ACUTA Journal

Winter 2005

ACUTA Journal of Telecommunications in Higher Education

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### ACUTA's Core Purpose is to:
Support higher education communications technology professionals in contributing to the achievement of the strategic mission of their institutions.

### ACUTA's Core Values are to:
- Share information, resources and insight,
- Respect the expression of individual opinions and solutions,
- Maintain our commitment to professional development and growth,
- Advance the unique values and needs of higher education communications technologies, and
- Encourage volunteerism and individual contribution of members in support of organizational goals.
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Don Norris, page 12

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From the Strategic Leadership Forum at the Annual Conference to the Fall Seminar in Denver to the focus of this issue of the *Journal*, we have raised the visibility of the importance of strategic planning. As someone very wise has said, if we fail to plan, we plan to fail. My experience at Northwestern University has taught me that there are at least three vitally important reasons why strategic planning for information technology is critical:

1. It aligns the technology direction with the University’s strategic plan, as well as our school and administrative department plans.
2. It enhances communications and develops stakeholders and partners within the Northwestern community for information technology initiatives.
3. It develops a roadmap for technology to facilitate funding decision making with a multi-year view.

If we are going to achieve excellence, we must develop information technology strategic objectives and operational objectives that align with our institution’s mission and goals. To accomplish this at Northwestern, we begin by listening and communicating with the University community. This happens throughout the process, culminating when we share the completed three-year University Information Technology Strategic Plan with our senior administration for funding consideration, our staff, key stakeholders, committees, trustees, deans, vice presidents, and the broader NU community.

From the strategic plan come direction and support for technology decisions. Strategic planning provides the roadmap for those who make decisions based on what is in place today, what needs to be expanded, and what is necessary for the future. Without a plan, we could not successfully provide services for today, much less be prepared to meet the challenges of the future.

In *Strategic Planning for Public and Nonprofit Organizations*, John Bryson says, “Strategic planning is a disciplined effort to produce fundamental discussions and actions that shape and guide what an organization is, what it does, and why it does it.” What could be more basic—and more important—than that?

This edition of the *Journal* also addresses the issue of leadership, a close companion to strategic planning. Much has been written on the subject of leadership, and I offer these quotes as food for thought on this other important subject.

“Management is efficiency in climbing the ladder of success; leadership determines whether the ladder is leaning against the right wall.” (Stephen R. Covey)

“Great leaders are almost always great simplifiers, who can cut through argument, debate, and doubt to offer a solution everybody can understand.” (General Colin Powell)

“Leaders are visionaries with a poorly developed sense of fear and no concept of the odds against them. They make the impossible happen.” (Dr. Robert Jarvik, 20th-century American heart surgeon)

“When the best leader’s work is done the people say, ‘We did it ourselves!’” (Lao-tsu, father of Taoism)

Opportunity exists for those who seek it. If you are not involved in the strategic planning process on your campus, take the initiative that characterizes a good leader and find a place for yourself or begin the process in your area. It is not just what you plan to do tomorrow but what you start today that will make a difference. I hope the articles in this issue of the *ACUTA Journal* will help you gain new insight into leadership and strategic planning.

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**Presidential Message**

Patricia A. Todus
Northwestern University
ACUTA President
2005-2006

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Key Findings from the ACUTA Trends Survey

What are the most important communications technology issues ACUTA member institutions face now and will face over the next five years? How are your peers planning to address them? ACUTA and the consulting firm WTC conducted a survey of ACUTA’s institutional members, asking them to identify the most important issues and trends in higher-education communications technology. The survey asked members to rank the most important issues in several key areas, including management, strategic issues, infrastructure, technology, organizational issues, policy, and external issues, and to identify the top five funding issues they believe will require the most funding resources in the next three years.

Survey Method. The survey was conducted by WTC using the Web-based survey software Web Surveyor®. An invitation to participate was e-mailed December 7, 2004, to 768 ACUTA primary members. We received 105 responses to the survey: 61.3 percent of the participants were public institutions, and 38.7 percent were private institutions. The average student FTE was 11,914, and the average faculty/staff FTE was 3,535. The participants were well distributed across Carnegie classifications.

The results of the survey provide a comparison of current high-priority issues and challenges and those anticipated by ACUTA members over the next five years. In most instances, there was not a significant difference between the current and emerging issues, indicating that members feel they will be working on similar issues over the next few years.

The following results offer a valuable insight into what ACUTA members responding to the survey believe are the most important issues they are dealing with on their campuses now and will face in the near future. The results could create opportunities for a strategic approach to communications technology planning.

Management Issues. “Developing a vision for the future,” “keeping up with current technology trends,” and “keeping up with demand for services” were identified as the most important current and future management issues. “Creating new funding sources” was also named as a top issue for the future, which is closely related to the current issues “keeping up with technology trends” and “keeping up with demand for services.” The participants did not rate “community image,” “vendor relationships,” or “promoting image on campus” as high priorities.
Strategic Issues. "Developing a strategic master plan," "funding models," "network survivability," and "business continuity planning" were all closely rated as the top strategic issues both currently and for the future. "Supporting distance learning" is projected to lose priority status in the future compared with today. "Outsourcing" was ranked at the bottom of the strategic issues pile.

Infrastructure Issues. Survey respondents rated "network infrastructure performance," "planning for new construction," and "preparation of the physical infrastructure to support VoIP" as the three most important infrastructure issues. Considering the amount of new construction on many campuses and the widespread investigation and/or deployment of VoIP, these rankings are not surprising. What is interesting is the relatively low rankings of "full convergence," "cable plant refresh," "wireless LAN," and "UPS or diesel generator backup power"—not even reaching the top six in terms of current or future importance.

Technology Issues. When asked to rank technology issues in order of importance, institutions responding rated the "role of mobility," "storage area networks," and "integrated messaging" as both the top three current issues and the top emerging issues over the next five years. Current issues mentioned with less frequency but still by more than 10 percent of respondents were "migrating remote access from modem pools to different technology" (interestingly, still a lingering issue), "voice recognition," and "IP TV." It was also interesting to note the technologies that were rated as very low in either current or future importance, including "identity-based network service," "wireless," "full convergence," and "mobile messaging/smartphones," among others.

Organization Issues. "Internal relationships with other departments such as IT, Telecom, and Facilities" topped the list of current and future organizational issues. "Development of a network security office" and "organization change to
support convergence" finished second and third, respectively, for current issues. They also ranked second and third, in reverse order, as future issues. We might conclude from this that most institutions will have a network security organization in place within the next few years, so they will no longer need to deal with this issue as a priority. In addition, it is quite likely that many institutions will have implemented some phase of convergence within the infrastructure within the next five years and will need to reorganize the staff to support the technology convergence.

Policy Issues. “Development of network security policy and procedures,” “refreshment cycle of network systems,” and “chargeback versus central funding policy” top the policy issues, which fall in line with the organization, management, and strategic issues previously identified. “Outsourcing” ranked at the bottom of the list of policy issues, which is consistent with the low rating of outsourcing among strategic issues.

External Issues. “Regulatory,” “Internet2,” and “contracting strategies” were identified as the top three current external issues. “State networks” closely followed as the fourth most important. “National Lambda Rail” and “K–12 initiatives” rounded out the list as fifth and sixth most important. Rankings of issues for the next five years were identical. These external issues have the potential to significantly affect the management of communications technology, and their importance to the top management issues of “keeping up with technology trends” and “keeping up with demand for services” is apparent. ACUTA members will need to closely monitor these and other external issues in order to adapt their networks and systems and remain in compliance with regulatory requirements.

Issues That Require the Most Funding Resources. “Network infrastructure performance” and “keeping up with demand for services” were identified as requiring the most funding resources. Rounding out the top four were “keeping up with technology trends” and “refreshment cycle of network systems,” which came in third and fourth. “Business continuity planning” and “preparation of the physical infrastructure to support VoIP” were nearly tied for fifth. With the rapid changes in technology, obsol-
nce of current technology is accelerated and life cycles are shortened, which creates shorter refreshment cycles. This finding is consistent with the need for continuing network refreshment and investment in new technologies, which carry the biggest impact on the technology budget.

Conclusions. After reviewing the survey responses, it can be concluded that no single issue could be identified as the top priority in higher-education communications technology. There was no significant difference in results when looking at public versus private or large institutions versus small institutions. In addition, there were few major differences between current and future issues in any of the areas that we studied. However, there was a definite increase in priority for the future in wireless VoIP, the role of mobility, and storage area networks.

The results of this survey were used by the Higher Education Advisory Panel to guide its selection of the primary theme for the 2005 Forum for Strategic Leadership in Communications Technology, “Developing a Shared Vision: Strategic Planning as a Guide to Technology Funding.” Several presentations at the 2005 conference were based on insights gained from the survey results.

The purpose of this survey was to seek input from our members as to their perceptions of the most important communications technology issues and challenges they think their campuses face now and will face in the near future. In actuality, all the issues that were studied are important to some degree on nearly every campus, and ACUTA members need to monitor these issues and stay informed in order to provide advice and direction. However, the survey results do provide an interesting glimpse into current and near-term priorities.

ACUTA and WTC will be conducting a second communications technology issues survey, designed to identify changes since the first survey. We will continue to share the results and track changes in our members’ rankings of the “most important” issues.

Phillip Beidelman is president of WTC, Inc., and ACUTA Director-at-Large. Reach him at pbeidelman@wtc-inc.net. Jeri Semer is executive director of ACUTA. Reach her at jsemer@acuta.org.
The Changing Face of Planning and Leadership

by Donald M. Norris, PhD
Strategic Initiatives, Inc.

A number of years ago I wrote *A Guide for New Planners* for the Society for College and University Planning (SCUP). Recently, I approached SCUP about the need for a fresh look at the full range of strategic planning challenges and opportunities facing campuses in the 21st century. The reasons are both obvious and compelling.

Planners are facing a new set of realities. Financial exigencies have forced public and private institutions to rethink their financial models and seek new sources of revenues and innovative approaches to enhance productivity. Government and policy makers at the state and federal levels are demanding greater accountability. Colleges and universities are finally beginning to realize tangible results from leveraging their massive investments in information and communications technology (ICT). This is transforming the nature of learning, scholarship, and knowledge sharing, leading to greater performance, reduced costs, and new experiences for students, faculty, staff, alumni, and other stakeholders. Domestic and global learning competitors are challenging existing practices and showcasing e-learning innovations whose value propositions are high and whose costs as low. The nature of campus master planning is changing to accommodate both sustainability and the impact of digitization on learner-focused facility design as well as the need to leverage facilities far more effectively.

Let's examine these developments more closely and assess their impact on strategic planning and campus leadership.

**Accountability and Focusing on Value**

For the better part of a decade, colleges and universities have been under increasing pressure to demonstrate their value. Support for higher education as a public good waned during the recession of the early 2000s. Public institutions in many states have experienced increasing scrutiny and a variety of performance funding measures that drive state appropriations. In 2005, the National Commission on Accountability in Higher Education (NCAHE) has been formed to federalize accountability for higher education in the spirit of the No Child Left Behind movement in K–12. At this point, what actions NCAHE will take are unclear.

Higher education has long cherished “quality” as its gold standard; but the definition of quality has been entrusted to the education providers and accreditation agencies that assess the input and throughput of institutional programs and practices. Quality is seldom explicitly linked to outcomes. It is subject to the interpretation of educational experts, not learners, employers, or others in a position to evaluate the outcomes carried forward by learners. In today’s world, excellence is esteemed more than quality, and excellence is reflected in performance.

**Value** is the performance standard that makes more sense for our times. Value is especially useful in dealing with learning and its related developmental experiences. Value consists of three items: (1) learning and developmental outcomes, (2) the experiences through which those outcomes are achieved, and (3) cost. Value is situational and contextual, not monolithic. Nor can value be singularly ascribed to a particular program or institution for its dealings with all types of learners. Value is based on the match between individual needs or perceptions and the variety of outcomes and experiences available to them, at particular costs. Value propositions must be differentially articulated for different groups and even individuals.

Not surprisingly, the fastest growing learning providers are those that have discovered how to
deliver superior value to learners. Critical to their success is the capacity to articulate and demonstrate their value propositions. Many of the most successful and fastest growing for-profit competitors in the learning marketplace clearly focus on understanding and articulating their value proposition for adult learners. Competency-based outcomes, consistent learning experiences and standards of learning across the institution, and convenience for adult learners differentiate institutions, the University of Phoenix, DeVry University, and other for-profit providers from most universities. These institutions can measure and articulate their value, something that most nonprofit learning enterprises cannot achieve.

But even traditional institutions are proclaiming their value and doing something about it. The Boston Consortium consists of 14 private institutions that are collaborating to enhance the performance of administrative and academic support services for the purpose of enhancing performance and controlling cost. The Minnesota State Colleges and Universities are aggressively leveraging distance learning to create new value propositions for Minnesota learners and reduce the marginal cost of learning so it is less than the rate of tuition and fees in public institutions. Wilkes University is redesigning its institutional experience, based on mentoring, to engage students, faculty, staff, and alumni in new ways. This will create new value propositions for all participants. And the list of value-oriented innovators goes on—not yet a torrent, but more than a trickle.

Enhancing Performance and Reducing Costs through Leveraging Technology

In a recent article in EDUCAUSE Review, William Graves affirms that the new conditions facing higher education require strategies for identifying, prioritizing, and proactively meeting the critical performance expectations facing higher education. Fortunately, there are numerous case-by-case examples of value-building transformations in individual courses and programs in colleges and universities. Carol Twigg’s ground-breaking work for the National Center for Academic Transformation has demonstrated that almost any academic course experience can be reinvented and enhanced, using both technology and clever faculty-driven redesign and, in the process, achieve better quality and outcomes and reduce cost. The latest round of NCAT’s Course Review Program is striving to promote these enhancements and savings and encourage institutions to leverage course reinvention across the institution.

