still in the testing stage. That may translate to job security for the ACUTA member who can demonstrate every couple of budget cycles that UC is saving the college money and that there are additional new UC features that will do the same in the next 12 or 36 months. Curt Harler is a freelance writer and contributing editor to the ACUTA Journal. Reach Curt at curt@curtharler.com.
Unified Communications Implementation:
A People Problem?

Jim Romeo

On many campuses today, students download content for classes, ask questions about study plans, and have free access to the university's library and general career content. They communicate freely among many different modes through a new unified communications (UC) infrastructure.

Implementing UC is a complex undertaking with challenges and obstacles. However, some of its greatest challenges are not necessarily technical ones. They are the obstacles in building and developing a coherent team of vendors, consultants, and technical managers. Without this essential unit, the benefits of UC are difficult to achieve.

Building a coherent team depends on many factors. “The biggest factor in the success of a UC project is team buy-in,” says John Turner, director of networks and systems at Brandeis University in Waltham, Massachusetts. “It is essential that the networking team and the telecom team work as one unit, not as two competing entities.”

Fostering Buy-In

Buy-in to the unification effort by different functional groups is a guiding principle in building a development team. “With any major IT project that impacts a university so broadly, it is important to have a broad participatory approach to planning and implementation,” says George Kahkedjian, CIO of Connecticut State University System, in Hartford, Connecticut.

Earnest participation by others will depend on perception. How the effort is perceived and how the team is built can have a big impact on the UC plan. “Merge the telecom and network teams and have a strong systems group presence,” Kahkedjian says. “Pick a vision and stick to it. Pilots are fine, but all too often there is no plan to go from pilot to implementation.”

Most projects include vendors and consultants, and it is important that they align themselves with the needs of the end users. Accommodating customer expectations as well as end-user requirements necessitates ongoing monitoring of the project.

“UC, like all other technology projects, succeeds when the customer’s expectations are in close alignment with a proposed solution,” says William Bumbernick, CEO of Alteva, a VoIP service provider presently working with Rowan University in Glassboro, New Jersey, on UC initiatives. “The entire effort may be broad and include desk phone, mobile phone, e-mail, chat, voicemail, presence services, fax, business and productivity intelligence, and customer relationship management integration. The vendor must be focused on the end-user experience. A successful UC implementation automates and unifies all forms of human and device communications into a common user experience.” Bumbernick has seen impressive efficiency gains result from the optimization of business processes.
Warren Arbogast, president of the Boulder Management Group in Washington, D.C., also knows that achieving customer objectives means being careful to ensure that everyone in the project is equally informed. He does this by asking questions.

“What are we trying to accomplish?” he asks. “What resources will it take to meet our goals and objectives? Is everybody committed to doing their part? By ‘everybody’ I mean both service providers and customers or, as most people call them, ‘users.’”

Unified Communications: Many Things to Many People

All players on the project team must know what UC means to this particular campus. This means clarifying objectives up front. “I’ve found that with unified communications efforts, like most all projects, the more we can clarify, define, and articulate in advance the better,” says Arbogast. “For me, to make unified communications projects successful, three elements are important: clear project goal statements, project plans that are detailed and easy for everybody to read and understand, and simple yet comprehensive service agreements that ensure that both service providers and telecommunications/IT customers—as well as third-party vendors—understand their responsibilities.”

Clarity of purpose and objectives may be strained by misconceptions about UC, such as: “It will enable toll bypass.” “Quality will suffer.” “You will have lots of downtime.” “E911 is not possible.” Multiple misunderstandings abound.

“One of the major disconnects that tracks to the telecommunications industry itself is that there are no hard lines around what UC is and is not,” says Bumbernick. “Too many companies are offering enhanced PBX functionality, such as voicemail to e-mail, and calling it unified communications.”

Alteva believes that UC is a holistic approach to combining all of a customer’s communications through the integration of commonly used applications and services such as Microsoft Exchange, Dynamics, and Office Communications Server, as well as custom integration capabilities via a simple application program interface (API) that can enable homegrown or less commonly used applications.

Arbogast cautions against the use of unrealistic expressions and asks questions to arrive at a common understanding. “What do we all mean when we use the term ‘unified communications’? More importantly, do we all mean the same thing throughout the project?”

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Such questions help avoid the scenario in which everyone goes along with a project but does not really understand what it is all about. "Like any effort geared around communications, it's not enough to see all the heads in a room nodding up and down in unison," Arbogast adds. "The most common misconception I've encountered regarding UC is the definition of the term itself. This means project leaders must work hard to ensure that everybody understands what we are all talking about throughout an implementation. It sounds like common sense, I know. But this, honestly, is a bigger stumbling block than many might guess."

**Teambuilding 101**

Upfront communications and objectives are best established and implemented when a solid team is developed. But what makes a good team to implement a UC project?

"You need a team that can plan in multiple phases, set milestones, and adjust to changing economic conditions and changing university priorities," says Kahkedjian. "Timing with the academic cycle is important, as information must be disseminated."

Selecting members of the team should include functional representation from groups within the university and those who will be end users. After all, they have the most at stake in a UC effort.

"The team should include those responsible for operating and managing the current 'non-unified' communications networks and should be run by an overall project manager," says Tim Rooney, director of product management, for BT Diamond, based in Exton, Pennsylvania. "Members of the team need to understand and contribute to how the unified communications technologies and products will be deployed, operated, and managed."

However disparate these different members may be, an effective project manager can use tools to keep them informed. Staff at Rowan University spend considerable time designing the flow of communications in their plan. They use flowcharts and other tools to keep team members informed of the big picture.

"In our model," Bumbernick says, "the key component during integration is communications design. We spend a significant amount of time with each new customer to determine the best _comflow_ (communications flowchart) for their needs. This can be challenging because many customers try to relate their communications needs with the technologies that they are accustomed to rather than opening their minds to the relatively limitless capabilities of their new systems."

Bumbernick offers a simple interface and API—very automated and easy to use—that can enable homegrown or infrequently used applications and can be used by customers to add or remove users as the school term changes.

**Staying on Target**

With clear objectives and good information, a UC project must avoid a common bad practice: straying from a plan when it is convenient to do so.

"While they can't say yes to everybody, they also, really, can't say no to anybody," explains Arbogast. "Unlike corporate settings or, say, the military, where the rule can come from on high—where the bosses say, 'This is what we will do'—and the masses say, 'OK'—higher education is all about consensus building and collaborating with faculty, staff, and administrative colleagues. This, obviously, is a good thing. My experience is that it also makes the work even harder for IT leadership."

For Arbogast, this is why it is essential to facilitate good, clear conversations early and often with telecommunications, IT management, and other key staff with a stake in the UC project. Communicating with each other is the way to make this happen.

