Fourth Annual EDUCAUSE Survey Identifies Current IT Issues

IT Funding Challenges tops the list of hot IT-related issues on campus; Security and Identity Management heats up and demands more institutional resources

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The 2003 Current Issues Survey was the fourth consecutive survey conducted by EDUCAUSE to capture information from members about their most pressing campus IT-related challenges.[1] Nearly 34 percent (542) of the 1,620 EDUCAUSE primary member representatives who were asked to participate responded to an e-mail invitation to complete the Web-based survey in January. Survey participants were asked to check up to five of 30 issues in response to each of four questions (see Tables 1 and 2).

Table 1

The Four Questions

1. Which of the IT-related issues below are most important for your campus to resolve for its strategic success?

2. Which of the IT-related issues below have the potential to become much more significant in the coming year?

3. Which of the IT-related issues below are you, as an IT leader or administrator, spending most of your time addressing?

4. On which of the IT-related issues below is your campus spending the most human and/or financial resources?

Survey Findings: All Respondents

Two overall findings for all respondents for this year's survey are especially notable:

1. IT Funding Challenges has become the number-one IT-related issue in terms of its strategic importance to the institution (Question 1), its potential to become even more significant (Question 2), and its capture of IT leaders' time and attention (Question 3). This is not surprising given the state of the U.S. economy, the draconian cuts in college and university budgets (especially in the public sector), and the growing need for resources to support an established IT infrastructure while continuing to make new investments to keep up with technological change.

2. Security and Identity Management is not only on the top-ten list of IT-related issues that are of strategic importance, growing in significance, and demanding the campus IT leader's time, but is now among the top ten in human and fiscal resource consumption (Question 4), suggesting that campuses are beginning to take action to address this critical challenge.

Comparing responses across all questions for all respondents, three issues rank in the top ten in all four areas:
- Administrative/ERP/Information Systems
- Maintaining and Upgrading Network and IT Infrastructure
- Security and Identity Management

Three other issues are on the top-ten lists for three of the four questions:
- IT Funding Challenges (all but Question 4, Spending)
- IT Strategic Planning (all but Question 4, Spending)
- Web Services/Web-based Systems (all but Question 3, IT leaders' time)

How do these results compare to last year's? Table 3 presents the top-ten issues for all respondents for each of the four questions for last year and this year. By and large, we found some notable changes in this comparison.

1. Maintaining and Upgrading Network and IT Infrastructure rose from ninth last year to fourth this year on the top-ten list of strategic issues. This might be the result of our renaming this issue on the survey (from last year's Maintaining Network Infrastructure) and expanding it to include several issues that were discretely presented last year (Desktop Computing Management, Emerging Network Technologies, Software Site Licenses). In the survey glossary, it was defined as including such challenges as replacing hardware on an established cycle, upgrading software/licensing agreements, managing bandwidth (especially in residence halls), routinely investing in network upgrades, and implement-

Table 2

2003 Current Issues Survey

Administrative/ERP/information systems
Advanced networking/Internet2
Assessment of technology/ROI
Business continuity/disaster recovery
Change management
Collaboration/partnerships
Data management
Digital libraries
Distance education/virtual universities
Distributed learning/teaching and learning strategies[1]
Electronic classrooms/technology buildings
Electronic communication[2]
Faculty development, support, and training
Instructional/course management systems
Intellectual property management
IT funding challenges
IT governance, organization, and service delivery models
IT staffing and human resources management

IT strategic planning
IT training
Leadership for IT
Maintaining and upgrading network and IT infrastructure[3]
Online student services
Policy and Federal compliance
Portals (enterprise level)
Remote access
Security and identity management
Student computing
Support services
Web services/Web-based systems[4]
Other_____

[1] The term "distributed learning" was added to "teaching and learning strategies" to further distinguish this issue from distance education.
[2] A new issue in 2003.
[3] This issue was expanded from last year's term "maintaining network infrastructure."
[4] This issue was renamed in 2003 to focus more on the concept of Web services than last year's term "Web-based systems development and integration."

ing new technologies (for example, wireless, mobile computing).