The debate stimulated by Nicholas Carr’s article “Does IT Matter?” in the Harvard Business Review (and his subsequent book) provoked educational leaders to reexamine their investments in ICT. The bottom line is that ICT yields real strategic advantage only if it is used to truly change the way an enterprise functions. The bane of higher education is that we practice innovation with a lower case “i.” A thousand points of academic light do not produce enterprise-wide innovation, and the flames tend to flicker out rather than ignite new ones.

To maximize value, institutions must practice enterprise-wide, systemic innovation, leveraging technology to enhance productivity and reduce costs. Graves points out that this requires institutions to nurture an interconnected set of infrastructures and capabilities—technology, information, analytics, and innovation—if they are to engage in systemic transformation. Few institutions have developed these capacities to a level adequate for the challenges of the 21st century.

Facilities Master Planning for the Digital Age

Higher education has experienced a building boom over the past five years. Many institutions have engaged in a sort of “facilities arms race” to see which institutions could build the most lavish student unions, learning resource centers, computing commons, sports compounds, or residential space. Pervasive network computing and the emergence of wireless communications have created an entirely new topography of

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digital learning spaces on campus and beyond. On some campuses, campus planners have created a new breed of multifunction facility that combines library, academic, and student union space. These new facilities have enabled the evolution of new patterns of interactivity among faculty, students, staff, and alumni.

On the ground, institutions are becoming far savvier about designing new facilities to reflect emerging learning practices. The design process for individual projects is changing as architects and designers are becoming more familiar with instructional and student needs. Smart, flexible design concepts are emerging to deal with the reality that a building designed today will change electrical systems once, furniture at least twice, and software systems fifteen times or more.

But the real revolution in campus master planning is yet to come. Confronted with financial exigencies and the need to enhance performance and reduce costs, campus leaders will be addressing the need to systematically reduce the square footage on campuses. This will involve revising the distribution of classroom and other space. Planners will need to dramatically enhance the productivity of facilities usage. Moreover, the proportion of learning engaged in through virtual or blended modes will continue to increase. In ten years, some traditional institutions are planning to use online learning to deliver as much as 30 percent or more of their total credit hours. And lecture-oriented classroom space may be substantially replaced by space configured for small group work.

Under those circumstances, what will the portfolio of campus space look like? Wireless interactivity is opening new options for campus usage patterns. It is also blurring the boundaries between the campus and other learning settings of choice. With apologies to the late Peter Drucker, the campus of the future will not disappear, but it will certainly look and feel different than it does today.

**Competition and Globalism**

The vibrant competition among institutions is likely to intensify as the focus on value sharpens. The “medallion” colleges and universities and high-ranked professional schools will enjoy good fortunes, but tough times are ahead for institutions whose value propositions are soft and indistinguishable from other, competing institutions and learning enterprises. Dean Richard Matasar of the New York Law School predicts bad times ahead for private law schools and programs of middle-of-the-pack reputations and value. Other professional schools will experience similar reversals, especially as the levels of student debt reach unsustainable conditions. The for-profit sector will continue to grow, cherry-picking choice programs in which to compete and promoting their capacity to deliver value and be held accountable for doing so.

Then there is international competition. Thomas Friedman asserts that “the world is flat” in many industries, and knowledge-based industries are not immune. *Transforming e-Knowledge: A Revolution in Knowledge Sharing* describes the dimensions of the boom in e-learning enterprises across the globe. This includes efforts in China, India, Southeast Asia, and Australia that are developing world-class e-learning experiences at a fraction of the cost of current best practices in the United States. Sometime in the near future, one can expect these approaches to “sneak in on little cat feet in the middle of the night.” The providers will not be “foreign” institutions, but struggling American colleges or universities acquired and repurposed to provide high-value, low-cost postsecondary learning with an American institutional brand.

Over time, these approaches will be adapted by American learning providers and a greater range of choices and value propositions will be available to learners. Increasingly important will be learning and developmental experiences that are “embedded” in the culture of organizations, delivering significant value within the context of those organizational cultures. Many institutions are customizing learning offerings to particular corporate clients, using in-house problem solving and case studies. Some of these offerings are organized not by degree or disciplines, but by performance outcomes. For example, the Cooperative Learning Institute at Virginia Tech is crafting embedded, contextualized, co-created leadership-development experiences for corporate and institutional clients.

**Sustainability**

A growing numbers of students, faculty, staff, and alumni are pressing that *sustainability* perspectives and principles be applied to create socially and environmentally sound decisions. Several years ago, SCUP launched Campus Sustainability Day, an event that focused attention on what sustainability principles mean when they are applied to the planning and operations of colleges and universities. The response has been remarkable. Participation in subsequent Campus Sustainability Days has mushroomed. SCUP is accumulating a growing body of knowledge on cloning sustainability practices into campus planning and decision-making processes. In many ways, sustainability is becoming SCUP’s “brand.”

In its broadest context, planning for sustainability may be precisely the principle college and university strategic planning needs for the 21st century. The campus of the 21st century
needs to be financially and programmatically viable. It needs to fulfill differentiated value propositions for a wide range of stakeholders in the face of withering competition and changing conditions in the professional marketplaces on which it depends. Tomorrow’s campus, physical and virtual, should be environmentally, socially, and professionally sustainable.

Smart Change and Leadership

In the face of these challenges and opportunities, colleges and universities need bold leadership that can mobilize the vision and energies of their university communities, engaging in smart change to discover sustainability.

“Smart change” is the aggressive application of the principles and practices of change management to create systemic, enterprise–wide change for the purpose of discovering sustainable futures. Change management is an iterative process that provides a strategic context for the institution’s ongoing efforts at process improvement, capacity building, and value enhancement. Change management weaves these initiatives together so they focus on and develop enterprise–wide capacities and outcomes. Effective change management requires clear articulation of the performance leaps expected of institutions in the 21st century. Accountability for progress toward these performance goals is imperative.

Some institutions are focusing on value and practicing smart change. One example is the “Boldness by Design” initiative at Michigan State University. The University is positioning itself for national and international leadership as the premier land-grant university for the 21st century. This involves building on and repurposing the values and value propositions that distinguished land-grant universities in the 19th and 20th centuries. Broad-scale participatory processes are engaging members of the University community to discover and shape what these principles mean around the world, nationally, and at home.

On the other hand, most of today’s university presidents continue to spend most of their energies raising funds, driving themselves past the point of exhaustion. They are pursuing an impossible goal: Filling the gap in their current financial models which are unsustainable, in many cases. Isn’t it time to try a different approach by leading smart change?

Don Norris is president of Strategic Initiatives, Inc. Reach him at stratinit@aol.com.

Resources


Terry Calhoun, Anthony D. Cortess, and SCUP’s Sustainability Advice and Review Panel, “We Rise To Play A Greater Part,” 2005 Update in Support of Campus Sustainability Day III


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The fundamental purpose of leadership is to produce useful change, especially non-incremental change. The highly technology-driven, competition-filled, volatile environment we all find ourselves in now requires more leadership than in any previous time in our history.

I am very concerned about a pending leadership void in higher education and, according to Gartner, all sectors of American business created by a “graying” of IT leadership. Gartner’s research reveals that more than 83 percent of current senior IT leaders are over 40, and more than 50 percent are over 50.

Gartner’s findings, especially as they relate to higher education, appear to confirm one of the key findings of an EDUCAUSE Center for Applied Research (ECAR) study. In the January 2004 ECAR Key Findings report on “Information Technology Leadership in Higher Education: The Condition of the Community,” Richard Katz and Gail Salaway also reported that the community is graying, and that this may pose issues of leadership continuity.

All IT leaders in higher education should heed this wake-up call. At a Gartner Symposium in November, 2005, in a presentation titled “Higher-Education Scenario,” Marti Harris, a Gartner research director, identified the following strategic-planning assumption: “Higher-education executive leaders must plan for a 50 percent turnover in top IT leadership by 2010 (0.8 probability).” This assumes that one of every two currently sitting IT leaders will retire and/or otherwise leave the higher-education community in the next five years.

Harris went on to say that many current CIOs began their IT management roles during the explosive growth in higher education and the expansion of the use of IT in the late 1960s and 1970s. These leaders had the opportunities to develop skills and experiences that many of today’s younger managers often lack given the more specialized nature of today’s IT environment.

Harris specifically stated that it was imperative for higher-education institutions to begin immediately “to recruit and train young IT professionals to ensure an orderly leadership transition during the next few years.” While I agree with this action item, I suspect that it may be difficult to achieve. The shortage of IT leadership is an issue throughout the industry, and the well-documented fact that salaries and benefits in higher education place it toward the bottom of the entire industry sector will leave higher education a less likely choice of younger IT professionals.

Given the salaries-and-benefits challenge noted above, I believe it is incumbent upon us to leverage some of the additional findings in the ECAR study. Two of those findings are:

- **Higher education is, for many, a calling.** The ECAR study reveals among respondents a remarkable loyalty to higher education and often to an institution. What is equally important is that 61.2 percent of the professionals under the age of 40 who participated in the ECAR study indicated they plan to stay in their current position 15 years or more. This is especially important as we consider how to recruit and/or develop the next generation of senior IT leaders in higher education.

- **Colleges and universities provide very stimulating and personally challenging work environments.** The study states that it appears that the academic climate as well as the dynamic nature of the technology environment—new technologies as well as new job functions
manage those technologies—creates constant opportunities for respondents to learn and grow professionally.

When we have opportunities to recruit new IT professionals, we should certainly leverage these qualities to promote our institutions to these potential future leaders. However, for most institutions without the commitment to succession planning that we see in most larger commercial enterprises, the most viable choice is to identify and develop our existing staffs.

Former ACUTA director-at-large Anne Apicella once said, "Leaders aren't just the boss." Leaders exist throughout our organizations. It is essential to identify the current leaders within our organizations, at all levels, and begin the process of developing them as the possible future IT leaders. It is an added advantage that these people may already be committed to higher education. They are already aware of the potential downside—salary and benefits—but are equally aware of the plus side—the working environment.

While such people may possess the desired leadership skills, they may not aspire to be senior IT leaders. Baby Boomers, who are now reaching retirement age, viewed climbing the career ladder essential to success, but the same cannot be said of the generations who are now in middle or entry-level management and technical positions in our institutions. Both the Gen Xers and the Gen Yers have different views of what is important. Careers do not rate as highly with many of them as they have with those of us whom they will replace. We need to demonstrate how their personal goals can be accommodated within the larger goals of the IT leadership functions in our institutions.

We must use whatever we view as our list of essential leadership skills to begin this process of identifying and developing the next generation of IT leadership. Doing any less will merely subject our institutions to the very real possibility of failing to provide an orderly IT leadership transition during the next few years.
To conclude, here are 12 skills that affect how we work with others and how they respond to us as leaders. (I adapted this list years ago from a source called “smartleadership.com.”) Whether you choose to use this list or your own, I encourage you to decide what skills are essential to your institution’s IT leadership function and identify the leaders that exist in your organization and how you will develop them.

1. **Vision.** As individuals, we must have both a clear goal and a firm commitment to reaching it. Our staff and others will readily line up behind us if we let them know where we are going. What are your goals? Have you clearly communicated them to your staff and peers? Do you have a plan for how to accomplish your goals?

2. **Charisma.** This attribute stems from high self-esteem and high energy. If you have it, you attract others that want to be like you, have what you have, and do what you do.

3. **Character.** Your ideas, values, experiences, knowledge, and wisdom make up your character. This is the core of your creative center. People trust individuals/bosses/leaders whose character embodies truth and strong values.

4. **Responsibility.** More than being willing to take initiative and be accountable for the outcome, this includes knowing the level of risk and the potential rewards. Responsible leaders go beyond what is normally accepted to achieve the exceptional. They demonstrate they are willing to take risks that are commensurate with the rewards to be gained.

5. **Planning.** You must be able to balance planning with execution. This means you must know how to develop a plan, how to organize people and other resources to accomplish the plan, and when to take action that will facilitate execution of the plan.

6. **Social skills.** If you listen and respond well to people and express genuine interest in them, you have strong social skills. One element of this is the ability to recognize and return each individual’s behavioral style.

7. **Achievement drive.** Effective leaders are highly motivated. They have a need, a burning desire, to produce results. Their drive sets an example for other people.

8. **Emotional stability.** This is just another way of saying maturity. It is the ability to maintain your balance in the face of good and bad experiences.

9. **Tolerance for ambiguity.** A leader can deal with roadblocks while moving forward, juggle lots of activities without losing focus, and see how all the details fit into the big picture.

10. **Decisiveness.** People have no desire to follow weak or wishy-washy decision makers. They follow individuals who can assess situations, analyze choices, and move toward solutions. This ability is absolutely essential to leaders.

11. **Delegation.** Effective delegation requires competent staff/individuals whom you know will do the work you assign. Follow through by inspecting that work. This is how you get more done through other people.

12. **Positive outlook.** Concentrate on what you can do right. Believe you will reach your goals. In short order, other people will believe, too.

    While these skills are all essential for being an effective leader, there is one more I would personally add. For want of a better term, I’ll call it **fulfillment.** This is the passion, personal commitment, and gratification we exhibit when we truly enjoy what we are doing. When you work for someone who finds fulfillment in his or her work, you will find this positive attitude irresistibly contagious.

Let us as current IT leaders not fail our institutions by ignoring the critical issue of leadership in higher education. Tony Mordosky, associate provost of information resources/CIO at Rowan University, is a former president of ACUTA and a frequent speaker at ACUTA events. His personal commitment to strong leadership won him the ACUTA Ruth A. Michalecki Leadership Award for 2004–2005. (See details on page 49.) Reach Tony at mordosky@rowan.edu.