"Said simply, telecommunications professionals and IT leaders in higher education cannot overcommunicate with their customers, especially on a unified communications effort. After all, we're looking to make changes to how people work with information and one another," Arbogast adds. "That's serious for customers. In higher education, telecommunications professionals need to do a tremendous amount of reaching out, talking with, and communicating, maybe even overcommunicating, with their customers. Otherwise, expectations will vary widely, and that is where trouble takes root. And more often than not, the technology professionals end up taking the blame for an initiative's shortcomings—perceived or real."

Arbogast points out that if a major UC project is approached without upfront conversation that clearly outlines goals and expectations, it easily ends up as overpromised and undelivered. "My advice: Talk a great deal with faculty, administrative, and student customers before, during, and after your efforts to unify campus communications. Keep your eyes open and reach out to multiple UC vendors and experts out there; ask tons and tons of questions—hard questions—and let technology vendors and systems designers provide you information and expertise. They want to do this, and most do a great job. Higher education IT professionals should con-
sider them as a valuable resource. Then, consider and weigh all the options. No one-size-fits-all solution exists for higher education.”

Unified Communications: The Road Ahead

Looking down the road, educational institutions will have mixed areas of concern in unifying their communications. Universities tend to adopt new technologies, so the question becomes whether an institution wants to be on the bleeding edge, the cutting edge, or the trailing edge.

Rethinking services and how they are delivered is at the core of what John Turner sees as important. “UC is a marketing term that someone came up with that we are all trying to define and live up to,” he says. “What we need to be concerned about is communications and the ever-changing landscape that lies before us. If we do not seek a strategic plan for our institutions, we will find ourselves marginalized and unable to deliver the core services that evolve out of today’s technologies.”

An institution of higher learning has an obligation as well as allegiance to students, faculty, and administration. It must be mindful of them when altering communication services.

“We need to look at all aspects of how our students, faculty, and administration communicate and introduce facilitating technologies to enable more efficient and more custom communication paths,” says Turner. “This includes IM, e-mail, voice, video, Facebook, blogs, Twitter, etc. If we are not, at a minimum, familiar with each of these technologies, then how can we know where we need to go?”

A properly designed and implemented UC solution will vault a university forward toward truly modern communications, says Bumbernick. “From online courses to faculty meetings to student workgroups or committees to university-wide announcements to emergency services—I think you get the idea,” he says. “UC will change the way we teach and the way we learn.”

Jim Romeo is a freelance writer and frequent contributor to the ACUTA Journal. Reach Jim at freelancewriting@yahoo.com.

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UNC’s VoIP Migration: Decommissioning a Legacy Switch

Jon Buck

In 2000, the centralized IT department at the University of Northern Colorado (UNC) started researching VoIP technology as a viable alternative to installing a high-count copper cable from new construction at the Ross Hall of Science to the central office, home of the campus Nortel SL-100 phone switch. By not installing the copper cable, UNC would realize significant cost savings. We had recently invested a considerable amount of money on a software upgrade for the existing phone switch, and we were concerned about the cost of supporting the existing voice network and a separate data network.

Moving Forward

At that time, a select group of individuals from IT participated in a pilot of the VoIP technology and found the idea of supporting one converged network intriguing. After multiple providers of VoIP technology were evaluated, the decision was made to move forward with Cisco’s solution for interoperability with existing network equipment in the new wing of the Hall of Science. UNC IT and Cisco account team meetings focused on the design for implementing CallManager for the entire campus. Several PRIs were used for communication between the TDM and VoIP systems. At about the same time, a catastrophic failure of the existing voicemail system unexpectedly expedited the migration to a new unified messaging platform implemented with dual switch integration.

The new phones in the science building were so well received that many users asked when this technology would be available on other parts of campus. At that time, however, UNC stuck to the plan that the VoIP technology would only be an option on new construction to avoid investment in copper installation for both voice and data. Construction accounts or eager departments funded their own migration to these new communication tools. Implementation of the IP phones utilized the configuration of desktops connecting to the phones’ PC ports.

After we successfully completed migrations in some of the newly remodeled areas, executive staff at UNC expressed an interest. IT demonstrated the technology and identified the cost savings over copper consolidation. Some of the benefits of VoIP included:

1. No more phone switch software upgrades
2. The ability to combine funding models for disparate voice and data networks into one converged network
3. The option to discontinue dual support for two different phone systems
4. The potential for another opportunity to take advantage of the digital display. Executives saw this and asked, “Why aren’t we doing this all over campus?”

IT immediately sought a funding method for campuswide implementation. Fortunately, some recent projects expedited this migration. First and foremost, a campuswide cabling project to move to Cat5e had been funded for all academic buildings, and several administrative buildings had been completed in the last few years. Just a couple of buildings remained in need of cabling infrastructure improvements. Plans for those upgrades were put into action.

At that time, there was also a good financial plan for funding projects and major upgrades for the voice and data networks. A portion of the phone revenue and network funding was put into project accounts dedicated to providing a refresh of the respective technology (a luxury that is no longer an op-
Of course, a campuswide migration would exceed the funds put aside for technology refreshes on these two networks. We decided to pool the two project accounts to fund a new converged network and to lease the remainder of the technology that was needed. Two separate RFPs went out; one was an itemized list of equipment that was needed, and one was to provide a lease for this purchase over a five-year term.

Progress in Three Phases

With funding out of the way, the difficult part was complete. The project was now broken up into three phases. The first phase was to prepare the network with enough fault tolerance to support a mission-critical service where downtime is not tolerated. The second phase consisted of the actual deployment of handsets and “like for like” standard voice services. The final phase was the cutover of PRIIs and the remaining phone services that were not ready for mass deployment.

In the network, a full mesh redundant core was designed. Where the network was already divided into two campuses, a second building was selected for our west campus and a second building for our central campus to house the redundant equipment. Investment in a high-count fiber cable between the two data centers on each side of campus enabled a dual-homed ability for the outlying buildings from this traditional star topology without duplicating the fiber infrastructure. Utilization of a rapid spanning tree verified that a voice conversation would not drop amid fail-over to a secondary facility. Default QoS settings were used for voice VLAN settings. Managed UPSs were sized to provide power to distribution and edge switches for a minimum of 30 minutes. Core switches were connected to emergency power or building generators. PoE switches were installed to the edge. Residence halls took a different design. UNC saved money by installing non-PoE switches in these buildings and not purchasing IP phones. Analog voice gateways provided dial tone to the existing student phones.

When the network upgrade was complete, handset deployment began. We contacted departments a week or two prior to their migration with information on the project scope. General IP phone configurations were imported in a bulk fashion. A call center was established for queuing the calls from student technicians as they set up the handsets on desks. Engineers answered the calls from technicians to customize settings on the phones to mirror each phone’s previous settings.

