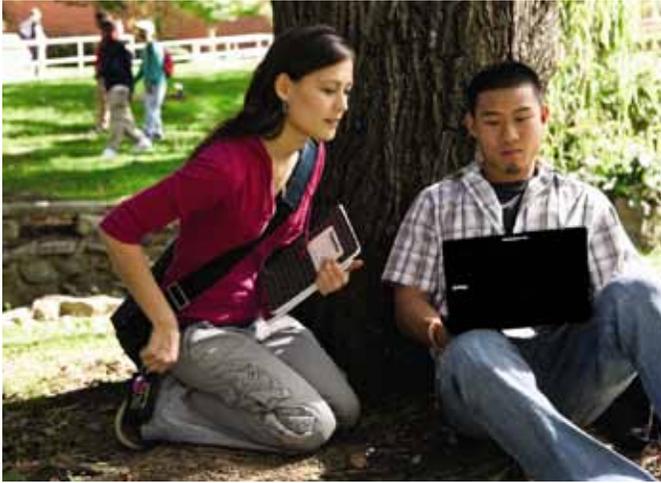# Preparing for the Demands of Digital Learning Environments in Higher Education

HOW TO REDUCE COSTS AND COMPLEXITY WITH AN EFFICIENT INFRASTRUCTURE

Introduction

Higher education leaders have many opportunities today to make changes that can profoundly alter the learning environments they provide students. The digital revolution and rise in the use of both wireless networks and mobile computing devices promise a new paradigm in education, one in which students and faculty need anywhere, anytime access to the network; where learning can be more personalized and customized; where students are more engaged; where remote learning opportunities are optimized; and where collaboration between all stakeholders becomes much easier to achieve.

Institutions of higher learning, including public and private universities, community colleges and technical schools, are increasingly turning to digital learning approaches. Higher education students expect a more socially engaging and collaborative learning experience and new technology is enabling these opportunities that were once difficult to imagine. The Center for Digital Education's 2011 Digital Community Colleges Survey found that 92 percent of respondents have expanded distance learning offerings for online, hybrid and Web-assisted courses over the past year. A survey of adult students also found that 33 percent cited blended courses (courses that are part online and part in the classroom) as their preferred learning format.[1]

However, layered on top of these digital opportunities are significant budget pressures and rising enrollment rates. Traditional funding sources — like grants and donations — are under tremendous strain, forcing administrators to consider tuition hikes and reduced course offerings, along with other undesirable cost-cutting measures. Along with these budget pressures, colleges and universities are experiencing an increased demand on IT resources, including registrations systems, financial aid delivery, help desk support, mobility management, and online/self-service applications.

The challenge that the higher education community faces is how to reduce complexity and costs within their infrastructure and maximize existing resources at a time when funding is in short supply. Colleges and universities need to reduce costs while ensuring they are providing staff and students with technology that enhances learning and leads to improved student success.

Some campuses are solving this problem by streamlining and simplifying their existing IT infrastructure. Improving what's already in place not only saves money,

but also makes it easier to enhance student learning and achievement using today's technological tools. Here's a look at how this is possible.

Seeking Answers:
Reducing Costs, Improving IT Management, Fostering Student Achievement

Many IT infrastructures in education were not originally designed to handle the demands presented by digital learning environments, including the need for increased bandwidth and greater storage capacity. As technology has rapidly shifted, students, professors and administrators have come to expect secure, powerful and reliable Internet access, including wireless service. As digital learning becomes increasingly prevalent, it also becomes mission critical as it enables collaboration, personalized learning and 24/7 access to resources. Providing a robust and reliable infrastructure has become a top concern for campus leaders.

Infrastructure issues that colleges are struggling to address today include:

Reliable network access

Higher education networks need to support thousands of students all logging in at once using mobile devices, whether for class, for testing, or outside of class to access homework assignments or informational resources. Such a load can challenge the capacity of university networks, especially older ones.

The move to "BYOD" (Bring Your Own Device) solutions in higher education is also straining system capacity. Allowing network access for devices of various types, platforms and capacities represents a major test for university networks.

Storage

The need to store information and student data today is greater than ever before. Many different types of rich media (such as HD videos and audio files) and other student resources are now routinely incorporated into college level courses. Student information, including personal data, coursework and grades, requires additional bandwidth as well.

Systems management

Managing IT systems during a time of technological transformation presents challenges on many levels. IT managers

need to cope with myriad devices using differing operating systems and platforms. Keeping all these devices up and running is a significant burden for IT departments that are operating with a lean staff.

Security

As more users enter a system, security becomes an ever-bigger issue. This is especially true with wireless networks and when users access from various mobile devices under a BYOD plan. Higher education entities also have to comply with security standards, such as FERPA and HIPAA. Authentication and virus protection measures need to be in place. Identity management and single sign-on are also critical to establishing a secure environment.