Help Us Grow the Network: Tell a Colleague about ACUTA
Filling the Leadership Void
Culture and Collaboration Make Higher Ed Attractive

by Jack Suess
University of Maryland, Baltimore County

Question

Reliable sources predict that a leadership void will develop over the next five to eight years. Some estimate that a full 50 percent of current senior IT/communications executives will retire or be eligible for retirement in that time frame. Given that higher education typically has a difficult time recruiting from industry due to discrepancies in pay scales, and given that industry salaries are projected to rise because of the anticipated shortage of talent, what can be done to develop leadership talent internally? If the logical strategy is to encourage lower-level managers to take on leadership roles, what are the most effective methods?

While we all want to believe that we are so valuable we can’t be replaced, my bias is that no one is irreplaceable in an organization. We know that someone will be chosen for IT leadership positions as they come open. The real questions are what will we lose with coming retirements and how will we compensate for that within our institutions and profession?

Thinking about what we will lose, I believe the concern over a potential leadership void arises because we are, or soon will be, losing many of the founders that shaped IT within our institution and profession. Many of today’s leaders came into the profession in the 1970s and 1980s. They helped to shape two key facets of technology—personal computing and networking. They worked closely with early adopters among the faculty, and often built the IT organizations at their institutions.

Although salaries in education are typically lower than those offered by the business sector, I believe that higher education has its own appeal to outside workers. One of the positive aspects of the dot-com bust is that many talented people who were drawn into startup companies while in their 20s and early 30s now have families and want something more than working 80 hours a week. With its focus on community, learning, and diversity, higher education is a very attractive place for them to work and raise a family. Higher education can’t offer stock options, but it can offer a quality of life that is attractive to many. As a community, we have to reach out and invite those outside academia to apply for openings.

While we can do a better job of recruiting outside higher education, most of our new leaders will be drawn from within higher education. IT is a field that has always drawn people from a broad array of academic disciplines. As we look to bring in new leaders, we need to cast our net widely and look for the best people across the enterprise. I recently had the pleasure of having dinner with a new CIO, someone who taught college history prior to joining IT. Another successful CIO was once the registrar on his campus. As we look on our campuses, there are many people now who understand the power of IT to transform the academy—we should be mentoring and encouraging them to enter the profession.

Within the profession, it is essential that we continue to be committed to our cultural values of collaboration and knowledge sharing—they are unique in academe. By doing so, we provide the basis for acculturating new members that come to our community as quickly and effectively as possible. Professional organizations such as ACUTA are critical to that process.

Finally, our culture of collaboration will prepare us for moving from individual leaders to leadership teams. The IT enterprise at most organizations now spans a wide variety of sub-disciplines. Most people who have entered the field in the last 10 to 15 years have specialized knowledge within IT but don’t necessarily have the broad background that today’s retiring IT leaders developed through years in the profession. Successful IT organizations will develop a diverse leadership team that shares the responsibilities for IT leadership. This will require not only an emphasis on the benefits of working within higher education but also new approaches to management training within our profession that will ultimately be the keys to our long-term success.

Jack Suess is vice president for information technology and CIO at UMBC. Reach him at jack@umbc.edu.
Filling the Leadership Void
Strategies for Succession Management in IT

by Samuel J. Levy and Linda C. Halverson
University of St. Thomas

Question
Reliable sources predict that a leadership void will develop over the next five to eight years. Some estimate that a full 50 percent of current senior IT/communications executives will retire or be eligible for retirement in that time frame. Given that higher education typically has a difficult time recruiting from industry due to discrepancies in pay scales, and given that industry salaries are projected to rise because of the anticipated shortage of talent, what can be done to develop leadership talent internally? If the logical strategy is to encourage lower-level managers to take on leadership roles, what are the most effective methods?

If estimates are even close—that 50 percent of current senior IT executives may retire in the next five to eight years—the challenges of succession management are formidable. One could add to that integrating our multi-generational workforce, with distinct characteristics and career goals among the generations (see Geeks and Geezers by Bennis and Thomas).

In Information Resources and Technologies (IRT) at the University of St. Thomas (UST), we’ve developed a number of strategies to develop and promote from within, even though we enjoy the advantages of excellent human resources talent in the Twin Cities. We spend a lot of our time reviewing leadership potential among our colleagues and developing programs to encourage and reward their activities.

We often find that our younger employees—given that they maintain the currency of their knowledge—know as much about the foundations of information resources and technologies as they will need for a career. What they often need to develop are “soft skills”—an understanding of how organizations work, how higher education works, and how to negotiate, motivate, and interact effectively with people. This recognition leads to clear individual paths for education, professional development, and collegial opportunities.

• We grow leaders from within. UST, from its earliest days as the College of St. Thomas, has long had a strong community feeling. Employees tend to be woven into the fabric of the community through adjunct teaching and involvement in many university activities outside their normal work domain. This fosters a sense of community, mission, and commitment to more than just a bottom line.

Identifying and developing leaders from within the organization complements that culture. Managers watch for leaders to emerge and provide opportunities for them to increase their visibility, take on new challenges, and prove themselves in ways that extend beyond their job profiles. Part of what we watch for is what motivates them. Extrinsically motivated people (salary only) typically don’t get much attention. We watch for leadership potential and then create professional development opportunities through education and training. Then we seek opportunities for those emerging leaders to demonstrate their abilities through project assignments that encompass both ongoing maintenance of current services and new technologies and services development.

Success in these leadership roles also provides high visibility in the organization and the university. The recognition that grows from success builds confidence for the employee and consensus in the university about his or her abilities and performance.

• We mentor. We start by emphasizing and maintaining “line of sight to the mission” of the University through
organizational planning and development activities designed to provide our colleagues with an understanding of how a higher-education organization works beyond the specific goals of our technology and library work. We assign potential leaders to cross-organizational leadership teams built around division and project-management goals that emphasize the interdependencies of our work. We seek and support opportunities for partnering senior and potential leaders in presentations to university and professional organizations.

- **We measure leadership in our performance assessment process.** Every manager or supervisor is rated on his or her ability to engage proactively to accomplish the division’s and the University’s mission through the achievement of aligned goals. They are also measured on their ability to use effective strategies to create new initiatives or programs, as well as their ability to manage change, lead change, and influence others to change. We watch people who are being followed by others—and we find out why.

- **We recognize and reward.** We are cognizant of the salary inequities between some of our job families and those in the market, and we are committed to bridging that gap within the confines of our limited resources through comprehensively developed pay plans. We formally recognize people who have gone above and beyond the scope of their job responsibilities. They may receive a St. Thomas pin from the executive vice president, or an IRT “Fish” pin and thank-you certificate, or be recognized in an in-house publication, *IRT People.* Beyond these and other motivational tools, we work very closely with our human resources leadership to recognize the need to re-bench positions and even whole job families to higher salary ranges when job profiles have changed, and to identify and correct inequities in salary caused through compression or cross-department misalignment of job profiles. And when “pay-for-performance” opportunities are available, we reward those who have demonstrated their leadership.

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The Converged Workplace

by Joanne Kossuth
Franklin Olin College

As voice, video, and data services converge, it is easy to get caught up in the day-to-day management of the rapid pace of technological change and the latest "cool" things. One area that is often overlooked but that requires real leadership is the organization and staffing of the personnel required to support the technology and related services.

One of the biggest challenges is in planning not only for here and now but for the future as well. The number of employees and the range of technical skills required this year will not necessarily be the same next year or the year after or with the emergence of technology X.

One example of this is the emergence of voice over IP, which has resulted in the convergence of the "phone" people and the "data" people on many campuses. The phone people come from a background of five 9s service, a focus on customer service, and a separate infrastructure with intricate route settings and a never-ending list of options. The data people come from a background of do it now, a reputation for less-than-stellar customer service, and an infrastructure that until recently was seen as specialized and narrow in scope.

Some meaningful questions need to be asked. As VoIP increasingly captures market share, do the phone people have a career path in the organization (or even outside the organization as many of the carriers also progress down the VoIP path)? Are they knowledgeable about the overall environment of your organization so that they can contribute in other ways? Can the data people step up on the customer service end? Do they understand that the reliability of the network is of a mission-critical nature and not only for the technical staff?

A second example of how new technologies make old skills and even job descriptions obsolete is the plethora of user-friendly Web design and development tools. As end users become more accustomed to developing their own webpages and managing their own content, what is the role of the staff that used to be the "go to" people to develop a webpage or to change or manage content? Are they up for additional training to make them effective in the backroom support areas such as database management?

Strategies for Success

In this evolving environment, what can information technology departments do to retain and develop qualified staff?

MetLife CIO Steve Sheinheit suggests establishing mentoring relationships; making cross-organizational assignments: encouraging outside associations, committees, or governance board assignments; and implementing job rotation.

Monte Ford states that CIOs are responsible for setting a creative tone. We must accept attrition, but we must also invest in top performers and address management gaps so that the same problems are not dealt with year after year.

Experience in the higher-education arena validates their views to an extent, but there are 10 things the higher-education information technology professional should do as a part of a strategy for success:

1. Understand the big picture or the enterprise view because technology and information supports and informs the business of higher education and is not, alone, the meaning of higher education.
2. Be agile, and wear multiple hats, because everyone is being asked to do more with less. Volunteer for tasks that are not strictly within your
job description. Remember, there is always the “other duties as assigned” section!

3. Innovate because good ideas are always welcome, and even a bad idea, when teamed with ideas of others in a brainstorming activity, can become a really good idea! Don’t exclude faculty, staff, and student participation in brainstorming for innovation.

4. Automate day-to-day processing to build time and focus for emerging technologies. The last thing CIOs and others want to hear is that there is never time for the “cool stuff.” Make the cool stuff part of the job on a regular basis.

5. Work in teams since two heads or more are almost always better than one, and teams succeed where individuals often fail.

6. Be a lifelong learner. Read and learn for yourself. Learn from others in and out of IT. In this changing world, staying on top of things is critical.

7. Everyone wants to be the guru of something, and in these days of rapid technological change, there is no way to be a guru at everything. Pick a passion.

8. Communicate well—verbally and in writing. Be able to share technology with everyone from colleagues to faculty to the trustees. Security and identity theft are not necessarily favorite topics, but they are important; and it is part of everyone’s job to make them real for others. Today’s three-year-olds use computers and are adept with mice. Their expectations will be even greater than those of our customers today.

9. Collaborate and develop networks and relationships that benefit the institution. The pool of knowledge is very large, and the more times you do not need to reinvent the wheel, the better you can focus creative energies.

10. Focus on the customer—and focus on the customer some more. Customer service is a critical tool in helping to convert others to the technical side. To be effective, IT employees need to understand the business of the customer and be able to help make the work of that business easier. Good customer-facing or relationship-building skills are a major plus.

Staff Development

Upon close examination of your staff, you may conclude that you are not keeping up with the pace of change. Identify the shortfalls, hire for the skills that are most critical to your organization, and develop those skills that are missing. How do you do that?

• Cross training/shadowing. If your staff does not understand what other areas of the college actually do, assign your staff to work in that area for a week. You never know, the help-desk staff might better understand why the admissions staff need help right now when acceptance notifications are due.

Perhaps your staff does not even understand what others in the IT area do. A tool that has proven effective is to provide an inventory of skill sets and ask your staff to choose their top three choices for additional training. Schedule
the cross training at a time when both parties can benefit and are not subject to the stress of busy times, such as startup. Use staff meetings to encourage presentations of work in specific areas and to develop interest.

- **Professional development.** Create a professional development plan for each employee. Tie that plan to performance reviews. Ensure that the plans are individualized enough to reflect the employee’s requirements, aspirations, and career stage. Don’t file them; use them and update them. Make success a joint effort. Use external relationships and contacts with others such as vendors and colleagues to provide another avenue of review and development.

- **Mentoring.** Mentoring takes time and effort but has a high payback. Having more than one mentor can also be beneficial, so encourage staff to participate in campus committees, social events, academic events, and even coursework where appropriate. Time spent in mentoring others can change the perspective of the person doing the mentoring as well. Invite staff to president’s council and board meetings as appropriate. Encourage staff to demonstrate their projects themselves as opposed to you demonstrating their projects. Give credit where credit is due.

- **Building credibility.** Focus staff on building credibility through accomplishment by clearly identifying risks involved in projects and associated implementation and migration strategies. The processes are as important as—if not more important than—the technologies. Credibility helps to cultivate buy-in on the front lines of the constituency groups, critical for the increasing number of projects that affect multiple departments if not the entire enterprise.

- **Being a role model.** Articulate your vision, stand up for your vision, and relate your vision to the role of technology at your institution. Help your staff become articulate champions of change who can speak the language of their customers. Work with them to understand which battles are worth fighting and which are not.

**Conclusion**

Technological change is both never ending and stressful. By hiring for the qualities and skills mentioned above, fostering development in the gaps, and encouraging innovation, you will create a flexible, articulate, credible, effective, and customer service-focused staff. This staff will be equipped with the skill sets (technical and soft) to adapt to an increasing rate of change and increasing customer expectations as nanotechnologies and biotechnologies have an impact on our profession.

Joanne Kossuth is CIO at Franklin W. Olin College of Engineering. Reach her at joanne.kossuth@olin.edu.

**Notes**

1 Steve Sheinheit, "6 Ways to Develop Highly Successful People," *CIO Magazine*, July 15, 2005 (http://www.cio.com/archive/071505/otw_stars_sidebarsidebar_one.html)


Video over IP or Video over UTP

What's the difference and which is right for you?

With all the changes in technology in recent years, it's no wonder that it becomes difficult to know how to leverage it to your advantage. One such technology marvel is the transport of video signals over cables.