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Engineers also took this time to record information for the implementation of a new dynamic 911 system that would track the location of IP phones to emergency response locations (ERLs). The technicians left behind a quick reference guide for the convenience of the end user. The handset deployment was a time-consuming portion of the project, but not nearly as intimidating as our original expectations. All in all, feedback was positive on the functionality of the phone, specifically with regard to the voice quality. The major complaint was inability to accommodate cordless phones that had been brought to campus without UNC IT's prior knowledge. In most cases, sale of an 802.11b/g model IP phone was offered, which was out of the budget for most departments. In some cases, the extension was put in dual service with an analog gateway where cordless was deemed to be beneficial for life-safety situations.

Special Challenges
Early during the deployment, a catastrophic failure of the police department's antiquated call-recording device expedited the migration of our 911 call center. For replacement of 911 call recording, UNC evaluated several IP-based call-recording vendors. The ultimate choice was a company that had a good background with LMR (land mobile radio) integration for handheld 800 MHz radio traffic recording. Cistera's Convergence Server has proven reliable in that effort. Another part of that purchase was a Quick-Record capability that includes an IP-based service/application ability. This recording feature allows recording on demand with the push of a URL service button on the IP phone in a TiVo-like fashion that has been popular for recording phone interviews for hiring committees and other purposes.

Also during the handset deployment, PRI utilization was closely monitored to ensure that there were enough channels for on-campus communication between the Nortel and Cisco phone systems. Creative dial plans were required to support five-digit dialing and our legacy long-distance authorization-code dialing consistently across campus and, in some cases, increased the utilization of those PRIs. As we added more users to the VoIP system, more PRIs were necessary between the two campus phone systems, and it made sense to move some off-campus trunking PRIs to the VoIP voice gateway as well.

Because long-distance dialing using the procedure familiar on campus would not be supported with the new phone system, we moved a long-distance circuit to the VoIP system and developed a new billing procedure. We tested several months of billing before offering it to the campus. Once it was offered to the calling community, both procedures were supported for a time with the understanding that the old method would no longer be supported after the end of the academic year.

Final Sweep and Relocation
The final phase of this project consisted of a final sweep of remaining phones on the SL-100 and then the relocation of the remaining PRIs. The sweep revealed that some phone lines had been skipped, including modem lines, alarm lines, and miscellaneous service lines such as those for elevators, emergency phones, and some courtesy phones that hadn't been migrated with the departmental/building migrations. In some cases, call centers were planned for cutovers at more convenient times over the summer. Some of these services required H.323 configuration expertise on the voice gateway. Fortunately, the two voice engineers on this mission had participated in the call center and H.323 training. The more specific training for these technologies proved critical to the success of the project.
An example of a benefit of H.323 was a coincidental annoyance a professor started having within weeks of migration to his new phone. A computer-programmed (or misprogrammed) device began calling this professor about 30 times a day with computer-generated tones. It was not a fax, and it was difficult to track down. The professor, who did not want to change his phone number, inferred that the problem had begun due to the migration to an IP-based phone system. A match on the calling number on the voice gateway and a written policy allowed us to drop that attempt to contact campus at the reception of our DID PRI.

FXO (foreign exchange circuit) service for public-address paging was provisioned by a router with an FXO card. That card was also able to terminate an auto ring-down circuit between our 911 call center and our local PSAP to enable that line to appear on an IP phone. That same router also houses an E&M interface card that connects to a radio console for LMR integration. This ISR could potentially be used for a solution to another challenge. A traditional analog gateway does not necessarily provide the line performance required for some services such as radio and television broadcast. Currently, those services at UNC rely on 1FBs that have been obtained for disaster recovery purposes.

Conclusions
Phase I of this project began after receiving equipment ordered in December 2006. Our legacy switch was quietly shut off October 2, 2008. Since that time, UNC has been able to focus on the value add that VoIP brings to this campus of 3,800 phones. New construction of some residence halls has prompted a change from analog service to IP phones to explore the benefits that a phone with a display can bring to students. Services were developed that provided a calendar of events for the opening month of the new academic year to assist with the transition to college life for freshmen and to advertise events for Friends and Family Weekend and Homecoming Week festivities. A campus notification system was tested for displaying text messages on the IP phones for communication of emergencies. Student feedback—surprisingly—has indicated renewed interest in phone service in residence halls. UNC continues to remove phone cabinets in the old phone switch room (new data center) and gift parts to collegiate friends.

Jon Buck is network communications manager at the University of Northern Colorado. Reach him at jonathan.buck@unco.edu.

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Mapping the Plumbing of Unified Communications

Secret fears of the systems administrators and CIOs of most organizations, including colleges and universities, were summed up by the character Scotty in one of the Star Trek movies. About to help steal the starship Enterprise, he said, “The more they over-tech the plumbing, the easier it is to stop up the drain.” As the complexity of applications increases, the power of operating systems increases, the bewildering variety of devices increases, and the size of devices decreases, the “plumbing” of our communications systems must become more specialized while simultaneously becoming more integrated...more unified. These systems offer new levels of functionality and communication, but they also offer new realms for complex maintenance and security risks.

As I researched this article exploring what we mean by unified communications (UC) and considering some of the issues facing decision makers who wish to avoid future plumbing problems, I became aware of the massive scope of what UC represents. This article attempts to sketch a map of where all this new “plumbing” goes, and to flag some of the urgent and important challenges along the way.

Students, faculty, and staff arrive at school with tools they plan to use to access their e-mail, voice communications, voicemail, instant messages (IM), video clips, images, sound clips, faxes, calendars, and remote applications (for example, remotely programming a home digital video recorder to record a ball game...or a favorite soap opera). In many cases their time schedules have become so compressed that they cannot wait until they have an opportunity to access a desktop computer or even a laptop to know a long-awaited e-mail message has arrived—and to take action on it immediately. This kind of 24/7/365 linked-in, logged-on, and universal access and availability appeals to both busy executives and networked students, and is increasingly called unified communications.

Definition

UC includes all call and cross/multimedia message-management functions controlled by an individual user. This includes systems for unified messaging, collaboration and interaction, real and near real-time communications, and transactional applications. The following definitions’ help put the pieces in order:

- **Unified messaging** includes voice messaging, e-mail, fax, and other mixed media.
- **Multimedia services** include video, sound clips, pictures, and short message services (SMS).
- **Collaboration/interaction systems** include calendaring, scheduling/workflow, project management, online course management, integrated voice response (IVR), and other collaboration and/or tracking technologies.
- **Real and near real-time communications systems** include conferencing, IM, PBXs, and paging.
- **Informational/transactional systems** include emergency alerts and communications, e-commerce, weather information, stock information, and more.