2. Distance Education has continued its slide from prominence, for the first time in four years not appearing on the top-ten list for any of the four survey questions. Perhaps the demise of several virtual universities has had a chilling effect on developments in this area. Or perhaps issues related to distance education are fractioned into other areas or being absorbed into the overall stream of campus activities—the opposite effect mentioned in the paragraph above. Even when looking at the results demographically, only respondents from schools in the Associate's Colleges Carnegie class (see later) indicated that distance education is an issue to be resolved for strategic success as well as one that will continue to grow in importance.

3. Last year, IT Staffing and Human Resources Management challenges had declined dramatically from previous surveys, and we speculated that these challenges might reemerge with a recovery in the U.S. economy and a resurgence in IT investment. Even without such a recovery, campus expenditures on IT staffing are back among the top ten after a year's hiatus, suggesting that in spite of a further declining economy, large expenditures for IT support services, especially human resources, are still necessary given the massive IT infrastructure on most campuses.

Other key findings include the following:

■ Web Services/Web-based Systems has made it onto the top-ten list of issues of strategic importance and issues likely to become more significant, as well as the list of heavy IT-related spending; last year it appeared only on the expenditures list.

■ Instructional/Course Management Systems did not make any top-ten lists last year, but in 2003 this issue is ninth on the list of issues expected to

become more significant and sixth on the list of top-ten campus IT expenditures, likely due to the significant jump in vendor maintenance costs.

■ Last year Teaching and Learning Strategies was on the top-ten list of issues considered strategic as well as issues expected to grow in significance, although it had fallen from fifth to tenth place on that list from the previous year. This year it has dropped off that list and remains only among the top-ten strategic issues.

■ Enterprise Portals, which last year was fourth on the list of issues expected to increase in significance overall, has now made the top-ten list of IT-related issues considered important to resolve for institutional strategic success.

■ The top three issues on last year's list of issues expected to become more significant did indeed become the top three on this year's strategic issues list. Furthermore, the top four issues for this question this year are the same as last year's. Distance Education was on last year's list of issues expected to become more significant, but as pointed out earlier, it did not make the top-ten list this year. One issue not identified as emerging in significance last year suddenly appeared on the strategic issues list this year, that is, Web Services/Web-based Systems.

■ With September 11 fresh on everyone's mind in January of 2002, we might have expected Business Continuity/Disaster Recovery Planning to have made the top-ten list for more than one survey question, but that was not the case. This year, however, this issue has made it onto the list of top ten issues expected to become more significant in the coming year.

What about how IT administrators spend most of their time? Last year there were notable differences for this question compared to the other three questions. Charged with overall leadership for IT and usually line management of the IT organization, the IT administrator must necessarily spend his or her time on ongoing management as well as strategic

Table 3

2002–2003 Comparison of Top-Ten Issues for All Questions

2002 Survey Results	2003 Survey Results	2002 Survey Results	2003 Survey Results

Question 1: Need to Resolve for the Institution's Strategic Success

2002 Survey Results	2003 Survey Results
1. Administrative systems/ERP	1. IT Funding Challenges
2. IT Funding Strategies	2. Administrative/ERP/ Information Systems
3. Faculty Development, Support, and Training	3. Security and Identity Management
4. IT Strategic Planning	4. Maintaining and Upgrading Network and IT Infrastructure
5. Security Management	5. Faculty Development, Support, and Training
6. Online Student Services	6. IT Strategic Planning
7. Teaching and Learning Strategies	7. Web Services/Web-based Systems
8. Distance Education	8. Distributed Learning/ Teaching and Learning Strategies
9. Maintaining Network Infrastructure	9. Enterprise-level Portals
10. Emerging Network Technologies	10. Online Student Services

Question 3: How IT Leaders Spend their Time

2002 Survey Results	2003 Survey Results
1. IT Strategic Planning	1. IT Funding Challenges
2. Administrative Systems/ERP	2. IT Strategic Planning
3. IT Funding Strategies	3. Administrative/ERP/ Information Systems
4. IT Staffing and HR Management	4. Security and Identity Management
5. Change Management	5. Maintaining and Upgrading Network and IT Infrastructure
6. IT Organization and Service Delivery Models	6. IT Governance, Organization, and Service Delivery Models
7. Maintaining Network Infrastructure	7. IT Staffing and Human Resources Management
8. Support Services	8. Leadership for IT
9. Security Management	9. Change Management
10. Faculty Development, Support, and Training	10. Support Services