Availability

All learning systems and networks need to be consistently reliable and accessible, both on a wired and wireless basis. When disasters strike — be it a weather event or other type of emergency — adequate back-up and recovery plans need to be in place to ensure continuity of service. This is especially important today, as more faculty, students and administrative staff rely on technology throughout the day. When campuses offer around-the-clock access, they also must ensure support is in place should something happen to threaten that access.

Professional learning

Adding new equipment and technological capabilities does not automatically enrich the learning environment. Both administrators and teaching staff need to understand the best strategies for incorporating new technologies into the curriculum. This often means online training sessions

ACHIEVING RETURN ON INVESTMENT

Return on investment, or ROI, can be seen from various IT simplification actions and strategies, such as:

➜ **Server virtualization.** A college campus may have hundreds of servers that have not been virtualized — meaning one physical server is dedicated to only one application. Based on an Intel study, customers can often achieve a 15:1 server consolidation ratio when moving from aging servers to new, virtualized servers running Intel Xeon processors. Based on the estimated operating system and energy consumption savings, the cost of the new servers could be paid back within 5 months.[2]

➜ **Consolidation.** If individual networks or servers have been set up at each site, consolidating and bringing them back to a central location can simplify management and save money.

➜ **De-duplication.** Information in storage often is duplicated, particularly e-mail. Colleges may think they need to buy more digital storage, when in reality, they need to "de-duplicate" the data they are storing.

➜ **Improved storage management.** Storage also can be used more intelligently by prioritizing where information is kept (not all data needs to be in "high access" memory, but can be put in a lower tier). By more intelligently managing the data that must be stored, less new storage capacity needs to be purchased.

➜ **Outsourcing.** IT outsourcing can be a cost-effective solution for a variety of tasks, such as the handling of e-mail, help desks or even entire IT operations. Data centers can be very expensive to operate and maintain effectively and efficiently. For some campuses, outsourcing the center and other high-cost IT functions can save money.

and other professional development activities, which higher education institutions need to work into jam-packed schedules and cash-strapped budgets.

Creating a Strategy:
Dell IT Simplification Assessment

The Dell IT Simplification Assessment can prepare higher education institutions to find economical, efficient ways to enhance and streamline their existing technology infrastructure and processes. Such an assessment can provide colleges with a roadmap for providing digital learning environments for students and faculty.

So what is involved in a Dell IT Simplification Assessment? In brief, Dell education technology consultants visit a campus for an extensive analysis of the entire IT infrastructure. These specialists have many years of experience within educational IT, and include former educators, technology directors and education CIOs. This unique experience not only provides Dell's education consultants with a wealth of technical expertise, but also with the ability to combine their technical expertise with their in-depth understanding of a college or university technology landscape. The assessment process they lead includes a review of the architectural, financial and operational components of the current infrastructure; a rating of the system's capacity to support current and future initiatives; and recommendations for how to improve the system and drive down costs through simplification.

"When we view our client's environment through the lens of simplification, we are looking for ways to consolidate, standardize and automate across the people, process and technology dimensions of the IT operation," explains Dell Higher Education Consultant Bob Brandner.

Here is a more in-depth look at what's involved in the IT simplification process:

First Stage: The Workshop

Before beginning the assessment, Dell consultants meet with information technology stakeholders responsible for and knowledgeable about the current direction of technology planning, policies and IT implementation for their campuses. These stakeholders could be the chief information officer (CIO), chief technology officer (CTO), vice-president/vice-provost for information technology, executive director for information technology, executive director for academic computing, or other similar job titles.

During this workshop, also referred to as a customer whiteboard session, stakeholders can discuss their academic computing goals for their institutions and how they hope to use technology to meet these goals, along with pain points that are preventing achievement. Dell consultants will cover best practices and how the institution's systems compare to highly efficient enterprises, including an examination of IT problem areas.

After the workshop, participants are sent a comprehensive report quantifying findings generated during the discussion, along with recommendations for future action. "While the CWS exercise is critical for clients that aren't clear about their IT goals and the barriers preventing their achievement, others know all too well where they want to be and what's holding them back," says Brandner. "In the latter scenario, Dell will forego the CWS and move right into the full IT Simplification Assessment."

The Assessment: An End-to-End Review

The Dell IT Simplification Assessment is a thorough review that looks at several areas of potential waste and inefficiency, such as how a service desk is managed or how server support takes place. Each area is given a benchmark or baseline score or metric — a point from which improvement will begin. After all, "you need to know how far away you are from 'good' before setting a course to get there," says Brandner. Dell then will recommend the best processes, practices and procedures to drive out unnecessary complexity and improve existing internal processes. The end result is an in-depth executive summary document that calls out specific infrastructure improvements, along with the cost savings that the college can recognize through implementing each recommended action. It's a

step-by-step process in which IT departments can become more efficient and provide better service for less money.