Tough Customers

When students today seek admission to colleges and universities, one of the criteria they consider is which institutions offer the most modern communications technologies as well as the best academics. Many students are used to being hyperconnected to personal networks offering information access anywhere, anytime, in any
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format, and on nearly any device. Faculty and staff are becoming accustomed to an increased ability to collaborate with each other and with students. Both learning and the business of learning take place 24 hours a day, requiring organizations to provide a reliable solution for both wired and wireless communications, delivering the right resources, right away. Recruiting and retaining these tough customers requires an integrated, unified system that is dependable, secure, and economical.

A major challenge of UC is integrating the communications functions above into a single environment with a single interface, whether on the desktop, the notebook, or other mobile device, allowing users to reach out to each other at the appropriate time.

Getting Personal, Instantly

Enter the concept of presence—knowing who is available, when they are available, and how they want to communicate. As students, faculty, and staff shape their personalized communication and collaboration environments, they expect to be supported in their attempt to create a personalized learning experience. In an era of customization and niche marketing, expectations for flexible, instant communications rise. As student expectations for access to faculty increase, so does the need for those faculty members to channel access into a controlled and convenient environment. Many faculty and staff members did not grow up in a world as connected as the one that now exists, and require simple, flexible, and dependable tools.

The importance of a simple, straightforward, and intuitive interface for the unified mailbox cannot be overstated. For some, the concepts of checking e-mail on their phone and receiving voicemail messages from their desktop or laptop computer will seem unusual at first and may meet with some resistance from those who are not early adopters.

Spreading the Word

Although convenience and collaboration are important, many considering UC are doing so for reasons centered on campus safety. In recent years, we have been confronted with stories of emergencies and tragedies on college campuses that required instant and reliable communications. Those responsible for campus security absolutely need the broadest set of communication tools, from pagers to mobile devices enabled for VoIP, allowing them to respond as quickly as humanly and technologically possible to emergency situations.

Campuswide community emergency notification should reach all students, faculty, and staff immediately, both as broadcast messages and as open channels for coordination and sharing of critical data. Presence information about key campus personnel and administrators helps determine their locations and facilitates the response to critical decisions.

Pesky Laws of Entropy

Let’s face it: We have blown the walls off the classroom and the boardroom. Both the flexibility of current learning environments and the increasing volume of information students, faculty, and staff must process is literally forcing us all to bring our work environment with us. The classroom is now anywhere there is a network connection, be it wired or wireless. Students are watching videos of lectures on their smartphones, taking part in video-based courses and study sessions, and submitting classwork virtually. Faculty may also communicate with students through IM and document sharing.

Virtual mentoring and videoconferencing connect faculty to each other in new ways. Committee members may meet on-
line though scattered over the globe, creating new levels of meeting efficiency and flexibility. Virtual office hours no longer tie faculty members to their desktops or laptops.

Of course, not everyone wants to be this connected. Therefore, any UC solution must adapt to varying levels of use, also offering enhanced communication to those on the trailing edge.

Security Issues

UC solutions, coupled with the next generation of mobile Web browsers, are creating familiar types of security challenges for IT departments and service providers. Because mobile users connect to their Web sites with mobile browsers, duplicating the connections from their desktops and laptops, the lack of security software has become an issue. Desktop browsing has become more powerful and complex over time, approaching the power of operating systems. The same is true for today's handheld devices. As their browsing capabilities increase, so do their levels of vulnerability, requiring a careful assessment of mobile security architecture and systems. However, plugging the technological plumbing leaks is not enough.

Secure desktop browsing is as much about safe browsing practices as about having the proper system safeguards. The same is true for mobile devices. Although one may install plenty of locks on all those new doors opened by everything from smartphones to netbooks—sealing back doors and windows to intruders—none of them can stop an intruder if a user leaves the front door open and unlocked.

A Not-So-Tidy Bundle

A common thread in my conversations with others about unified communications weaves a familiar pattern. Nearly all agree that the topic is huge, and to some extent amorphous. As the number and variety of devices plugging into the communications net increase, so do the variety and number of tasks users seek to perform. Expectations drive demand, and demand drives both development of, and holes through, the architecture.

Opportunities abound for increased revenues from connecting students to campus services and cost savings from efficient use of resources. Opportunities abound for enhancements to and improvement of the learning experience at all levels. Opportunities abound for improvements in safety and for greater efficiencies in administration. Opportunities abound also for lapses in security and unauthorized access.

Wrapping our minds around the entirety of the concepts and issues involved in UC is a big task. I hope this article helps map out the plumbing for you.

Elwin “Mick” McKellar is a freelance writer and frequent contributor to the Journal based in northern Michigan. Reach him at mick@mmnetwork.info.

Technology Primer: Unified Communications

Ron Walczak

Unified communications (UC) can mean different things to different people. UC can also produce significantly different benefits to different organizations because it is a suite of productivity applications that do not necessarily benefit everyone equally. This article will attempt to lay out a common framework for understanding what UC is and isn't, and provide insight into which applications and which user groups will benefit most within higher education installations.

What Is Unified Communications?

Unified communications is a suite of features that include standard voice capabilities and the integration of voice mail and e-mail (unified messaging), as well as tools that provide real-time information about a person's availability to receive calls (presence), advanced audio/video/web conferencing capabilities, business process integration, and the ability to connect to an end user regardless of his or her location or chosen handset (mobility).

Microsoft has a great vision statement for UC: "Integrating the experiences you associate with the telephone—phone calls, voice mail, and conferencing—with the work you do on a computer—documents, spreadsheets, instant messaging, e-mail, and calendars—has the power to fundamentally change the way people work."

I believe that the strategic impact of UC is realized by providing a caller with the ability to reach the right person and sharing the right information—the first time—regardless of his or her location or chosen communications device.

- Voice: Voice communication takes place over UC clients, which take the form of thick or thin clients, SIP phones, as well as dual-mode wireless phones that can communicate with telecommunications networks over GSM or CDMA and within the enterprise over Wi-Fi.

  Rules and filters determine how and where incoming calls should be routed based on caller ID, time of day, and current business conditions. The message-waiting indicator is intelligent and provides more value than a blinking light or symbol.

- Video: Regardless of the source (video server, CCTV, video conferencing, etc.), the ability to view video on your device enhances the user experience and can provide real-time information that can speed response to situations requiring "eyes" on the issue.

- Conferencing and Collaboration: Audio, video, and web conferencing connects the participants on whatever means they have available. They also integrate into calendars and provide telepresence.

- Messaging: Workers have single voice-mail, e-mail to any device, cross-media, reply forwarding, federated text, and instant messaging (IM).

- Mobility: Workers have single-number access: call one number and you connect to them, regardless of their mode of com-
munications available at that moment. All outbound communications likewise have a single-number origination.