Once handled exclusively over balanced 300-ohm (flat lead) and 75-ohm unbalanced coaxial cable (RG59 and RG6 to name a couple), the signals are now capable of being transported over unshielded twisted-pair (UTP) cables. With changes in UTP technology by upgrading UTP cable to more efficient electrical characteristics (advancements from voice grade UTP to Cat 3, Cat 4, Cat 5, Cat 5e, and now Cat 6 and Cat 6a), the UTP cable is now capable of cleanly carrying video signals. There is enough engineered noise cancellation and cross-talk rejection in today's UTP to allow video to be transported over UTP while maintaining its quality.

Another factor is at play as well—a different technology that is rivaling the transport of video over UTP. It is the convergence of video information from conventional analog baseband signals to digital information that can be handled and transported just like data information or packets. With the compilation of the digital video information into Internet protocol packets, the video can then be transported over conventional IP data networks. IP networks have become, by far, the most popular data networks in use today, comprising the majority of all local area and wide area networks, including the Internet.

What's the Difference?

For purposes of this article, the primary difference lies between analog video signals (signals intended to be watched on a TV) and digital data signals (signals intended to be watched on a PC). Let's start with analog signals.

- Analog video. A television is primarily designed to receive a wide band or range (broadband) of radio frequency (RF) video signals. Think of this band as the "channels" from which you choose to watch programming. This is the format that cable TV companies deliver over their cable TV system. It's also the same format used by the earliest televisions that used "off-air antennas" that some of us may remember having on top of our roofs back before cable TV.

Most televisions also have "video" options ("Video 1" and "Video 2," for example). These are single-channel (baseband) signals common on VCRs, DVD players, and multiple other types of television interface devices.

Both types of signals, broadband and base-band, can be transported over UTP. The process is done using a conversion device called a balun. Balun gets its name from "balanced to unbalanced," as it converts the signal from a 75-ohm unbalanced architecture (the center conductor, or first conductor, having different physical and electrical characteristics than the braided shield, or second conductor) to a 100-ohm, balanced architecture (both conductors...
being equal in physical and electrical characteristics).

The transport of single-channel baseband video is common in remote origination applications where a source feed in a remote location on a campus would need to be broadcast back to the video headend or central broadcast location. The multichannel RF broadband application is common when distributing signals from a headend or central broadcast location, out to many viewers.

Both the broadband and baseband implementations have some limitations. The baseband transport is limited to a couple thousand feet, whereas the broadband is limited to a couple to a few hundred feet depending on the bandwidth (the number of channels) used, and assuming no amplification. The higher the bandwidth used (the more channels on the system), the shorter the cable length is allowed to be.

Of the two types of analog signals, broadband and baseband, the broadband application is more applicable to distribution and, as a result, will be the one we focus on in this article.

Like most other facilities—colleges, universities, hospitals, or even commercial entities—your institution made a large investment in your cabling infrastructure. In some cases, that investment may not include coaxial cable, due to its high cost and space requirements. It would only make sense to leverage the investment and use that infrastructure to its potential to accommodate your communications needs. A number of UTP solutions available on the market today actually use the unused pairs on your installed horizontal to transport video, without disturbing the primary signals on the cable.

Probably the most common application would use a conventional broadband hardline backbone (like that of a cable TV system) as the transport across the campus (from building to building) with a transition to UTP at the distribution or horizontal cabling level through the use of a multiport balun device (RF coaxial signal in and multiple UTP ports out). At the other end (user end) of the horizontal UTP drop, another balun device is deployed to convert the signal back to coaxial RF so it can interface with the television set. Deploying this UTP solution over existing horizontal drops using the existing unused pairs results in the most efficient use of installed resources. This solution obviously eliminates the need to wire a building with costly and space consuming coaxial cable drops. (See Figure 1.)

- **IP data video.** Let's now take a look at the IP concept. The architecture of this solution is very different from the analog video architecture. In the IP architecture, the video information is broken down into digital packets and handled as data information. The signal is nested into IP packets and transported over the same network hardware as conventional data. It's forwarded in a continuous streaming format so it is being broadcast and decoded simultaneously (multicast streaming video). Each video signal or channel is individually streamed, resulting in multiple streams simultaneously residing on the network. It becomes obvious that the more streams or channels you have, the more you increase traffic on the network. My quick rule of thumb for MPEG2 video (DVD quality) is to allow about 5 MB of bandwidth for each IP stream, so a 100 MB backbone would carry a 20-channel system fairly comfortably, while a 1 GB backbone would carry closer to a couple hundred-channel system comfortably.
One of the strong recommendations for implementation of an IP solution is a dedicated backbone separated from the data backbone. This will keep the more highly concentrated stream traffic isolated from the data at the backbone level and, using switches, as opposed to hubs, at the horizontal level, will direct only the data traffic on the user ports requesting data and only the single-video channel being requested by a user on that port, minimizing the traffic at the horizontal (or user) level. In other words, the traffic being delivered to any given user is limited to the channel he or she is watching and/or the data he or she is processing.

For the most part, IP video is intended to be received by PCs and presented on the PC monitor using a PC-based CODEC video decoder. However, there are decoder/adapters available on the market that will convert the signal back to video (baseband video) so the signal can be viewed on a conventional television.

The typical application using IP video would encode video sources (turn them into IP traffic) at the system headend (the place on campus where all the video sources originate and are combined to the common cable plant/network) and deliver them to multiple buildings using the existing (or dedicated, as spare fiber allows) data infrastructure. The IP streams are then delivered to the user end PCs using the existing horizontal data drops (just as conventional data is). Signals can then be viewed using a conventional browser or proprietary software on the PC. (See Figure 2.)

So, Which Technology Is Right for You?
The determining factors as to which is right for you are typically cost and resources. Let's take a look at the considerations of each solution. There are essentially three areas of concern when determining which application best suits your needs.

The first is channel count—the number of channels in the system and how they are combined. All of the channels, regardless of which application is used, require some type of processing at the central programming location, typically called the headend. The UTP solution, using RF modulation techniques, can typically be done for around $1,000 per channel. The IP solution, using the IP encoding technique, would run around $4,500 per channel. You can see from a channel perspective, it is much cheaper to deploy a UTP scheme, but remember, this only addresses processing the...
Channels into a format ready for transport. The transport itself and the deprocessing of the signals still need to be considered.

The second consideration is backbone (the transport): What, if anything, already exists, or what are the costs if the backbone needs to be built? The UTP solution in a campus environment will require a coaxial or HFC backbone. The approximate cost would be around $3,500 per thousand feet. Having an existing broadband backbone in place would greatly reduce this cost. The IP-solution backbone would require a fiber-optic network. The approximate cost of the fiber-optic backbone would be around $2,500 per thousand feet. Having the ability to use existing spare fibers would also be a great savings toward the cost of the fiber-optic backbone requirements.

The third consideration is the distribution costs: What will it cost to get the signal to an entity usable by students? The UTP solution would require multiport balun converters to convert the RF backbone signal to UTP, resulting in a per-port (per-student-room) cost of approximately $200 per port. Baluns at each end-user location would run approximately an additional $80 per port, resulting in an estimated per-port cost of $280. These end-user baluns would be necessary to convert the UTP signals back to RF so a student could view the video channels using a standard television set. Delivery of the signal in the UTP model would use the existing horizontal structured cabling already in place from the distribution closets to the student rooms.

The IP solution would require an Ethernet switch, and possibly even a router (depending on IT policies and planned structure), in each distribution closet to allow for interface with the existing horizontal cabling. It will be this existing horizontal cabling that will be used to deliver the IP signals to the student rooms. The estimated per port cost of the Ethernet switch hardware would be approximately $200. No adapters are required in the student rooms for viewing the content on PCs; however, if a conventional television is to be used, an adapter is required at an estimated cost of around $200 per television.

Determining the number of channels, the existing or desired backbone architecture, and the number of end users on the system will allow you to get a feel for the overall estimated cost of your solution. Also realize that an IP solution will require more IT support for configuration and control than the UTP solution, which will require more physical management in terms of jumper placement, balun handling, and management.

Table 1 summarizes the pros and cons of each application.

The bottom line is you should probably be leaning more toward UTP if you have an existing broadband backbone, lots of channels, and a small end-user count. A high end-user count, a small number of channels, and an existing fiber-optic backbone should lead you toward an IP solution.

Weighing and carefully evaluating all of the considerations above should help determine which solution will best suit your campus needs.

... Happy viewing.

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Interview

William J. Lennox, Jr.
Lieutenant General, U. S. Army
Superintendent, United States Military Academy at West Point

ACUTA: On today’s campuses, technology is ubiquitous and pervasive; but, in many cases, providing technology services happens so far behind the scenes that most users take it for granted. What should be the role of those responsible for voice, data, and video services—the phones, networks, and more—in the strategic planning process? If this is a leadership role, what personal characteristics will help a CIO or VP of Communications play a meaningful part in the process?

Lennox: Information technology (IT) can have at least two roles: a center for cost savings and a means of process transformation. In education, IT is clearly a means of process transformation and is a critical component in our strategic planning process. Our mission is to educate, train, and inspire leaders of character, and information technology is fundamental to our ability to accomplish this mission; so each year the Dean of the Academic Board reviews and approves our strategic information technology plan. Each semester, academic leaders discuss and prioritize upcoming IT initiatives supporting the strategic plan. Because information technology has differing effectiveness in academic disciplines, the strategic planning includes extensive communications with all constituents to properly prioritize limited resources.

The effective CIO understands information technology, education, and the interaction between the two. More information technology is not always better, so the CIO must exploit those opportunities where technology embraces education and resist pressures to add technology for technology’s sake. Technology done right is pervasive, ubiquitous, invisible, and reliable. Because not everyone in the strategic planning process understands the implications of information technology and its close relationship to current educational practices, the CIO digests and translates highly technical material to a nontechnical audience as necessary.

ACUTA: Students coming onto campus today have grown up with video games and computers. Is there a generation gap between new students for whom technology has been an integral part of life and leaders who have years of experience with traditional thinking? If so, what does this do to the leadership model? How does the leader who has limited hands-on experience with new technology lead the younger generation who are conversant and comfortable with it?

Lennox: There has always been a generational gap, and technology is but one component of many that contribute to that gap. Rotating our junior faculty every three to four years from Army assignments through advanced civilian schooling for Masters and PhD level education helps to minimize the generation gap between our cadets and the faculty. Our faculty is young, vibrant, and current in their respective disciplines. Leaders lead from the front and increasingly must understand themselves to shape organizational

Lieutenant General William James Lennox, Jr., of Houston, Texas, assumed duties as the 56th Superintendent of the United States Military Academy at West Point in June 2001. He entered the Army following graduation from the United States Military Academy in 1971, where he earned his commission as a lieutenant of Field Artillery. General Lennox has served in a wide variety of field assignments and in a number of staff positions including White House Fellow, Special Assistant to the Secretary of the Army, and Executive Officer for the Deputy Chief of Staff for Operations and Plans. He served as Deputy Commanding General and Assistant Commandant of the U.S. Army Field Artillery Center; Chief of Staff for III Corps and Fort Hood; Assistant Chief of Staff, CJ-3, Combined Forces Command/United States Forces Korea and Deputy Commanding General, Eighth United States Army; and, most recently, Chief of Legislative Liaison.

In addition to his Bachelor of Science degree from the United States Military Academy, General Lennox holds a Masters Degree and a Doctorate in Literature from Princeton University.
culture and wield information technology as an instrument of power. Leaders not conversant with technology should increase their familiarity while surrounding themselves with trustworthy subordinates who are. The principal advantage of information technology in an academic setting is arguably its ability to facilitate communications which bridges generational divides.

**ACUTA:** How do you prepare the mature leader to work with new technology successfully? Is there a basic skill set for leadership that never changes, or has the technology revolution of the recent past introduced some new skills? How do you get buy-in from all the stakeholders when change is necessary?

**Lennox:** The only constant in technology is rapid change. Instead of providing cadets with the skills to leverage current technology, the Military Academy prepares leaders of character to be agile leaders who understand technological concepts. The academic program vision explicitly states this objective:

"The Academic Program educates cadets to be Army officers of character who anticipate and respond effectively to the uncertainties of a changing technological, social, political, and economic world."

Of the academic program’s ten goals, understanding information technological concepts is the most recent goal. To accomplish this goal, all cadets take two rigorous required courses in information technology, work within an immersive and ubiquitous computing environment, and incorporate IT into their integrative experience. These experiences provide the necessary foundation to understand information technology as it affects decision-making.

To properly leverage information technology, all graduates must demonstrate their understanding and proficiency in five areas:

- The underlying physical and mathematical concepts relevant to IT. Graduates must be able to apply sequence, selection, and iteration to solve problems using computer-based tools. They must comprehend the physical and mathematical principles and constraints governing sensing, computing and communication, and possess a justified confidence in their ability to learn continuously about developments in IT.
- The ways in which IT systems function. Graduates must understand how the components of information infrastructures work together to manage information, and see the IT capabilities that exist at a particular time within the context of continuous and rapid progress, change, and evolution.
- Methods for successfully employing IT systems. Graduates must exploit available IT assets to adapt successfully when parts of the supporting IT structure fail. To defend the integrity of their IT infrastructure, graduates can apply information security concepts to risk assessments and make wise trade-offs between IT performance, cost, and security.
- The effective use of IT to solve problems and make decisions. Graduates recognize when, where, and to what degree IT can help solve a particular problem. They apply IT creatively to acquire, manage, and disseminate information essential to solving problems.
- The importance and implications of IT. Graduates can identify and appreciate the legal and ethical ramifications of using IT and recognize significant impacts of digitization on globalization and national security. Drawing on their knowledge of IT concepts, they adapt efficiently to IT-driven changes in doctrine, tactics, organizations, and procedures. As they gain experience, they can envision the potential warfighting impact of, and possibilities enabled by, future IT capabilities.

These outcomes encapsulate the five new skills that leaders must master to be effective leaders now and in the future.