As part of its review, the Dell IT Simplification Assessment examines five key areas of an educational IT system, with a broad, end-to-end perspective. Each area is reviewed to see its present "as-is" state and to locate areas of inefficiency that, if remedied, could result in recommended "to-be" improvements.

- *End User Computing*
  This encompasses the equipment and services users directly interact with: their current workstations, mobile devices, output devices and messaging.
- *Data Center*
  Campus server and storage, facilities, network, disaster recovery procedures and database operations are examined.
- *Application Operations*
  Portfolio management is reviewed, along with the SDLC (software development lifecycle) operations impact; software licensing; enterprise application integration; and automation.
- *Service Management*
  A look at how well the service desk operates, including IT governance and service delivery management.
- *Security & Compliance*
  The focus here is on reviewing vulnerability management, account management, intrusion detection and compliance management.

In addition to the end-to-end analysis, the assessment process includes discovery input, examining specific metrics reported by the IT team; in-depth interviews with focus groups within the institution, covering IT issues ranging from service management to storage to end-user experiences; and activity costing, which calculates specific costs for operations within a system.

Deliverables to expect after an assessment

Once this thorough, systematic review is completed, Dell prepares a detailed report with recommendations for improvement. These recommendations can be implemented by Dell, if a college chooses, by the college itself or from another company; assessments are independent and vendor-agnostic.

Deliverables include:
- *Executive presentation* — a lengthy report describing the high-level findings of the assessment as well as the financial value of having a simplified environment.

- *Simplification index* — a scale showing how a higher education institution can progress through stages of the simplification process, ranging from initial complexity to improving to consistency to optimization.
- *Recommended initiatives* — key initiatives are identified and rated from highest to lowest difficulty.
- *Initiative detail* — further explanation of each recommended initiative, with a detailed analysis of the current situation, proposed future mode of operation, recommended actions, benefits and implementation considerations.
- *Sample ROIs* — a cost breakdown showing financial return on investment that can be achieved with implementation of recommended initiatives.
- *"As-Is To-Be" chart* — a flowcharted, semi-graphic display summarizing the current state of a district's IT system ("as is") as well as what it could look like ("to be") if simplified.

Benefits of an IT Simplification Assessment

A key benefit from the Dell IT Simplification Assessment is that the final analysis identifies specific recommendations and improvements that will improve efficiency, effectiveness, and cut costs. These results can typically include a value to fee proposition of 5x or more — meaning the implementation of the recommended actions can result in an overall cost savings of at least 5 times the cost of the assessment. Implementing these recommendations also allows campuses to perform more work, more efficiently, with fewer resources.

A simplified system typically results not only in cost savings, but time savings as well. When a system is less complex while also being more robust, less IT support is needed for maintenance and day-to-day operational tasks. Instead, IT professionals can devote more time towards innovative approaches to education. Instructional faculty and staff also save time by avoiding technology snafus or hold-ups, leaving them more opportunity to focus on teaching — and students with more time to learn.

Conclusion

As the higher education community moves toward digital learning environments, it is critical they have an extremely efficient infrastructure, aligned with educational goals, in order for these initiatives to be successful. Systems that are optimized for the increased demands of a digital-centric curriculum — meaning more robust and secure Web access, better data storage and less complexity — will ensure colleges and universities have the technology and infrastructure in place to enable and support digital learning initiatives.

Students can participate in collaborative learning on a 24/7 basis, connecting with instructional faculty and other students anywhere, at any time. Faculty can make the best use of Internet technologies to provide a more interactive and personalized level of instruction. BYOD solutions become more achievable, helping to provide mobile access to all students. Professional development for professors and administrators is enhanced through online access, helping them learn even better ways to integrate technology with digital learning.

Endnotes

1. Assessing Consumer Preferences for Continuing, Professional, and Online Higher Education by Eduventures, http://chronicle.com/blogs/wiredcampus/colleges-arentkeeping-up-with-student-demand-for-hybrid-programssurvey-suggests/30930
2. Intel measurements as of Feb 2010. Performance comparison using server side java bops (business operations per second). Results have been estimated based on internal Intel analysis and are provided for informational purposes only. Any difference in system hardware or software design or configuration may affect actual performance.
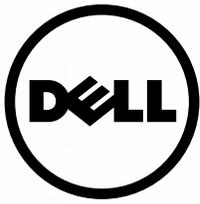
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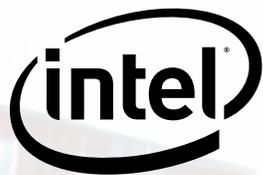
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