Question 2: Potential to Become More Siginificant

2002 Survey Results	2003 Survey Results
1. IT Funding Strategies	1. IT Funding Challenges
2. Security Management	2. Security and Identity Management
3. Administrative Systems/ERP	3. Administrative/ERP/ Information Systems
4. Enterprise-level Portals	4. Enterprise-level Portals
5. Online Student Services	5. Faculty Development, Support, and Training
6. Distance Education	6. Web Services/Web-based Systems
7. Emerging Network Technologies	7. Maintaining and Upgrading Network and IT Infrastructure
8. Faculty Development, Support, and Training	8. Business Continuity/Disaster Recovery Planning
9. IT Strategic Planning	9. Instructional/Course Management Systems
10. Teaching and Learning Strategies	10. IT Strategic Planning

Question 4: Expenditure of Most Institutional Resources

2002 Survey Results	2003 Survey Results
1. Administrative Systems/ERP	1. Administrative/ERP/ Information Systems
2. Maintaining Network Infrastructure	2. Maintaining and Upgrading Network and IT Infrastructure
3. Desktop Computing Management	3. Web Services/Web-based Systems
4. Support Services	4. Support Services
5. Electronic Classrooms/ Technology Buildings	5. Electronic Classrooms/ Technology Buildings
6. Faculty Development, Support, and Training	6. Instructional/Course Management Systems
7. Web-based Systems Development/Integration	7. Student Computing
8. Student Computing	8. Security and Identity Management
9. Distance Education (tied) Advanced Networking (tied)	9. Online Student Services
	10. IT Staffing and Human Resources Management

and emerging challenges. Thus we would expect once again to see issues in the top ten for this question that do not appear in the other lists. Examples are

- Change Management
- IT Governance, Organization, and Service Delivery Models
- IT Leadership (new to the Question 3 top ten this year)

Last year, IT leaders reported spending time on Faculty Development, Support, and Training; the issue does not appear on the top-ten list this year. On the other hand, Support Services, which was a major challenge just a few years ago but had dropped off all but the expenditures list last year, is back this year on the list for how IT leaders spend their time.

For the most part, institutions overall appear to be spending the most human and fiscal resources in the areas one might expect. Student Computing and Electronic Classrooms/Technology Buildings—challenges that might be considered related to infrastructure—do not appear on any other top-ten lists for all respondents. Gone from last year's list of greatest expenditures are Distance Education, Advanced Networking, and Faculty Development, Support, and Training, replaced by Instructional/Course Management Systems, IT Staffing and Human Resources Management, Online Student Services, and Security and Identity Management.

Demographic Similarities and Differences

Are there demographic differences in how IT-related issues have been reported? We looked for differences by control (public versus private); Carnegie classification; and enrollment size: small (less than 2,000), medium (2,000 to 7, 999), medium-large (8,000 to 17,999), and large (18,000+). To simplify analysis, we created four groupings based on Carnegie classifications: doctoral/ research universities intensive and doctoral/research universities extensive are combined into doctoral/research; master's colleges and universities I and master's colleges and universities II are combined into master's; baccalaureate colleges-liberal arts, baccalaureate

colleges-general, and baccalaureate/associate's colleges are combined into baccalaureate; and the fourth category is associate's colleges (essentially community and other two-year colleges). Table 4 provides issue rankings by institution size and control, and Table 5 by Carnegie classification.

Important to Resolve for Strategic Success

There is remarkable congruence across institutions of all sizes, control, and Carnegie class for the first question, that is, which IT issues are most important to resolve for an institution's strategic success. The following issues appear in the top five across all of the demographic categories:

- Administrative/ERP/Information Systems
- IT Funding Challenges
- Maintaining and Upgrading Network and IT Infrastructure

Two other issues appear in the top ten across all demographics:

- Faculty Development, Support, and Training
- Security and Identity Management

IT Strategic Planning is among the top-ten challenges for all categories except two-year colleges, and Web Services/Web-based Systems is a top-ten issue for all except large and doctoral/ research universities. Not surprisingly, Advanced Networking/Internet2 made the top-ten list only for doctoral/research universities. This category of universities, which tend to be larger, more complex, and more decentralized, also found issues related to organization, enterprise portals, and distribution of control to be more challenging.