- Directories are integrated into all communications types and provide click-to-call (or text or message) capability.
- Availability/Presence: integrated or federated presence shows which communications modes are available for recipients. Workers can edit their preference profiles. IMPEL and XMPP are the two main presence-associated standards, and you would do well to understand the differences and ways to use both.

What—and Whose—are the Benefits?

The benefits of UC will not apply to everyone in the organization. There are certain job classifications that do not require UC functionality. Fortunately, since UC functionality is a licensed product, you don't have to buy it for them! Those who will benefit the most include the following:

- Executives: These individuals communicate by voice and text regularly, Enhancing their communications channels with more options will increase their ability to gather information, make decisions, and direct members of their organization.
- Admissions/Recruiting/Institutional Advancement: Most communication is with students, parents, and donors. Reducing telephone tag, knowing the status/availability of those to be called, and controlling incoming communications will all be beneficial and will likely result in increased revenue and decreased costs. If your school likes the idea of a human answering incoming calls, you would be well-advised to investigate how these systems can help make that connection.
- Project team leaders and members (especially large capital projects): Enterprise teams are increasingly not collocated but distributed. The team leader should have access to team members and have continuous presence information.
- Call center/help-desk staff: More call centers/help desks are being decentralized or outsourced. UC features will allow call center supervisors to effectively manage their staffs as well direct incoming customer calls.
- Mobile workers: Anyone who cannot be easily accessed by walking to their location can be more effective if they have access to multiple forms of communications.
- IT staff move around the facilities and also meet with internal clients locally and remotely. Unleashing them from their desks while retaining full communications capabilities permits them to be more responsive, improving customer satisfaction.

Because UC is really a suite of applications, you can pick and choose those that provide the best return on investment. The diagram on page 28 illustrates the incremental benefits that can be experienced as your organization embraces and implements the available functionality.

“So What Am I Getting Into?”

As we said, UC is a suite of applications, and applications require servers. Depending on your chosen UC supplier, these features may be part of a centralized call-processing server or they may require additional hardware to operate. It's important to understand the ramifications of deploying additional servers into the network. Collaboration with the IT department and data center manager is essential to building a robust and manageable UC implementation. Some things to consider would include:

- Location of the servers. Don’t assume that the data center has room, power, and air conditioning to support your new servers. Just because the processors have escaped the PBX cabinet doesn’t mean you no longer have responsibility for fully engineering the space that will become home to the applications.
- Ongoing maintenance. If these servers and applications are residing in the IT department data center, you will need to negotiate a clear understanding of who maintains them.
- Help desk, moves, adds, and changes. Data network managers who take on responsibility for VoIP and UC must face a new set of user expectations when it comes to reliability and response to problems. The same person who understands that the network is experiencing delays or down time will not be so charitable if they can’t make and receive telephone calls. Oh, and they’re fickle too. You may have gotten away with not programming the 12 function keys of the end user’s PC keyboard, but not so on their telephone. And just when you think you have it just right, they will want you to change something. Welcome to our world.

Conclusion

Unified communications is becoming a reality. Because the business culture of higher education is different from that of organizations that can measure communications productivity in minutes and seconds and apply hard dollars to those measurements, making the business case can be difficult. So when the hard dollars don’t justify the project, I suggest taking a creative look at service quality, end user perceptions (and reality), life safety, and institutional image.

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Higher Ed, Data Retention, and Federal eDiscovery: The Case for Full e-Mail Archiving

Jeff Patterson

Recent changes in federal rules of civil procedure reflect the legal system’s recognition of our movement into a digital age, where e-mail has become the preferred method of business communications. And that goes for the business of higher education as well. Technology leaders in higher education who fail to educate themselves on the basics of such issues as eDiscovery, data retention, and comprehensive e-mail archiving leave their institutions vulnerable to costly legal sanctions and fines. In the event of any legal proceeding or lawsuit, without the dedicated foresight of technology and administrative leadership, your institution will remain exposed to grave financial risks. The good news is that actionable steps have emerged, adequate technology has been developed, and solutions exist with benefits that extend beyond vital legal protection. Following is some basic helpful information pertinent to higher education. More information can be found at http://www.cosn.org/Default.aspx?id=26&tabid=4189.

eDiscovery and What It Means

eDiscovery should not be confused with state and federal open records laws. Open records laws were designed to promote government openness and transparency. Data relating to the conduct of our government and public institutions are required to be released upon request. eDiscovery, on the other hand, is more broad-based and covers any electronic data that could be considered as evidence in a legal proceeding. Whereas open records would exclude private information related to government employees, the same data may be subject to eDiscovery.

In December 2006, the Supreme Court made changes to the Federal Rules of Civil Procedure. These are the legal rules that dictate what happens in federal civil cases and how discovery of information and materials relevant to civil cases is conducted.

Under the rule change, all electronic information is subject to legal discovery. Failure to produce such documents may lead to sanctions, including monetary fines and adverse court rulings in the underlying case. Organizations may be protected by the courts if the documents requested are unavailable because they were deleted in good faith through the routine operation of an electronic information system (with established and documented deletion schedules).

Although left unstated in the rules, many commentators believe that in order to qualify for this protection, any such data retention policy must be reasonable. This rule change can and should be read as a mandate for all institutions of higher education to develop rules for and commence using an e-mail archiving system that passes the test of reasonableness.

While the new rules apply only to federal cases, state courts often follow suit. Expect the same civil procedure rules to come to your local court system. Meanwhile, the type of federal civil suits that may bring these rules into play include employment discrimination suits (ADA), health and safety suits (OSHA), and student services suits (IDEA).

Notably, the new rules apply broadly to all electronic data that could be considered evidence, but the rules don’t offer specific definitions. For the moment, most organizations are focused on e-mail, with some starting to address the issue of instant messaging.

As awareness of the new rules grows within the legal community and among the general public, expect an increase in e-mail and other electronic-record requests. Your institution should instruct staff members not to expect privacy in any institution-provided account.

Nothing should be written that they would not want publicly shared or to be produced as evi-
dence in court. In fact, even university business conducted via personal e-mail accounts may be subject to eDiscovery, where it would still be your institution's burden to produce the messages.

How Institutions Are Responding

Colleges and universities are opting for a number of different archiving approaches that range from complete passivity to active engagement. Responses fall into four broad categories:

1. Waiting to see who gets caught and how bad it is;
2. Waiting to see what their state attorney general says;
3. Relying on system backups to provide archiving; or
4. Implementing a full e-mail archiving solution.

Some institutions are attempting to circumvent the requirements by establishing a policy to keep e-mail for as little as 90 days. While that may seem like a clever solution, it may not pass muster with the courts. In ruling on the reasonableness of an institution's archival policies, courts may look at statutes of limitations for filing civil suits (often two or three years), and may deem e-mail archiving for any less time as unreasonable.