**ACUTA:** Since 9/11 the business and higher education communities have taken security and business continuity far more seriously. In assessing risk or outside threats and setting up countermeasures, can you suggest some strategic thinking models that would be shared by military leaders and their civilian counterparts in higher education IT?

**Lennox:** The Cadet Leader Development System (CLDS) is USMA’s framework for developing leaders of character. This framework covers the need for leaders to be academically/technically competent which includes the goal of being able to leverage IT, as well as the need for leaders to understand and follow their moral, ethical, and legal obligations. These leaders’ obligations include accountability for their actions and the actions of their subordinates. By creating an environment that couples the need for IT proficiency with moral, ethical, and legal obligations, USMA develops a culture in which everyone can answer two basic questions:

1. What can I do now to prevent or minimize a threat?
2. What immediate actions do I take after a threat has occurred?
The growth in frequency, complexity, and penetration of computer-based attacks on our organizations has grown exponentially since 1988. The time between the release of a software patch and reverse engineering of that patch to exploit its vulnerabilities is rapidly shrinking. Mobile users with a plethora of computing devices further complicate the situation. Perimeter defenses and centralized management of security are necessary, but they cannot fully protect our IT infrastructures against this increased threat. Passive security awareness and training are insufficient responses to the increased threat. Leaders of character have the responsibility to ensure that everyone is actively trained and educated to respond effectively to attacks.

At the Military Academy, five ongoing programs help to develop our future leadership: Cadet Information Security Officer (ISO) Program; IT Saturday AM Inspection (SAMI); the Carronade Exercise; the Computer Defense Exercise; and, the Computer Emergency Response Team (CERT). These programs principally occur outside the classroom with strong support from the academic and military programs.

The Cadet ISO Program involves students in the governance and implementation of information technology services at the Military Academy. Cadet ISOs are at every unit from company to brigade. As a component of technical governance, these students develop training plans and train fellow cadets in the responsible usage of technology. To assess the effectiveness of this training, Cadet ISOs execute the IT SAMI and Carronade Exercise.

Throughout its long history, the Military Academy has formally inspected cadet living conditions. These "white glove" inspections ensure accountability, cleanliness, and functionality. In 2004, the Military Academy began inspecting cadet computers to ensure that they are maintained to the same high standards. In addition to these inspections, each semester an exercise called Carronade tests computer security awareness. Cadet ISOs send one of four phishing attacks to each member of their organization using an automated program. If cadets succumb to the attack, no sensitive information is transmitted but the cadet ISO is immediately notified so that they can walk down hallway and counsel the cadet. While the Military Academy's leadership and IT staff are aware of Carronade, they do not know the exact date and time of the attacks. Carronade help test security awareness while simultaneously testing incident response. This active training of students by students is central to preparing leaders of character that understand information technology.

The Computer Defense Exercise (CDX) challenges cadets that specialize in information technology in their ability to defend networks while providing services. This annual competition between the service academies is conducted by the National Security Agency (NSA). Over a three day period, the NSA attacks the cadet-run networks 24 hours a day and evaluates each team's response. Cadets
lead and execute the entire exercise with NSA and faculty mentorship.

Besides training cadets, the Military Academy shapes its organizational security culture through an active community of practice, the USMA Computer Emergency Response Team. The CERT meets weekly and works actively to develop policy and best practices in a rapidly changing security environment. The CERT provides a routine forum for leaders to influence and communicate with security professionals in subordinate organizations.

These five programs outside the classroom coupled with an in-class experience is USMA's approach to develop cadets who are information technology savvy.

ACUTA: Each branch of the military has its own strategic plan, yet it is important that these separate plans (1) are consistent with the direction of the larger organization; (2) do not leave gaping holes; and (3) do not overlap, resulting in inefficiencies. What military strategies could be applied on campus that would ensure that separate departments are not plagued with the same issues?

Lennox: The Military Academy provides central technical governance through a configuration control board that meets weekly. This ensures a consistent delivery of enterprise services according to the strategic plan. However, complete centralization of services, while efficient, is not effective in academic institutions. Each discipline utilizes technology differently, and academic department computer officers (DCOs) tailor information technology appropriately. These information technology professionals work for department heads and focus on delivering discipline specific technology consistent with enterprise services. The DCOs meet weekly with the Associate Dean for Information Technology to ensure their efforts meet the intent of the configuration control board and align with the Academy's IT strategic plan.

ACUTA: Henry Bienen, President of Northwestern University, said recently that "[I]nformation technology is a key enabler for research, teaching, and administration." Is that the attitude on the West Point campus toward IT? If not, in what way is your perception different and why? Are there any communications projects that you have recently implemented or plan to implement on your campus which you feel were particularly noteworthy?

Lennox: The Military Academy views information technology as a means of process transformation and is a key enabler for research, teaching, and administration. USMA's latest communication project expands our wireless network to cover all academic areas and other venues where people congregate. Whether cadets are at the library or waiting for a coach at the basketball arena, they will have access to USMA's network as they pursue academic excellence.

ACUTA appreciates General Lennox taking the time to answer our questions and share his unique perspective on and experience in leadership and strategic planning. You can e-mail him at webmail@usma.edu.
Managing Networks at Brigham Young University

by Gary Audin
Delphi, Inc.

Voice over Internet protocol or VoIP is becoming the dominant form of telephone communications for educational institutions. Forward-looking universities, such as Brigham Young University (BYU), already have significant deployments of VoIP on a converged network.

The data network is the infrastructure that will carry voice calls. The performance of the data network is a crucial factor affecting voice quality and call performance. Educational institutions must expand system management functions to support voice and, eventually, video over IP. This expansion will require management systems that provide real-time information beyond what has traditionally been provided for data network management, such as status and configuration details. Information must be provided on network performance, traffic, and resource usage, including individual phone call performance. This case study of BYU provides a view into the deployment of VoIP in an educational environment as well as insights about the network management monitoring requirements of such a deployment.

The Campus at BYU

BYU was a very early adopter of VoIP technology. Originally, the University began using the Selsius VoIP product line, which was eventually acquired by Cisco. The University looked at the first VoIP products available and decided to proceed although the technology was still in its early stages of development. Mel Anderson, the chief network engineer at BYU, has overseen the implementation of VoIP on campus for the past six years. He attained a great deal of experience as the technology evolved and the Cisco products expanded and matured.

The Provo, Utah, BYU campus has 334 buildings on 500 acres. There are 412 classrooms with wired access to the data network. In the past, the telecom and data networks were managed by separate departments. The University now has one organization for the management and operation of the data and telecom networks. As of June 20, 2005, the PBX on campus still supports 250 phones in administration. It did not support any dormitory phones, and the goal is to have the Siemens 9751 PBX offline by the end of December 2005.

Why Move to VoIP?

The BYU data center and PBX facility were initially located in a bunker building that was to be replaced with a new facility. As the PBX was not at the end of its life, it had to be moved before the facility was torn down, which meant that the move had to be accomplished by 2001, before the building demolition took place. A new underground room was made available to house the PBX and its 27,000 cable pairs. The PBX itself
Network size does matter. The BYU campus networks have many data network, VoIP, and legacy devices to manage and monitor:

- 35 routers from Cisco: model numbers 3620, 3750, 6000, 6509, 6513
- 1,200 LAN switches from Cisco: model numbers 2924, 3750, 4000, 4500
- 11,000 LAN ports with power of Ethernet (PoE)
- 14,000 LAN ports without PoE
- 4,800 analog phones connected to a Cisco VG248 gateway
- 7,100 IP phones from Cisco: model numbers 7940, 7960
- 12 Call Manager systems from Cisco running release 4.13ES7
- Two Unity voicemail servers running release 4.05
- Three Unity Exchange servers running Exchange 2000
- Two Cisco IPCC express servers (ACD) running release 3.52SR1
- Six IP phone gateways from Cisco: model number 6608, supporting 24 PRI digital ports connected to the PSTN
- 700 nonphone devices connected to the Cisco gateways
- 200 nonphone devices (faxes, etc.) connected to the Siemens PBX

was composed of five nodes and a core switch, and ran on DC power.

This move opened the opportunity for the university to consider new technologies for voice communications. ISO Ethernet was contemplated because it supported 10Mbps data and as many as ninety-six 64Kbps voice channels that could operate like ISDN. Planning included the view toward supporting digital video over the new network. Upon further investigation, the ISO Ethernet solution was eliminated because it was not very popular, and not many vendors supported it.

The next technology considered was VoIP products from Selsi, which had been acquired by Cisco. Other vendors were also considered, but none had products of the same caliber as Cisco available for implementation at that time.

Anderson and his staff had to reverse-engineer the voice network. The task of moving the 27,000 cable pairs in addition to moving the PBX while still providing voice services made the choice of VoIP much more attractive than trying to move the digital PBX and cable pairs with little interruption of service. Thus, the choice of VoIP was based on the ability to rapidly deploy the VoIP telephone service.

With the initial VoIP cluster installation in the old bunker building, the plan was to move the server cluster to the new facility as rapidly as possible. Anderson was given a four-hour window in which to move the voice services to the new platform. He and his staff accomplished the move in only two hours.

Selling the idea of VoIP was not easy—there was considerable resistance by the faculty and staff, who perceived multiple problems with IP phones, such as concerns about voice quality. Additionally, BYU needed phones with multiple line appearances. Eventually, resistance was reduced, and the move to VoIP was approved.

The Network for VoIP

The decision to implement VoIP affected the data network. A primary goal was to use the existing LAN switches, avoiding the cost of purchasing new LAN switches and ports. The final design used two Ethernet port IP phones: one port connected to the LAN switch and the second port connected to the desktop PC. The data network also needed to be upgraded to support the increase in traffic. To address this need, optical fiber was used to connect the various buildings. The core of the network is composed of Cisco 6000 series routers, which are accessed through LAN switches. Quality of service (QoS) for supporting VoIP was tested early. The QoS worked well, relegating 90 percent of the lost packets to the data traffic.

Today, the VoIP network supports 6,800 IP phones and 4,800 analog phones in the dormitories. A single node is reserved for test purposes. A two-node production cluster is in continuous operation. Because of the server cluster design, no major outage has occurred. Upgrades have been relatively easy, but they require phone re-registration. Currently, the servers are operating with release 4.13ES7 and the plans are to keep current with the Cisco releases.

Effective Monitoring: The Benefits

One of the major lessons learned from BYU convergence and VoIP deployment is that information must be delivered in real time and useful form as an organization moves into voice and video over IP. In convergence, it’s the “network, network, network” according to Anderson.

One major benefit of convergence is that the management function can be performed more easily. Problem resolution is faster, and problems can be identified before end users detect a change, thereby providing a higher level of user satisfaction. To recognize these benefits, organizations need a management system that offers well-designed screen displays with easy-to-read information, reducing the training time and staff investment.

Anderson believes management systems are also engineering tools. The reports from the management system should help in determining traffic and problem trend analysis. The reports can locate problems within a subnet or building on campus that affect multiple users. University dollars are hard to obtain—any tool that reduces and/or helps contain costs is very desirable.
The Right Monitoring Solution

Although converged voice and data network technologies bring many benefits, these tools also come with an inherent need to be managed because they have unique complexities not common to pure data network environments. The traditional PBX has been the repository for all the intelligence and management functions. When this intelligence and functionality is distributed as it is in VoIP, a new dimension of management need arises.

The management solution selected should:

- be simple to understand;
- be intuitive in its information display;
- support customization of information collection;
- allow customized information display;
- organize the information by geography;
- analyze the information by department and division;
- require little initial user training;
- allow nontechnical personnel to understand the meaning of the information and take appropriate action; and
- be installable without taking down the devices and network that will be managed.

As BYU learned, the management system for a converged voice and data network VoIP deployment should:

- reduce the cost of operating and maintaining all devices and services;
- enable the anticipation, identification, and quick resolution of problems;
- ensure delivery of acceptable services;
- measure and report performance in real time; and
- measure resource use for both hardware and software.

Another lesson learned is that the most important measurement in a VoIP network is call quality. To ensure QoS, the call quality must be reported on a per-call basis, and lost, dropped, and incomplete calls need to be measured and reported. Additional information must be reported, including:

- bandwidth use and bottleneck locations;
- QoS status;
- changes;
- alerts and alarms based on status changes and exceeding performance thresholds;
- gateway activity and use;
- device availability, configuration, and status;
- possible security problems; and
- traffic utilization.

BYU started with the Cisco management package. The Cisco product provided much of the information the organization was looking for, but not the visibility required. The TRACE tool was overloaded with data, and problem tracing took too long. Anderson went looking for an alternative system and found the PROGNOSIS’ IP telephony performance-monitoring product developed by Integrated Research (http://www.prognosis.com).

One of the selection criteria for a tool was the ability to install the management product while the Cisco CallManager systems were live and providing telephone service. PROGNOSIS offered that feature. In addition, the product enabled Anderson to instantly locate memory leaks. He was able to free memory and thereby improve the performance of the devices. Within an hour of the PROGNOSIS installation, his staff had new eyes into the network and VoIP devices.
Communications History at BYU

BYU has evolved over the past 20-plus years into a single data and voice organization. The move to a VoIP solution began in 1983.

1984: BYU purchased an AT&T Dimension PBX and cabled campus for telecommunications.
1986/87: Wiring standard written for Cat 3 and dual four-pair cable.
1988: RFP issued for digital switch to replace AT&T Dimension PBX; nine-node Rolm 9751 PBX (four locations) was selected, and RS-232 ports were offered on telephones connecting to a protocol converter for access to IBM mainframe.
1989: Student dorms provided with Centrex service (total of 3,700 rooms); PBX had 12,000 lines and trunks.
1989/90: When bunker containing existing PBX location had to be torn down, engineering study was performed to determine what needed to be done; study produced a five-phase plan
1998/99: BYU selected Cisco CallManager for deployment of VoIP.
2001/2: University installed eight-node cluster: four active, two redundant, one TFTP, one main server for VoIP.
2002: University instituted this year as drop-dead date to move to new data center.