Earlier we noted that Distance Education/Virtual Universities did not make any top-ten lists when considering all respondents. This is not the case when looking at Carnegie classification breakouts, where two-year colleges have indicated that distance education is still among the challenges they consider strategic to their institution's success. This is not surprising, given the mission and target student populations of two-year colleges.

Finally, last year Teaching and Learn-

ing Strategies appeared on the top-ten list for every category except two-year colleges. This year, it appears only on the top-ten lists for doctoral/research, baccalaureate, large, and public universities.

Expected to Increase in Significance

Four issues made the top-ten list for this question for all sizes, Carnegie classes, and public and private categories:

- Administrative/ERP/Information Systems
- IT Funding Challenges
- Security and Identity Management
- Enterprise Portals

Four other issues made the top-ten lists for most of the demographic breakdowns:

- Web Services/Web-based Systems (all but doctoral/research and large universities)
- Faculty Development, Support, and Training (all but large universities)
- Maintaining and Upgrading Network and IT Infrastructure (all but baccalaureate)
- Business Continuity/Disaster Recovery Planning (all but master's and associate's colleges)

In this area of issues expected to grow in importance, two other issues appear with higher frequency on demographic top-ten lists than they did last year: Assessment of Technology/ROI and Instructional/Course Management Systems. These will bear watching for growth in significance in the coming year.

Challenges Demanding IT Administrators' Time

Again, there is much more congruence than divergence in this area when examined demographically. While the rank order varies, IT leaders across all demographic categories report that they spend most of their time addressing the following issues:

- Administrative/ERP/Information Systems
- IT Funding Challenges
- IT Strategic Planning
- Maintaining and Upgrading Network and IT Infrastructure
- Security and Identity Management

Table 4

Issue Rankings by Institution Size and Control (Public Versus Private)

QUESTION No. 1: Which IT-related issues are most important for your campus to resolve for its strategic success?

Small	Medium	Medium-Large	Large	Private	Public
IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges
Administrative/ERP/information systems	Administrative/ERP/information systems	Administrative/ERP/information systems	Security and identity management	Administrative/ERP/information systems	Administrative/ERP/information systems
Faculty development, support, and training	Security and identity management	Security and identity management	Administrative/ERP/information systems	Faculty development, support, and training	Security and identity management
Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure
Web services/Web-based systems	Faculty development, support, and training	Faculty development, support, and training	IT strategic planning	IT strategic planning	Faculty development, support, and training
IT strategic planning	Web services/Web-based systems	IT governance, organization, and service delivery models	Distributed learning/teaching and learning strategies	Security and identity management	IT strategic planning
Security and identity management	IT strategic planning	Distributed learning/teaching and learning strategies	Portals (enterprise level)	Web services/Web-based systems	Distributed learning/teaching and learning strategies
Online student services	Instructional/course management systems	Portals (enterprise level)	IT governance, organization, and service delivery models	Portals (enterprise level)	Web services/Web-based systems
IT staffing and human resources management	Online student services	IT strategic planning	Instructional/course management systems	Online student services	Instructional/course management systems
Electronic classrooms/technology buildings	Portals (enterprise level)	Web services/Web-based systems	Faculty development, support, and training	Instructional/course management systems	IT staffing and human resources management

QUESTION No. 2: Which IT-related issues have the potential to become much more significant in the coming year?