To be sure, consult your legal counsel to determine the exact length of time that electronic communication and other data types should be archived.

Meanwhile, when asked through the 2008 Campus Computing Survey, “Does your institution have a strategic plan for e-mail and documentation digitizing to address eDiscovery?” a mere 17 percent of institutions could answer yes.

The survey is based on data provided by senior campus IT officials (typically the CIO, CTO, or other ranking campus IT officer), representing 531 two- and four-year public and private colleges and universities across the United States, with survey respondents having completed the online questionnaire during September and October 2008.

That, of course, leaves a whopping 83 percent of surveyed campuses with no strategic plan in place for e-mail and documentation digitizing to address eDiscovery—nearly two years after the Supreme Court ruling extending legal discovery to all electronic information.

While this may seem (and is) a very slow response to institutions covering their legal bases, so to speak, with so much digitizing of information in just the last five years, in some ways it is still remarkable that so many institutions carved out the time to address this issue at all—yet, sooner or later, they must.

Issues in Higher Education

While many basic principles hold true for both K–12 and post-secondary educational institutions as well as business organizations, there are a number of other issues exclusive to higher education.

Kenneth C. Green is the founding director of The Campus Computing Project, which administers the aforementioned survey. “The 2008 data reflect competing, yet critical priorities: IT security, retaining IT staff, and financing IT—all competing for limited budget resources,” Green says.

If that weren't enough, reining in control over e-mail presents its own set of issues. “Large numbers of kids don't see their campus e-mail account as their primary account,” says Green. Consider that the typical, full-time undergrad at a four-year college or university “arrives on campus with 3.2 e-mail addresses—some of which they may be willing to share with their parents and some they may not.

“On the other hand, many graduates decided they want to keep their account just because of the branding,” says Green.

This presents a problem when institutions in legal proceedings must locate and retrieve case-relevant e-mails. E-mail, however, is just the tip of the iceberg.
Electronically stored information (ESI) “can be found in e-mails, voice-mails, instant messages, text messages, documents, spreadsheets, databases, file fragments, metadata, digital images, and digital diagrams,” writes M. Peter Adler for EDU-CAUSE Review. Exponentially more so in higher education where knowledge stores, documents, databases, and creation of new information is more commonplace than in K–12, “[ESI] can be stored in every type of electronic media including hard drives, thumb drives, computers, handheld devices, backup tapes, and optical disks. The ease with which ESI can be generated, stored, altered, transmitted, and destroyed has complicated the discovery process, as has also the sheer volume of information that is processed and the various formats in which it can be created, stored, and produced,” according to Adler.

“Colleges and universities that do not actively manage their ESI may face difficulties in compliance, increased risks of sanctions, and higher litigation costs,” Adler writes.

In any case, e-mail is the most active and exposed area when it comes to litigation, and colleges and universities now often serve as both ISP and e-mail conduit for their students.

“Many institutions are providing e-mail for alumnae after they leave. Does that make the institution liable in eDiscovery lawsuits because a UCLA alum who has no affiliation with the institution other than the fact that he is an alum and his e-mail address is Petersmith at ucla dot edu?” asks Adler. Good question, indeed—one that many institutions now have to ask themselves.

As institutions play catch-up with the law while IT teams simultaneously confront a host of other pressing issues, some basic distinctions and helpful possibilities can smooth the course.

“Backups” Do Not Equal “Archives”

Relying on your monthly backup as your primary archiving solution has a number of drawbacks. First, backups are not the same as archives. Backups provide a recent copy for recovery in the event of a disaster, but save only a snapshot of your existing system at a specific time. In such a snapshot system, not all data are archived. Any data received and deleted (intentionally or not) between a period of particular backups will be lost forever. Without the ability to ensure a complete archive, such evidence may not hold up under legal scrutiny.

Second, data from tape backups are alterable by an institution’s IT staff. Such lack of data integrity could bring into question the accuracy of archived evidence. Additionally, most organizations systematically recycle their tape backups, copying over them with new data. Thus, backups may provide those engaging in eDiscovery with an incomplete and possibly inaccurate view of communications from the period at issue.

Third, tape backups are notoriously difficult to search. If (or when) your institution is served with an eDiscovery request, then your entire IT staff may be required to drop all other projects and spend months searching for and recovering the required data.

True archiving, on the other hand, can provide extensive search and retrieval functionality. Finding the required messages can then be done in minutes (versus weeks).

Developing a True e-Mail Archive

Considering the very real potential for disastrous financial and legal situations, your institution should begin to consider implementing a comprehensive e-mail archiving system. The two options are an in-house or hosted solution.

• In-House, Hardware-Based Solutions

With an in-house solution, you buy the hardware and software to archive your e-mail and store it in your data center. In-house solutions typically involve a software application running on a dedicated server, and may also include network-attached storage systems. The archiving application may function as a proxy, capturing all e-mail traffic as it crosses the network, or may utilize a journaling feature (such as with Microsoft Exchange).

Once the archive server captures the messages, e-mail is indexed and meta-data stored in an internal database. The actual messages are typically stored on a hard-drive-based system within the dedicated server, or on external arrays.

The purchased solution may give the institution greater customization flexibility, better utilization of available resources, and less access by outside contractors. In some cases, institutions may require direct control over all of their data and the entire archiving process.

Disadvantages of a hardware solution may include up-front and ongoing support costs, the drain on your IT staff resources,
must be confident that their e-mail is not being searched without proper cause. Some states require that all e-mail users must screen and evaluate e-mail messages according to content.

Based on its subject matter, a message might be archived for seven, five, or three years—or not at all. In practice, content-based archiving may be too time consuming for staff members to perform, and today’s technology can’t accurately or reliably identify the content of every message. More common is to simply archive all e-mail with the single exception of clearly-identified spam.

**Benefits of Archiving**

While archiving will place a significant burden on your staff and budget, the good news is that having a solid archiving solution in place offers many benefits:

- **Institution defense.** The data in your archives may in fact be your best evidence to defend the institution in the case of a lawsuit. Do not underestimate the value of the archives to exonerate your institution and prevent costly settlements.
- **Disaster recovery.** If e-mail archives are kept in an off-site system, the archives themselves can play an important role in your disaster recovery plan. E-mail accounts can be restored, database transactions can be rolled back, contracts and other working documents can be recovered, and digitized files can be accessed—even in the case of a natural disaster.
- **Knowledge base.** E-mail archives can serve as a knowledge base. Vast amounts of your institution’s data will be stored in countless e-mails. With an adequate search system in place, users can easily cull their own archives for helpful information, and administrators can efficiently comb former staff member accounts for crucial missing data.
- **Decreased local storage needs.** Some archiving solutions can benefit the local mail system by reducing the storage needs by utilizing a mail-stubbing feature and/or single-copy message stores. With mail stubbing, old messages and attachments are deleted from your local mail server and pointers are left that reference the data in the e-mail archives.