PROGNOSIS uses the same database, filters, and search commands as provided by Cisco. PROGNOSIS digests and filters the data provided by Cisco into useful information, which was then immediately available to the BYU staff. The staff could immediately read the screens without any formal training. Parameters and thresholds were easily set, helping reduce the number of screen displays, thereby focusing attention on problems that required action by Anderson's staff. Another selling point was the ability of PROGNOSIS to reside inside CallManager, which allows PROGNOSIS to monitor the CallManager system's internal as well as external resources. This coresident operation is certified by Cisco.

For BYU, an added value in working with PROGNOSIS is Integrated Research's encouragement of the customer to initiate product improvement recommendations based on experiences. According to Anderson, 90 percent of the customer suggestions are available in the next product release.

The Network Management Future at BYU
BYU already has plans for the future development of its converged network. The Siemens/Rolm PBX will stop operation and be removed by the end of 2005 or early 2006. The system is nearing its end-of-life, as there are more repairs required as it ages. In addition, eventually Siemens will not support the PBX products.

Anderson will continue with the deployment of IP phones. In addition, the staff would like to take greater advantage of the PROGNOSIS management system's capabilities, which have been only partially used to this point. The network management is an evolutionary learning process for the BYU staff.

"VoIP and IP telephony are strategic business decisions, not technology decisions," according to Anderson. His advice is to combine the data and voice network staff before moving forward with the deployment. Focus on the network before you move to converged operation. Definitely consider adding QoS to the network, with voice as the higher-priority traffic. Look ahead to see a rollover of technology every three to five years that will have to be planned for in the funding cycle.

Conclusions
As many users had heard of VoIP, the BYU user expectations were high. Thus, the move to VoIP required that the technology be sold to the users—not simply delivered to their desktops without consultation. The greatest lesson BYU learned from this process is that users expect a very reliable and stable voice service and prefer reliability over new features. Thus, the transition to a new solution must be smooth and provide clearly visible benefits to the user above all else. To that end, having a management tool that provides performance monitoring of the VoIP-specific elements is essential.

Gary Audin has more than 40 years of computer, communications, and security experience. He has planned, designed, specified, implemented, and operated data, LAN, and telephone networks, including local area, national, and international networks. Reach Gary at delphi-inc@att.net.
Strategic Planning Goes Global
Qatar project is a good example of how to succeed overseas

by Curt Harler

If the world is indeed getting smaller, then some schools like Texas A&M and Cornell might just be considered community colleges. Both of those universities—and several other ACUTA members—have campuses involved with international programs.

While it is daunting enough providing communications between West Halls and East Halls, consider the challenge of providing communications between the Western Hemisphere and the Eastern Hemisphere!

The reality, though, is more a matter of scale than of substance. Basic services—telephony, data networking, conference calling, video seminars—remain the same.

How does it come about? One ACUTA member suggested facetiously, “Executives at our university meet with executives somewhere else in the world, and then they tell us what to do.”

Actually, the strategic-planning process typically is much more open. Networking people have a real chance to contribute, both at the planning and the execution stages.

For Walt Magnussen, associate director of telecommunications at Texas A&M, the key to success in any international project is to collaborate with local universities or other colleges that already have a presence in the area.

“Telecommunications and networking folks tend to be individualistic. They see a project and want to own, manage, and control it,” Magnussen says. While that might work at home, it is a big mistake overseas.

A good example of a successful collaboration is the University City project in Qatar. There, five U.S. schools (Carnegie Mellon University, Georgetown University, Texas A&M, Virginia Commonwealth University, and Weill Cornell Medical College) work together to bring medical, business, and engineering programs to the Mideast.

Over the past 15 years, Magnussen has worked in 40 different countries—ranging from Africa to Latin America, Asia to the Mideast. His experience has taught him that, while collaborative management and control might have pitfalls, the advantages of this approach to a telecommunications or networking professional far outweigh the problems.

His advice to others, especially those with smaller schools that are getting started with overseas programs, is simple: Don’t do it on your own. “Always attempt to find who else is in the same region. The learning curve is steep,” he says.

Cornell Medical
Cornell’s Weill Medical College in Qatar (WCMC-Q) has been up and running for more than five years in partnership with the Qatar Foundation for Education, Science, and Community Development.

“We provide consulting expertise, but they have their own equipment,” says Dave Vernon, director of Cornell’s division of Network and Communications Services and special assistant to the CIO.
By establishing WCMC-Q in partnership with the Qatar Foundation, Cornell has extended its triple mission of education, patient care, and research to the Middle East region, and developed further its role as a transnational university.

The Ithaca-based staff does nothing in the way of on-site services. That is the responsibility of the Qatar staff. "But we do provide consulting and advice," Vernon says. "We are all Cornell. So we are available to answer any questions they have."

The Qatar campus is part of a large, multicampus, multi-university program in the Mideast. A state-run consortium helps with the on-location provisioning and other workaday tasks.

At 335,000 square feet, the WCMC-Q facility is huge. The government of Qatar provided Education City with two high-speed broadband links totaling 310 MBs. This allows WCMC-Q to communicate easily with colleagues overseas and to share lectures, interactive conferences, grand rounds, and other educational activities with them.

Facilities include advanced communications and AV solutions, a document camera for the projection of high-quality, 3-D color images, facilities to use a personal PowerBook or notebook, and provision for CD, VCR, or DVD presentations, in addition to Internet access. Seminar rooms and labs are equipped with Apple Macintosh G5 computers and flat-panel 23-inch monitors.

A distributed eLibrary is accessed via computers placed in clusters ("pods") throughout the building and through the wireless network. A wireless network brings the Internet and the distributed eLibrary within easy reach anywhere inside the building.

A&M actually moved into the old Cornell building, and that building is a transitional site for A&M. "When we move into our new building [later in 2006], another university will probably move into our space," Magnussen says.

On the Ground

"The biggest do-over I'd want would be to hire a local national—someone with the language and culture skills—and have them plow the ground for us," says Dr. Timothy Chester, CIO of Texas A&M University at Qatar. He spearheads the alignment of technology initiatives with the teaching, research, and administrative missions of the campus. He supervises all of the campus technology initiatives, including application development, infrastructure, workstation support, data center, network, instructional technology, and support services.

A&M-Qatar worked with the College Station, Texas, campus as well as schools already on the ground. In fact, Cornell acted both as an ISP and mentor for Chester for the first six months of A&M-Qatar's existence. Cornell provided A&M-Qatar an encrypted VLAN back to College Station. Traffic went from Doha to New York on Cornell's leased E-1 lines. From there, traffic went to College Station over the Abilene Network (Internet2). This allowed A&M-Qatar to run College Station IP addresses.

Today, they have their own link. In Qatar, Chester oversees everything one would expect to find on any other college campus. Arab Telecom dropped fiber into their building, and his staff runs everything from there to the desktop. "Everything from authentication to printers," he says. The only exclusion is the big, shared mainframe applications for financing and student tracking.

Already, several homegrown applications are in place, including online applications and document management and imaging, Web presence, and other niceties. Although the campus has only a couple hundred students, it offers all the amenities, including videoconferencing and AV services, to the faculty.

"Our template is to deliver the basic services we deliver to campus and faculty on the main campus," Chester says. "We reverse-engineered everything from there," he says.

That is driven by the agreement that says A&M-Qatar will deliver the same services in Qatar that students get in Texas. A&M-Qatar signed a 10-year agreement. That agreement included a five-year budget. Every year, that agreement is renewed and the budget is rolled out one year more.

"It's a typical budget," Chester says. They multiply their fixed costs by the number of students times the services they offer. Their operations costs include everything from power strips to the fiber backbone. There are shared services costs that include the use of administrative services, the services provided to A&M-Qatar by Magnussen's team, and similar charges.

In at least one way, he feels right at home. "They really push on us to maximize savings. We scrub the budget."

September 2005 found them devoting 30 percent of their time to campus infrastructure, 22 percent to academic affairs, 8 percent to supporting the administration, and 3 percent for the Qatar Foundation. Another 19 percent was for ITS management, and 15 percent was devoted to general overhead.
They addressed 277 help desk requests. Ninety percent were resolved in 24 hours, and all were handled within 72 hours.

**Providing Service**

Vernon says the Ithaca IT people are most apt to get involved with technology questions at the higher levels. One service that they provided, for example, was consulting on Internet2 connectivity through a POP in New York City for the Qatar campus medical school.

“We are able to help, if, for example, they do not understand the nuances of connectivity in New York,” Vernon explains.

Part of the general agreement called for the Qatar Foundation to bring an OC-3 link to New York City. “We peer that to our individual institutions,” Magnussen explains.

A small technical staff in Qatar works together there to provision and solve technical assets and challenge.

With the program in place for many years, things are running smoothly. Vernon says that, early on, there was a need to define responsibilities and lines of communication. Once the marching orders had come down from the president and provost’s office, those were two areas of strategic planning that the Qatar-based folks felt could have been stepped up. “There was a sense, initially, that the international campus did not feel it was getting all of the information it needed,” he says. “They wanted to ramp up the information they got from the United States.”

It was not a major hurdle. Vernon assumed leadership responsibility for communications, giving the overseas campus someone to champion communications. By and large, it was for such things as planning times and facilities for videoconference meetings and ensuring that the right people with the right expertise were in the room at the assigned times.

“It was not that time intensive,” Vernon says. “It has no effect on our budget.”

For A&M the process was smooth, too. It did not hurt that the president of Texas A&M is the former CIA chief Dr. Robert Gates.

Most of the participating colleges were brought into the relationship with Qatar Foundation when the foundation approached a university that it felt could deliver “best-of-breed” education in a particular area. Each individual school began its strategic planning by putting together a proposal to provide service. Then the project would move ahead, with the various departments implementing their sections of the strategic plan.

While the Qatar program draws on A&M’s expertise in petroleum engineering, it is the agriculture school that provides most of the international opportunities. A&M has presence in Kenya, Mali, and all over South and Central America. Magnussen’s strategy is consistently the same.

“We always check with other universities in the area to find ways to work together,” Magnussen says. “On the ground, you always find they have significant resources that you would never find on your own,” he says.

**Collaboration**

The value of collaborative processes was driven home to Magnussen in a project A&M set up in Mexico City. Early on, they paid for a direct connection between Texas and Mexico City. “It was costly and not reliable,” he says.
They struck an agreement with the National University of Mexico and now use Internet2 in Mexico.

“We gave up partial control,” Magnussen admits. “But the cost is a lot better, and the service is very good.”

One direct spin-off of that original relationship has been the approval of four or five more grant projects between A&M and Mexico.

While the actual requirements vary from project to project, Magnussen finds that meeting the connectivity requirements of a project usually falls to telecommunications.

He always works for an IP connection. “Once you have access to the site, the next level is providing the LAN and meeting the requirements for voice, data, and video,” he says. “Convergence is a must. Connections are expensive enough.”

This puts the telecommunications manager in the familiar role of prioritizing traffic, supporting specific applications (i.e., two-way videoconferencing), and finding ways to provide an access grid for high-definition access at the right bandwidth.

Magnussen finds he gets good support from the staff on the ground. Thinking back to a project he executed in Nairobi, Kenya, he notes, “The researchers are the first to preach communications and collaboration.”

With the world of education and communications getting smaller, such projects are keys to survival and success.

**Translation Tables: For the Humans**

If Walt Magnussen could turn back time on any of his international projects, he says he would make a personal change—he’d learn Spanish.

It is not the technology that trips up a good network manager. Sometimes communicating what is required can be a challenge.

“As much as I work in Latin America, I wish I’d spent the time to learn better Spanish,” he says. “The language issue, especially in South America, can be problematic.”

In projects in Singapore and China, in Africa, and even the more northerly areas of Latin America, English is a given among technical staff. “Most manuals are in English,” Magnussen points out.

But elsewhere, most manuals are in Spanish. While it is not a problem in Mexico or most of Central America, in South America—Chile, Peru, Argentina—he finds himself working with translators who do not fully understand the technology. “I keep kicking myself that I didn’t learn more Spanish,” he says.

Tim Chester agrees. He says he states the state of language education in the States is a sad commentary on our educational system. But he caught a break on language.

“In Qatar, everyone speaks English. Even the entry-level service workers from the Philippines speak English,” he says. “If we were working in South America or Africa, you would have to have someone who speaks the local tongue.”

**The Local View**

Chester was the first person A&M had on the ground in Qatar, arriving July 5, 2003, and he says he loves the work. He is especially excited that A&M-Qatar will be graduating its first class of engineers in 18 months. “We’ll then have a group of Arab engineers working for their country. In 15 to 20 years, they will be the leaders running things. It’s exciting to have a small role to play in that growth,” he says.

Chester’s learning curve was steep. “You really have to insist that every dependence on any vendor has a service level agreement spelled out,” he says. “You have to have more than a handshake agreement.” Used to working with the campuses in Texas and adjusting requirements at home on the fly, he did not insist on written agreements at first. “I didn’t communicate expectations well. That one was on me,” he says.

Another factor he did not anticipate was the hours involved. CIOs and network specialists always work long hours. But Chester finds himself working a typical 8 to 5 day as CIO, going home for dinner, and then returning for another two or three hours to work directly with the people in Texas who are many time zones away.

For a view of his monthly progress in Qatar, click on http://technology.qatar.tamu.edu.

“At the same time, this is the most exciting and the hardest work in my career,” he says.