Small	Medium	Medium-Large	Large	Private	Public
IT funding challenges	IT funding challenges	IT funding challenges	Security and identity management	IT funding challenges	IT funding challenges
Administrative/ERP/information systems	Security and identity management	Security and identity management	IT funding challenges	Security and identity management	Security and identity management
Security and identity management	Portals (enterprise level)	Administrative/ERP/information systems	Administrative/ERP/information systems	Portals (enterprise level)	Administrative/ERP/information systems
Faculty development, support, and training	Administrative/ERP/information systems	Portals (enterprise level)	Portals (enterprise level)	Administrative/ERP/information systems	Portals (enterprise level)
Web services/Web-based systems	IT strategic planning	Distributed learning/teaching and learning strategies	Web services/Web-based systems	Faculty development, support, and training	Business continuity/disaster recovery
Portals (enterprise level)	Web services/Web-based systems	Faculty development, support, and training	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	IT staffing and human resources management
Online student services	Faculty development, support, and training	Assessment of technology/ROI	Business continuity/disaster recovery	Web services/Web-based systems	Web services/Web-based systems
Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Instructional/course management systems	IT governance, organization, and service delivery models	Business continuity/disaster recovery	Faculty development, support, and training
Assessment of technology/ROI	Business continuity/disaster recovery	Business continuity/disaster recovery	IT staffing and human resources management	IT strategic planning	Maintaining and upgrading network and IT infrastructure
Business continuity/disaster recovery	IT staffing and human resources management	Maintaining and upgrading network and IT infrastructure	Instructional/course management systems	Instructional/course management systems	Instructional/course management systems

QUESTION No. 3: Which IT-related issues are you, as an IT leader or administrator, spending most of your time addressing?

Small	Medium	Medium-Large	Large	Private	Public
IT strategic planning	IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges
IT funding challenges	IT strategic planning	Administrative/ERP/information systems	IT strategic planning	IT strategic planning	Administrative/ERP/information systems
Administrative/ERP/information systems	Administrative/ERP/information systems	IT strategic planning	Administrative/ERP/information systems	Administrative/ERP/information systems	IT strategic planning
Maintaining and upgrading network and IT infrastructure	Security and identity management	IT governance, organization, and service delivery models	IT governance, organization, and service delivery models	Maintaining and upgrading network and IT infrastructure	Security and identity management
IT staffing and human resources management	Maintaining and upgrading network and IT infrastructure	Security and identity management	Security and identity management	Leadership for IT	IT staffing and human resources management
Web services/Web-based systems	IT staffing and human resources management	Maintaining and upgrading network and IT infrastructure	Leadership for IT	Security and identity management	Maintaining and upgrading network and IT infrastructure
Leadership for IT	Leadership for IT	Leadership for IT	Collaboration/partnerships	Support Services	IT governance, organization, and service delivery models
Faculty development, support, and training	Support Services	IT staffing and human resources management	Change management	IT staffing and human resources management	Leadership for IT
Support Services	Change management	Change management	Maintaining and upgrading network and IT infrastructure	Web services/Web-based systems	Change management
Security and identity management	Web services/Web-based systems	Assessment of technology/ROI	IT staffing and human resources management	Faculty development, support, and training	Support Services

QUESTION No. 4: On which IT-related issues is your campus spending the most human and/or financial resources?

Small	Medium	Medium-Large	Large	Private	Public
Administrative/ERP/information systems	Administrative/ERP/information systems	Administrative/ERP/information systems	Maintaining and upgrading network and IT infrastructure	Administrative/ERP/information systems	Administrative/ERP/information systems
Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Administrative/ERP/information systems	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure
Web services/Web-based systems	Web services/Web-based systems	Instructional/course management systems	Web services/Web-based systems	Web services/Web-based systems	Web services/Web-based systems
Support Services	Support Services	Support Services	Support Services	Support Services	Support Services
Electronic classrooms/technology buildings	Electronic classrooms/technology buildings	Web services/Web-based systems	Electronic classrooms/technology buildings	Electronic classrooms/technology buildings	Instructional/course management systems
Student computing	Student computing	Security and identity management	Security and identity management	Student computing	Electronic classrooms/technology buildings
IT staffing and human resources management	Security and identity management	Online student services	Online student services	Instructional/course management systems	Security and identity management
Instructional/course management systems	Faculty development, support, and training	Portals (enterprise level)	IT staffing and human resources management	Faculty development, support, and training	Student computing
Data management	Instructional/course management systems	IT staffing and human resources management	Instructional/course management systems	Security and identity management	Online student services
IT funding challenges	Online student services	Data management	Student computing	IT staffing and human resources management	IT staffing and human resources management

Table 5

Issue Rankings by Carnegie Classification

QUESTION No. 1: Which IT-related issues are most important for your campus to resolve for its strategic success?