**Recommendations**

If your institution has not already done so, then we highly recommend that you pull together an information management team comprising your legal department, IT department, and records and information management. Taking action now may decrease your vulnerability later.

*A CoSN white paper on this topic is available to CoSN members. Learn about CoSN at www.cosn.org.*

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Partnerships: Taking the Business Relationship to the Next Level

As we do business with many different entities, we cross paths with a full range of individual as well as corporate personalities. We choose to pursue relationships—or not—based on such factors as the availability of a certain product or service, first impressions on a personal level, probability of a successful outcome, and more. Sometimes the business relationship never gets off the ground; but sometimes the relationship results in years of success for everyone involved. Why do some relationships become true partnerships while others do not?

Characteristics of a True Partnership

Those who provide information communications technology on campus are in a unique position to answer this question. ICT is both a customer for services as well as a provider to its faculty, staff, and students. These services include long distance, voicemail, wire and cable infrastructure, MACs, wireless, and more. Several ACUTA members helped identify five basic characteristics of successful partnerships:

1. Knowledge. Those who provide products and services need to be well informed about the technology landscape and how their product fits into it. They need to know what their customers’ needs are as well, and what is “hot” on the market as well as what will have lasting value. They need to be able to advise customers how various products may or may not work together.

“I expect a vendor to know my business well enough to offer services that meet my needs at a price I can afford,” says Jeanne Jansenius, director of telecommunications and technology infrastructure services at the University of the South. “I may want everything, but I know I can only afford some things. I appreciate a vendor who recognizes that, respects my limits, and helps me prioritize to get the most for my money.”

On the other hand, being an informed consumer will help you make the best choice among vendors as well as technologies that will most effectively meet your needs. Doing a little research up front, including asking your peers on other campuses for their recommendations, will save you time and money and assist you in developing your RFP. It may also preclude the necessity of an RFP.

2. Excellent communication. “A good partnership or a good vendor relationship has primarily to do with good communications, two-way, back and forth,” says Mike Grunder of Vantage Technology Consulting Group. “You’ve got to know what’s possible and what’s not, what’s reasonable and what’s not, and not just make empty promises you may not be able to keep.”

“When you have a partner—in life or in business, one of the core rules is communication,” says Anthony Tanzi of Wentworth Institute of Technology. If expectations were agreed to and are not being met, it is incumbent upon the other party in the partnership to communicate this so that the partnership remains strong and grows.”

The customer has a responsibility to communicate clearly and accurately what his needs are. What does the product or service need to do? What problems is it
A Good Example of Bad Customer Service

The University of California at Santa Barbara is in the midst of selecting partners for cellular service on a systemwide basis (i.e., all campuses in the state). We are using the strategic sourcing process to select a strategic partner because the expenditure for cellular service is so large it needs to be competitively bid.

One of the large carriers has suggested that we avail ourselves of the benefits of consolidating all of our accounts onto one summary bill and subscribing to an electronic copy of the billing for recharge purposes. This would allow us better management and control of our expenditures. They have also recommended a technology that will integrate our cell phones with the station dialing plan of our PBX.

Both of these recommendations are attractive, but would require a significant investment of time and expertise, and would require support from this vendor on a scale that we have not previously experienced. The current culture of this wireless carrier is to interface with customers primarily through 800-number call centers and the Web.

If you are a large customer of this carrier, you are assigned a sales rep through whom you are forced to channel all your technical questions, many of which are entirely unrelated to the sales process and are not well understood by the salesperson. The salesperson in turn has been unsuccessful in finding answers, mostly because the internal departments seem to find it easy to ignore the salespeople, and most of their internal departments apparently feel they are not required to talk to large customers.

In the case of this particular carrier, the quality of their network got them to the table, but it will be the quality of their customer support that will enable them to play the game to win the business of large customers. I am not sure they understand this.

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commitments. Building in checkpoints and establishing schedules helps to keep everyone accountable. To build trust, both customer and vendor must hold themselves accountable for the success of the project.

As Buck Bayliff, solutions consultant at PCR Inc., says, “Making strong business decisions in today’s environment involves more than just information and cost factors; now it includes the ongoing exchange of knowledge nuggets and relies on trust in the partnership. Managing deliverables is top priority, and simply reacting to the customer’s needs is at least unacceptable, and can be disastrous. For the partnership to be a positive experience, each party must agree to clearly defined roles or key performance indicators. Taking the time to read through all available data and listening to the partner for insight and feedback will turn content into true value. Open and continuous communications between the partners must prevail.”

5. Commitment. We live in a throw-away society. Too often, even relationships are considered disposable, because there are plenty of vendors that offer most products. But there is much to be said in favor of long-term relationships in which both supplier and customer grow stronger. Long-term customers provide valuable input for product development, and, conversely, they often benefit from special value-added customization over the years. Staying with one vendor’s product over the years increases productivity for the staff that doesn’t have to be repeatedly retrained, plus the customer of long-standing usually heads the list when it comes to customer service. Feeling confident of a customer’s loyalty helps a company plan for the future.

Partnership Strategies for Vendors
On a philosophical level, make integrity your focus. If your customers trust that you will provide real value, they will be loyal. On a practical level, the following strategies may help you as a vendor to obtain and retain effective relationships:

- Know your product/service and make it unique. Have something that differentiates you from the rest of the market.
- Expand your circle of contacts and you will win business.
- Recognize that competition will always exist and welcome it with confidence in your product and what you offer.
- Whenever possible, establish discount levels in advance, and clarify what services are being provided and by whom.
- Realize that things will go wrong from time to time and be ready to accept responsibility when you’re at fault. Turn mistakes into opportunities to prove you know what customer service is all about.

As someone who has experience in both the campus and vendor camps, Grunder suggests that service providers should “add patience to the list of partnership attributes. You’ve got to have it to put up with the idiosyncrasies of some customers and their organizations. You also need to have a sense of when to push and when to back off. Balance is the idea.”

Partnership Strategies for Customers
Customers and vendors alike should make integrity their focus. If your vendors know that you respect their right to make a reasonable profit and that you aren’t just trying to take advantage of them, they will likely work with you to see that you get the best value.

- Always communicate your requirements and limitations with clarity and precision. A carefully written RFP sets the tone for a successful project.
- Communicate your budget parameters and project limits at the outset. If this project is one piece of a much larger undertaking, say so; if not, don’t imply there’s more to come.
- Don’t make decisions based on price alone. If you want a long-term relationship, the lowest bid may not be the one that serves you best.
- Realize that things will go wrong from time to time and be ready to accept responsibility when you’re at fault. Turn these mistakes into opportunities to prove your loyalty to the vendor who wants to make it right.