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Implementing State-of-the-Art Telecommunications at Butler University

Moving to an in-house VoIP system in one year ... oh my

by Scott Kincaid
Butler University

Talk of convergence of voice and data networks is everywhere, but are IP-based systems technology for technology's sake, or can they offer real value to higher-education institutions? At Butler University, our goal was to improve communication among our faculty, staff, students, and outside constituents. New telephony systems today provide untold new options, but would a new system be affordable? Could a new system meet the needs of Butler's millennial students, who now carry mobile phones all over campus? In our quest to improve communication, should we really take on the responsibility of managing a PBX and intermix voice and data networks, given the ongoing threats to computer networks? Guided by a desire to make Butler's telecommunications systems work better for everyone, we took the plunge.

The Situation

Butler University is a private liberal arts college in Indianapolis, Indiana. We focus on providing a high-quality education by integrating liberal arts with professional education. Now celebrating its 150th anniversary, Butler enrolls some 4,400 students, with more than half living on campus and being served by the campus network.

Butler has always prided itself on close contact between faculty and students. Approximately 900 faculty and staff members support Butler's mission, and their communication needs extend throughout the campus and beyond.

The school had used a Centrex system for the last 10 years with some 3,000 stations. Most faculty and staff had basic analog phones. Centrex was very reliable but lacked basic functions, such as call queuing. A Centigram 640 provided voicemail, but residence hall students had to share their voicemail box with their roommate. Lastly, the telephone company service (especially billing) was a constant frustration. With
growing University expectations, Centrex was becoming an impediment to our success.

The technology staff—Butler's Information Resources department—began researching the telephony landscape. Many sources predicted that an in-house PBX would be more cost effective than Centrex, but none of the paths appeared simple or cheap.

The Information Resources staff had a decision to make. The question was whether to take this potentially enormous project on internally or to seek outside help. To increase our knowledge and confidence, we decided to engage an experienced consulting firm to coordinate a formal needs analysis and assist in the evaluation of vendors. Following a review, Butler engaged Dietrich Lockard Group, an independent telecommunications consulting firm in St. Louis, Missouri.

**Goals and Objectives**

Determining how a new phone system could improve communication and advance Butler's mission was our first, most critical objective. To engage the University community, we created a committee to work alongside the consulting firm. That committee included staff from admissions, finance, the libraries, student life, facilities, information resources, and faculty. They went to SuperComm to get a jump start on industry trends.

We conducted surveys, interviews, and focus groups with faculty, staff, and students. Butler found that many were suffering under the burden of Centrex and Centigram, while still lauding the system's high reliability. For example, all of the offices with heavy call volumes had only basic calling trees to help route calls and lacked management reporting. The analog phones could handle only one call at a time, and moves, adds, and changes usually required a technician to visit each phone. Like most universities, we also lacked any means to communicate to the entire campus if time-sensitive, emergency information needed to be disseminated.

Student surveys showed nearly all students (92 percent) had a cell phone, but nearly the same number used their regular phone as well. While almost two-thirds of the students preferred cell phones, one-third still preferred a regular telephone. Additionally, 73 percent of the students indicated that their campus-provided voicemail was important, and they clearly wanted a private voicemail box. All this was a surprise to us given penetration of cell phones.

Next we compared the various problem areas with the University's strategic initiatives and established five major goals:

1. Improve communication with the students and within the student community, including allowing for private voicemails.
2. Improve the handling of callers to high-volume call areas.
3. Leverage services such as multiline and self-labeling sets, use online directories, and improve training.
4. Provide more immediate access to specific Butler personnel.
5. Remain competitive with peer institutions in the level of services offered, particularly those that affect students and their families.

**What Direction?**

Joe Indiano, director of network and systems at Butler, and Dorothy Lockard, president of the consulting firm we had engaged, repeatedly used the needs analysis results to help us pinpoint the best opportunities within the context of the University's strategic plan. The consulting firm also estimated the total budgetary cost for various options so we could determine what paths, strategically, were worth pursuing for Butler. After combining our goals and objectives with much research, Butler decided to acquire its own in-house system.

**Request for Proposal**

The consultant crafted a tightly worded custom request for proposal and conducted bidder's conferences. The University began the journey of interviewing manufacturers, visiting vendors, and making customer visits.

Although our main criteria were total overall cost and meeting the needs defined in the RFP, other issues were important as well. Local support from an experienced vendor was imperative if Butler was going to move all of its telephony in-house, possibly using VoIP. Integration experience with new telephony systems and other enterprise systems (e.g., PeopleSoft, LDAP) was crucial. With Macintosh users representing 25 percent of the faculty population at Butler, we wanted a system that offered equivalent features (such as videoconferencing capabilities) for both Mac and PC. And an effective and flexible integrated emergency notification system was high on the priority list in this post-9/11 era.

Our analysis showed that vendors were moving most of their investments
and focus to IP-based systems. Acquiring a traditional telephony system now would be far less risky to implement for Butler, but could result in us investing in a system and new phones that would have limited life.

**The Network**

While we evaluated various vendor offerings, we also asked ourselves if the existing University network was ready for a VoIP system. The answer was a resounding "no." As is true for most schools, our network was originally designed for openness and was vulnerable to attack and component failure. Fortunately, we had already crafted a new network design and had begun a three-year program to replace most components. However, we were only in year one. If we deployed a VoIP-based system now, we would be going backward in terms of telephone service reliability.

What we really wanted was to increase the reliability of our data network so that it matched what people had become accustomed to with voice. We wanted to make the data network as good as traditional telephony has been. With some creative financing, we arranged to compress Butler’s three-year network replacement project into one year. This would allow us to focus on deploying a single network, which would provide reliable service for voice and also more reliable services for traditional network applications.

We quickly proceeded to implement all new routers and switches across campus. The new network design included more segmentation, QoS (quality of service) and protections such as rate limiting and intrusion detection. The University already had the necessary fiber backbone in place, but we did need to replace selected old wiring with new Ethernet cable.

Improvements in the new converged network, such as installing a UPS in all network closets and replacing old wiring, would now benefit the new telephony system and the traditional network services.

**Vendor Selection**

Following an exhaustive review of a range of options, we decided to acquire a Cisco IPT system and to use Berbee Information Networks as the implementation partner. The new system configuration included:

- Cisco Call Manager with redundancy;
- 1,200 IPT stations (faculty, staff);
- 1,800 analog ports via VG248 gateways (student phones);
- Cisco Unity voicemail with mailboxes for each student;
- Cisco IPCC Express for six call centers;
- Cisco Emergency Responder for campuswide E911 capability;
- Berbee InformaCast alert system;
- ISI Infortel call accounting.

**Ininitely Personal**

Since our goal was to improve personal communication, we redefined “IP” to stand for “infinitely personal.” Our team’s focus was on the people we were empowering to communicate more freely, not on the IP data packets. “We have chosen an IP system not because it was VoIP, but because, overall, it could provide the best set of services to meet our needs,” said Butler’s Indiana, project manager.

**Implementation**

Because so much was already changing, we wrote an RFP for local circuits and decided to use a new carrier, Time Warner Telecom, for our new system. We were able to negotiate installation of dual carrier entry points, and Berbee helped us split and place the new telephony servers across two campus locations.

As part of our testing, we created a pilot with 35 phones for use among staff and faculty. This was important in fine-tuning our overall rollout. Equally important was gaining buy-in from users and developing advocates for the system. Pilot users gave useful feedback, boasted about their experiences, and created “phone envy” among their colleagues.

Butler’s move from traditional telephony to an IP-based system meant we didn’t have to do a traditional push/pull cutover. We distributed new IP-based phones to all users several weeks before cut and arranged training sessions for all faculty and staff. Everyone, including users at the new call centers, was able to make and receive internal calls on his or her new IP phone while the old Centrex phones handled external calls. Then, on July 11, we went live, routing all incoming calls to the new system, and turned off Centrex. It worked. While we missed a few lines and features (watch out for alarm circuits), our new, converged, in-house system functioned with ease.

All together, the new system took approximately one year from the planning process to the final implementation and included a $1.5 million investment by Butler. We considered leasing the new telephony system but
finally chose to purchase and finance it in-house. We are covering the cost by redeploying the month-to-month fees we had been paying for Centrex. Our analysis did not show that an in-house IP-based system was cheaper than Centrex for Butler, contrary to popular comments. Actually, overall costs went up slightly, but we dramatically expanded services to all our constituents.

Benefits

The new system is certainly not the system your parents used! It is a soft-PBX based on a series of integrated servers linked to PeopleSoft, LDAP, and the network. We have implemented six full-featured call centers. Students and outside callers get instant help regarding such items as student accounts, admissions, financial aid, and box office tickets. If help is not immediately available, calls are rerouted intelligently, not just sent to voicemail. Additionally, faculty and staff can use a directory of numbers available on the telephone’s display area. This directory is updated daily from our PeopleSoft system.

Each student who used to share a line in a residence hall room now has his or her own unique phone number and private voicemail box. The phone number and voicemail box moves with students as they change rooms from year to year. Changes to room assignments are entered into PeopleSoft, and an automated interface carries the change into the telephony system. When students receive voicemail, an e-mail is automatically sent, letting them know of the message so they are more likely to respond.

Campus safety is always a priority. Now, with the Berbee InformaCast software, alerts can be made in audio and/or text, simultaneously or by zone, and within seconds to all IP phones.

Success Factors

Our experience helped us identify a number of critical success factors. These include:

- identifying the applications that would have the most positive impact on students, faculty, and staff;
- having a tightly written RFP that became the basis of our contract;
- engaging users and senior leadership frequently throughout the project;
- creating and securing a realistic budget, including contingency funds;
- assembling a team that included telephony staff, network engineers, PeopleSoft developers, and facilities staff;
- selecting vendors with experience in integrating IP systems in our type of environment;
- maintaining an outcome-oriented attitude between the school and the vendors;
- emphasizing end-user training; and
- implementing network equipment that could reliably support voice traffic.

While not anticipated at the beginning of the project, we decided to keep the consultant on the team after the selection of the telephony vendor. Dietrich Lockard Group was instrumental in ensuring our vendors implemented a system that included all the items defined by the contract and RFP. The consultant also helped keep everyone sane when normal problems arose.

Additionally, we engaged Berbee Information Networks’ security practice to make sure our design and implemen-

tation would allow data and voice traffic to coexist but also to ensure that the telephony servers were protected from student desktops and outside threats.

Lastly, the telecom and data network staff worked together closely and reported to the same director within information resources.

Today

Campus constituents were originally concerned about the potential voice quality of IP-based telephony, but now we regularly hear comments such as, “I didn’t realize at first that it was the voicemail system that answered.” We worried about viruses and worms, too, but students returned in full force in the fall, and the new network worked well.

More important, our high-volume call areas have up-to-date features to support their efforts. No one is limited by an old single-line, analog phone; on the contrary, new features, such as a campus phone directory integrated into the phone’s display area, have created a more convenient communications environment. Even students, who love their cell phones, are much more likely to stay in touch due to the improved voicemail system.

Butler is now riding the wave of convergence. While it is not for the faint of heart, an “infinitely personal” system is achievable with the right internal and external resources.

Scott Kincaid is CIO at Butler University in Indianapolis, Indiana. He can be reached at skincaid@butler.edu.
At ACUTA's Annual Conference in Kissimmee this past July, the ACUTA Ruth A. Michalecki Leadership Award was presented to Anthony J. Mordosky, CIO and associate provost of information resources at Rowan University.

For 16 years Tony has contributed to ACUTA in a number of ways that have had a lasting impact on the association and many of its members. As a member of the Board of Directors and later as president, he focused the Board's attention on the importance of leadership, urging ACUTA to provide opportunities for members to develop their leadership and communications skills in addition to their technology skills, and advocating the importance of these skills in working with faculty and administration at our institutions.

Mordosky served as an active member of the Higher Education Advisory Panel, taking a leading role in creating and supporting the Strategic Leadership Forum. He continues to be invited to participate in the Leadership Forum as a presenter, which is a testament to the high regard in which he is held by fellow higher education leaders.

He has also represented ACUTA at meetings of other higher education associations and has testified before governmental agencies as an effective representative of the ACUTA leadership. He has also served as a member and chair of numerous ACUTA committees and task forces throughout his membership, always contributing as an active leader of these groups that do so much of the work of ACUTA.

Tony's management, leadership, and technology skills have been recognized by several institutions that have chosen him as chief information officer. At his previous institution, Bradley University, and at his current institution, Rowan University, he became CIO in particularly challenging times. He has led turnaround efforts at both institutions, overcoming budgetary challenges to develop and maintain a solid and well-respected technology operation that is recognized as excellent both within and outside the institution. His responsibilities have expanded beyond communications technology to encompass information technology and libraries. He has forged excellent relationships with academic leaders and has made successful efforts to understand and meet the needs of stakeholders throughout the campus community.

This prestigious individual award recognizes ACUTA members, associate members, and corporate affiliates for outstanding leadership. Nominations are accepted from the membership each spring.
Bryant University

Bryant University's President, Ronald Machtley, believes technology should be a differentiator for the campus, which is why the University implemented a deliberate technology initiative as part of its larger strategic plan five years ago. Our overall goal was to develop a single converged network infrastructure to support a rich variety of voice, video, and data applications that enrich learning and collaboration, improve student career opportunities, boost administrative productivity, extend educational resources beyond the classroom as well as the campus, and position Bryant as a leader in technology within higher education.

With this goal in mind, Bryant worked continuously to offer new and improved technologies to enhance the teaching and learning experience and streamline its business operations by creating total convergence of our IP network infrastructure to support voice, video, and data. This comprehensive effort has included the adaptation of voice over IP (VoIP), 100 percent wireless data coverage in all buildings, IP video, LAN mobile radio integration, IP security cameras, library and audio visual streaming media storage, IP video conferencing, synchronous and asynchronous distance learning, digital signage, video on demand (VoD), Internet radio, digital TV broadcasting, virtual private networks, IP-based AV management, Wi-Fi/cell phone convergence, IP-based lighting and HVAC controls, physical access security, GIS, and Homeland Security initiatives.