“To me,” says Pat Nelson, “it is of utmost importance to act in a professional and respectful manner and not make unreasonable demands or conduct business in a way that reflects poorly on my employer. I represent my employer, and how I act and react could have far-reaching impacts. I want to be sure that my approach matches the tenor of the institution I represent and that I don’t overstep my authority.”

Conclusion
In tough economic times, it becomes more important than ever to build those successful vendor-customer relationships that are best described as partnerships. A partner is someone we work alongside for our mutual success. We treat a partner with respect, and our commitment to the partnership goes beyond a legal document. There are times when making a simple purchase is over and done with in a matter of seconds; but for those projects that require something more, building a partnership based on knowledge, communication, accountability, honesty, and commitment will give you a good return on your investment of time and energy in the years to come.

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The near insatiable demand for bandwidth has forced us to use traffic shaping to manage our network. During the day, we direct more of our bandwidth to the central campus and tamp down the residential network, but open that up during the evenings, nights, and weekends. We have also segmented the residential network from the rest of the campus, allowing us to better protect the central campus from any potentially damaging viruses or malware originating from the residential students.

Educating students on responsible use and security continues to be a challenge, and we hope to increase our focus on this issue in the coming year.

ACUTA: Since higher education seems to be perpetually in challenging budget times, what is your most important financial issue? How are you addressing it on your campus?

Vandever: Our current budget challenge is related to human resources—attracting and hiring qualified personnel. As we support increasingly complex enterprise systems, the skill sets we require of our personnel more closely mirror those of corporate IT departments, but our compensation has not always kept pace. And, once we hire a qualified person, we need to invest in professional development to keep that person’s skills relevant.

Despite the impending uncertainty in university revenues, the institution has continued to aggressively move forward in IT development on all fronts. We are fortunate that our administration recently funded several new IT positions.

ACUTA: Aside from funding, what issue are you, as the CIO, currently spending most of your time addressing?

Vandever: Until recently, telecommunications, administrative computing, and academic computing were distinct units that reported to the same person. The creation of a new chief information officer position made it possible to merge the three groups into one cohesive unit. As CIO, I am a member of the provost’s senior staff and participate in university-wide strategic decision-making processes.

The new IT division will be more agile and flexible, better able to respond to client needs. As with any merger, there are issues to overcome and new expectations to set. Once these have been addressed, the university will benefit from a more comprehensive and strategic approach to IT.

In addition, I am creating a new IT governance structure that will accept input from various campus stakeholders, build a priority-setting process for IT projects, and align our IT projects with the university’s strategic goals. Many of the technology projects on our campus are “priority #1,” which is an impossible environment within which to operate.

These changes will position the university to continue to provide high-quality IT resources to our students, faculty, and staff in these difficult and demanding times.

ACUTA: What is the impact of this issue for your campus? What is your strategy for addressing this issue?

Vandever: When complete, the merger will result in stream-lined customer support for our users on campus. Users will not have multiple points of service to navigate, simplifying their interactions with ITS. Open and frequent communication with the campus community will be key for the success of our new organization.

The change in governance will provide increased transparency in planning, but will most likely lengthen the planning cycle. Our users will be more involved in decision making and planning, but as we involve new groups of stakeholders and formalize decision making, the planning cycle will naturally lengthen.

ACUTA: Given that a key function of the CIO’s responsibility is preparing the campus to support future technologies, what technology changes do you see for your campus as you look forward five to seven years?

Vandever: I believe there will be more demand from users for instantaneous information access from any location. We will be required to provide access to our data in many formats. In addition, users are no longer willing to accept a single solution or answer; they “mash up” content and create their own versions of software. For instance, iGoogle allows users to control the content of their Google homepages by customizing “widgets”—from newsfeeds to games to stock quotes. Because of these experiences, our users now expect the same services from us, and that expectation will continue to grow in the next five to seven years. As users transfer their communication to mobile devices and the Internet, we expect the use of traditional communication tools, such as e-mail and land-based telephones, to decline.

ACUTA: How are you readying the campus for these changes?

Vandever: Planning for IT is a continuing challenge that cannot be met by IT management alone. While the governance structure is critical for the prioritization of IT projects, it is also important for long-range planning. The governance process gives the users and IT staff an opportunity to work together, learning about potential opportunities and changes. Another key to this success is professional development. Supporting our staff by sending them to conferences and training programs is an excellent way to bring innovation to our campus.

Reach Jennifer at jvandev@siue.edu.

*
Q&A with the CIO

ACUTA: Much of the technology we now support in higher education is driven by consumer electronics. What decisions about your technology infrastructure have been affected by this and how?

Vandever: The market penetration of mobile phones and laptops has certainly had a significant impact on our technology planning. Meeting students' demand for wireless connectivity to their laptops has been a continuous effort for several years. We have expanded our wireless coverage from a few hotspots to near total coverage of campus buildings and have also upgraded from an open network to a far more secure, encrypted one.

The university has incorporated students' mobile phones into its safety initiatives with the advent of our e-Lert text messaging service, used to quickly notify faculty, staff, and students when an urgent situation arises. In addition, we are planning several new mobile initiatives to provide students easier access to university applications.

ACUTA: Freshmen at most institutions today are far more extensive users of technology than those of even five years ago. What is the most challenging technical aspect this presents for your campus?

Vandever: Balancing the expectations of unlimited access and bandwidth with responsible use presents the most challenging aspect of dealing with new students on our campus. Most freshmen arrive with plenty of hardware and some technical skills, but we often find them lacking in an understanding of responsible or secure behavior.

At the beginning of each semester, we respond to many complaints about students who have illegally shared copyrighted content. In each case, we contact the students and inform them of the infraction, and, in almost all these cases, the students are surprised that their actions are illegal. In addition, student academic misconduct involving technology has increased. For example, there have been several cases of students using mobile devices to record exam answers and share these answers with other students.

A further challenge is providing technology resources to students in a secure environment. Students sometimes do not recognize the implications of sharing passwords with others or leaving accounts open on their computers. Our challenge is to encourage students to use the available technology in a responsible manner—just because they can doesn't mean they should.

ACUTA: In what ways has this affected how you deliver support services?

Vandever: As our residential computer population grew, we faced a decision about providing support to those in on-campus housing. While we do not have enough technical support staff to provide hardware support for every student, we recognized a need to provide basic support for these residential students and have done so for the past five years. We ensure that the student's computer is free of viruses, malware, and adware, and that the computer can connect to the university's critical software, such as Blackboard and Banner. If a student has a laptop computer with a problem, it can be dropped off at the central IT location. If a student has a desktop computer with a problem, an ITS employee will make an appointment to visit the student's room to fix the computer. This program has been a great success.

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