Our challenge was to combine diverse networks and networking technologies throughout the campus into a unified backbone and deliver multi-service networking over a single easy-to-manage IP infrastructure, thus reducing management burden and administration and equipment costs, and improving overall network reliability.

The intent of this initiative was to enhance the student's telephony system; provide additional applications and intelligence without added costs; provide support for voice, video, and data applications; provide unrestricted wireless mobility to students and faculty throughout the entire campus environment; improve safety on campus; improve communications through digital signage; and to facilitate distance education, ubiquitous computing, collaboration, and a shared learning environment using videoconferencing and video-streaming technologies.

The Technology Landscape

Bryant's first step in convergence was to implement video conferencing over IP. We have had video conferencing over ISDN for years, but we recently upgraded our video conferencing equipment to enable us to use video over IP.

Our second step in convergence was to implement VoIP in the residence halls, replacing the existing Centrex system and implementing a campuswide
wireless network. The University has partnered with Cisco for all networking equipment/solutions. We are the first institution of higher education in Rhode Island to implement VoIP as well as the first to initiate discussions with the surrounding community to implement a Homeland Security solution promoting community outreach. We are using/testing the Cisco LAN Mobile Radio solution for communications among the University’s public safety department mobile radios, the facilities department mobile radios, and our IPT/data infrastructure. In our next phase we will be extending this capability out to our local community police and fire departments.

Additionally, Bryant University is the only institution in Rhode Island with a mandatory laptop program that is built into the student’s tuition. All incoming freshmen are provided with a new IBM laptop that is replaced in the student’s junior year and gifted upon graduation. To support this initiative, Bryant has partnered with IBM for hardware procurement and integration and with Cisco for providing a wireless environment.

Today Bryant University provides gigabit Ethernet service to the entire campus and 100 mbps full-duplex throughput to all devices on campus. We are in the process of replacing our DS3 Internet connection with dark fiber connection. This will increase our Internet bandwidth capacity to gigabit speed. With dark fiber in place, Bryant will be able to extend many of its campuswide technology initiatives well beyond the physical boundaries of its campus.

Planning, Leadership, and Management Support

Bryant’s technology initiative has been and continues to be a campuswide effort involving campus leadership. One of information services’ goals is to implement/support technology initiatives that will assist in meeting the University’s mission for each of the five functional vice presidents. Many of these initiatives overlap other departments such as facilities with the HVAC system, public safety with the IP security cameras, residence life with the implementation of the wireless data network and VoIP systems, and academic affairs with Blackboard. The unique method of goal setting across functional lines had a positive influence on building an institutional foundation for technology. The network is viewed by the administration as the infrastructure on which all technology is built.

Promotion of Technology and Maturity of Effort

After considering a range of vendors, Bryant selected a comprehensive networking and communications solution from Cisco Systems. The Cisco IP communications solution provides support for voice services in residence halls and other locations, as well as sophisticated telephony and messaging applications that enhance communications and improve productivity, at about the same cost as the University’s previous phone system.

Faculty depend on the network to work with students electronically outside the classroom through Blackboard, which allows students, faculty, and staff to share documents, collaborate synchronously and asynchronously, and monitor and assess their own goals and activities. Additionally, we are exploring the use of VoIP to include videoconferencing that will be used by students and faculty for academic advising, distance learning, and virtual office hours. Response to the system has been overwhelmingly positive.

Wireless access was first deployed at Bryant’s George E. Bello Center for Information and Technology. We decided to provide wired and wireless connectivity at this state-of-the-art facility when it was completed almost two years ago. We expanded coverage to the rest of the campus in the summer of 2004.

The Bello Center is a centerpiece of Bryant’s use of technology for instructional and research purposes. The 71,000 square-foot facility houses Bryant’s library, instructional and conference facilities, and a cyber café, and provides access to a rich variety of information resources. The Bello Center offers more than 1,200 wired network ports and ubiquitous wireless access, as well as help-desk phones for use if students encounter technology issues. Group study rooms allow students to meet and collaborate.

Bryant’s network also provides support for video-streaming technology, which has been used for both live and prerecorded events and training programs. The University also utilized Cisco IP videoconferencing solutions to support collaborative and shared learning and to deliver distance education and facilitate meetings off campus. While on a recent visit to China, the Bryant University president welcomed the incoming class and parents through a two-way videoconferencing connection.
Another innovative component of Bryant's video initiatives can be found in the rotunda of its Unistructure Building, which features a compelling digital-signage system and multiple LCD monitors. Two 100-inch Mitsubishi custom rear-screen projection displays and eleven NEC 21" LCD monitors serve as an electronic bulletin board. Using networked or cable video, the University administration and student organizations can communicate with the community using attractive visual imaging.

Bryant is also in the process of implementing an IPTV solution to broadcast cable TV channels over the IP infrastructure. This technology allows students to watch cable broadcasts on their laptops and utilize video-on-demand features to assist with reviewing educational resources such as digital library assets. A content management system allows for digital archiving and will offer an advanced key-word searching application for all library resources and historical classroom video/audio recordings as well as campus recordings of events. Portable web-casting and streaming technology by Sonic Foundry is currently being used to capture classroom instructions and events. This type of technology will eventually be available as standard equipment in all classrooms, giving the instructor the option to capture all or a part of the classroom content for live web-casting or recorded streaming. We are also exploring using the VoIP network to support a virtual language lab.

Bryant's network also helps to improve safety on campus. Staff in residence halls are testing radios that integrate VoIP technology that allows them to pick up public safety and other emergency radio communications. Cisco IP phones in residence halls can be used as a paging system to broadcast emergency announcements, while Cisco Emergency Responder provides support for Enhanced 911 service. And the University has linked its security cameras to the IP network, saving money and increasing its coverage areas.

Bryant's network is being built to be both flexible and scalable. Additionally, having a single converged network infrastructure reduces management burden, saving money on network administration and support. The University is actively planning a variety of new applications. More than 2,700 students already have access to IP phones, and in 2005 Bryant will extend the system to faculty and administrative offices. Unified messaging for administrators and faculty is also being planned to allow them to manage voice-mail and e-mail messages from a single, integrated mailbox for improved responsiveness and productivity. Also being planned is the migration of videotape that the library holds over to a storage area network (SAN) unit to be distributed by the network. Lastly, we are looking into purchasing IP Communicator software and Web cameras for all laptops, giving students the choice to purchase handsets for their computers and thus extend the VoIP and video conferencing functionality to their laptops.

Quality, Performance, and Productivity Measurements

Part of our measurement is based on winning ACUTA's Institutional Excellence Award, the Cisco Award, and any recognition that we may have received due to our achievements. We have been ranked in the Princeton Review two years in a row, improving from being ranked 12th to 6th the following year. We have been written up in the local newspapers and in educational and technology magazines and have been featured as a case study by several technology manufacturers.

One of information services' annual goals is a target of 98 percent availability in all network areas not including planned downtime for preventative maintenance. We achieved our goal with the lowest area scoring 99.5 percent and the highest area scoring 99.9 percent which was achieved in four areas including the VoIP.

The University completed its network upgrade in 2004, and the system has quickly demonstrated its benefits. For example, the campus wireless network is helping students and instructors work together more easily than before. Faculty productivity has increased 15 percent, and ubiquitous network access has boosted student productivity by more than 30 percent.

Bryant's enthusiastic adoption of technology also allows the University to retain a competitive edge in recruiting students. Because of Bryant's extensive use of technology, many corporations rent the Bello Center, residence halls, and classrooms over the summer for corporate events, which helps to boost the University's profile. With coverage in the national media and an emerging reputation as a leader in innovative technology, Bryant has already seen an increase in applicants.

Bryant's network administrators have also benefited from the new network because a single converged network infrastructure requires substantially less...
management support than multiple networks.

By converging dispersed networks onto the IP backbone, the University can save more than $126,000 in personnel costs each year. Administrators also anticipate a four-year cost recovery period for the Cisco IP communications solution, followed by $265,000 savings annually.

Customer Satisfaction

In preparation for the installation of VoIP in the residence halls, Bryant's IT department began speaking with the Student Senate about a year before implementation, since this would impact them the most. The students' biggest concern at the time was the fact that the phones were not cordless. Since the start of school, we've had no complaints about this. They have a speakerphone, so as long as their conversation does not have to be private, they are happy using that. Other than that one issue, the Student Senate supported the new technology. It gave them many more features than what they had before.

The Department of Public Safety has greatly appreciated our efforts in wireless security cameras and implementing the LAN mobile radio to better communications between their own public safety officers and the surrounding communities' police and fire departments.

Faculty members are quickly showing acceptance of Bryant's technology surge. Today roughly 95 percent of faculty members are using Blackboard to post course materials through the campus intranet. Faculty have been enthusiastically engaging in the new technologies in the classrooms and labs. Because demand for technology classrooms has increased, Bryant has equipped all of its classrooms with AV and computer technology.

One of the challenges we have faced with the adaptation of a more ubiquitous environment is laptop control in a classroom. The environment has opened up a means for students to cheat during exams and instant message during lectures or surf the web. Bryant is currently seeking technology alternatives to help alleviate this problem by incorporating instructor-based control and setting up laptop use policies for classroom participation. One of the products we have been piloting is Silicon Chalk, which not only allows the instructor to manage students' laptop use in the classroom, but also allows the student to capture the instructor's presentation on the laptop for later review. Additional challenges have been with students using the network for entertainment purposes. For example, some are using gaming devices such as XBOX over the wireless network, which has caused some issues. To overcome this problem, Bryant has adapted network use policies and performance remediation tools to minimize network degradation.

President Machtley summarized our efforts and the impact on the University in these words: "Bryant consistently focuses on providing the highest possible value and most relevant experience for our students... Our technological sophistication enables our students to enter the workforce not only computer-literate, but fluent in the many and varied ways that technology can enhance productivity."

Visit Bryant University online at www.bryant.edu.

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help you to ensure the success of your new technology projects. This is starting to sound like one of those amazing weight-loss programs. Can this be true? Let’s see.

It makes exquisite sense that this services management environment should contain both voice and data information. As the voice and data organizations work together to build your inventory structure and develop processes, they will gain an understanding of the issues that each faces and how each of their worlds is put together. They will benefit from learning about and adopting processes that each culture brings (e.g., change and problem management are pretty alien in the voice world, while billing for services is alien in the networking world). When you put the two together, they are better and stronger; and when this becomes apparent to the participants, the actual merging of the organizations becomes far easier. The understanding that is gained through the process development actually facilitates merging the organizations. And so you have fulfilled my necessary criteria for implementing new technology—the right tools and the right organization.

In the recent ad hoc reporting structure poll taken on the ACUTA listserv, it was interesting to see that only one school reported having a merged voice and data networking organization. I truly believe this is the level at which the operations organizations should be merged and that to do this they require proper tools. Simply having telecommunications report to an IT director is not the same as having a merged organization. If they aren’t merged at the functional and operations level, then they will not have the strong foundation needed to successfully run a converged voice and data network.

By the way, there are significant additional benefits to the IT organization and the institution that can be gained by implementing a full-blown services management system. You can use the metrics gained from such a system to reduce vendor maintenance costs, negotiate more favorable contracts, and increase contract compliance for site licenses by having precise counts of hardware and software. Equipment refresh rates can be defined, and replacement costs can be easily projected for more accurate budgeting. And finally, and not least importantly, you also have the information you need to rebuild your network in the event of a disaster.

In fact, I’d like to change what I said earlier about getting CIO support for this. I think any CIO will see this as a critical success factor to implementing new technology and will place it high on the priority list of projects needed to build a strong and successful organization. Now that’s a legacy!

Janet Smith is the principal at Janet L.F. Smith & Associates. Reach her at janet@jlsmithassociates.com.
Many organizations jump directly into implementing the latest technology without understanding what needs to be done in preparation for it to be truly successful. Planning the implementation of new technology can extend well beyond the project management of new hardware and software to seemingly unrelated activities that are fundamental to project success.

When you're implementing IP telephony, everyone knows that the data network needs to be assessed and often upgraded to support voice. Often overlooked are two other essential ingredients of a successful IP telephony implementation: (1) a comprehensive services management system, and (2) a converged voice and data organization. In order to implement the technology, you need to have the means to properly manage it—the right tools and the right organization.

What do I mean by services management? It's the tool—processes, databases, and applications—that allows you to manage your operational activities, hardware, and software from purchase order through billing. It includes inventory management (that's the uninstalled stuff you've got in a warehouse or storeroom); the installed base of equipment (including things like cell phones and pagers) together with locations and chargeback information; software inventories (so you can track site licenses and see that current versions are running on all platforms); change management (which allows you to propose, vet, and track all changes); and problem management (which logs and tracks trouble calls but also displays changes so the help desk knows why something is broken on Monday morning). Problem management also receives alerts sent from network management systems and automatically opens trouble tickets according to your rules. Services management also provides MAC order processing, even allowing users to place orders online for expedited service orders, tracking, and technician dispatch. And finally, it generates an integrated bill that contains all communications charges: voice service, data ports, storage, messaging, pagers, cell service, and long distance. Phew! That's a lot of work!

Unfortunately, there's little glamour in doing this and generally a great deal of work involved in designing the right system to suit your institution and collecting data to populate the many databases, and a fair amount of integration required to link with existing systems such as purchasing and general ledger. There is no single system available today that will do all this. (I can hear the phone ringing now as vendors call to protest that statement.) And to make matters worse, no CIO ever advanced his or her career by supporting this. Obtaining funding for services management in the face of demands for high-profile projects such as gigabit Ethernet, storage area networks, mobility, and heightened security is a serious uphill battle.

So why do it? I can't think of an investment that will yield greater returns to your institution. It will help you to minimize service disruptions, speed problem resolution, improve workforce utilization, and provide better customer service. And this effort will

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