Doctoral/Research	Baccalaureate	Master's	Associate's Colleges
IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges
Administrative/ERP/information systems	Administrative/ERP/information systems	Faculty development, support, and training	Administrative/ERP/information systems
Security and identity management	Faculty development, support, and training	Administrative/ERP/information systems	Maintaining and upgrading network and IT infrastructure
Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Web services/Web-based systems
Faculty development, support, and	Security and identity management	Web services/Web-based systems	Security and identity management training
IT strategic planning	Web services/Web-based systems	IT strategic planning	Faculty development, support, and training
Advanced networking/Internet2	Distributed learning/teaching and learning strategies	Security and identity management	Online student services
IT governance, organization, and service delivery models	Instructional/course management systems	Electronic classrooms/technology buildings	IT staffing and human resources management
Portals (enterprise level)	IT strategic planning	Online student services	Distance education/virtual universities
Distributed learning/teaching and learning strategies	Portals (enterprise level)	Instructional/course management systems	Electronic classrooms/technology buildings

QUESTION No. 2: Which IT-related issues have the potential to become much more significant in the coming year?

Doctoral/Research	Baccalaureate	Master's	Associate's Colleges
IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges
Security and identity management	Security and identity management	Security and identity management	Security and identity management
Administrative/ERP/information systems	Administrative/ERP/information systems	Portals (enterprise level)	Portals (enterprise level)
Portals (enterprise level)	Portals (enterprise level)	Administrative/ERP/information systems	Assessment of technology/ROI
Maintaining and upgrading network and IT infrastructure	Faculty development, support, and training	Web services/Web-based systems	Maintaining and upgrading network and IT infrastructure
Business continuity/disaster recovery	Business continuity/disaster recovery	Maintaining and upgrading network and IT infrastructure	Administrative/ERP/information systems
Instructional/course management systems	Web services/Web-based systems	Faculty development, support, and training	Web services/Web-based systems
IT governance, organization, and service delivery models	IT staffing and human resources management	Online student services	Faculty development, support, and training
Faculty development, support, and training	IT strategic planning	IT strategic planning	Electronic classrooms/technology buildings
Advanced networking/Internet2	Instructional/course management systems	Assessment of technology/ROI	Distance education/virtual universities

- IT Staffing and Human Resources Management
- Leadership for IT (except at baccalaureate schools)

A number of other issues appeared with frequency across all the categories, with three issues appearing to be somewhat unique, reported by IT leaders at only one or two types of institution:

- Assessment of Technology/ROI (only at medium-large institutions)
- Online Student Services (only at associate's colleges)
- Collaborations/Partnerships (only at doctoral/research and large universities)

How Institutions Spend Their Resources

When it comes to IT spending, again there are more similarities than differences across institutions of all types and sizes, and from last year to this year. Perhaps this is a natural response to the wide-ranging effects of financial

QUESTION No. 3: Which IT-related issues are you, as an IT leader or administrator, spending most of your time addressing?

Doctoral/Research	Baccalaureate	Master's	Associate's Colleges
IT funding challenges	IT funding challenges	IT funding challenges	IT funding challenges
Administrative/ERP/information systems	Administrative/ERP/information systems	IT strategic planning	IT strategic planning
IT strategic planning	IT strategic planning	Administrative/ERP/information systems	Administrative/ERP/information systems
Security and identity management	Security and identity management	Maintaining and upgrading network and IT infrastructure	IT staffing and human resources management
IT governance, organization, and service delivery models	Maintaining and upgrading network and IT infrastructure	Web services/Web-based systems	Maintaining and upgrading network and IT infrastructure
Leadership for IT	Faculty development, support, and training	IT staffing and human resources management	Leadership for IT
Maintaining and upgrading network and IT infrastructure	IT staffing and human resources management	Support Services	Support Services
Collaboration/partnerships	Web services/Web-based systems	Leadership for IT	Change management
IT staffing and human resources management	Change management	Security and identity management	Security and identity management
Change management	Support Services	IT governance, organization, and service delivery models	Online student services

QUESTION No. 4: On which IT-related issues is your campus spending the most human and/or financial resources?

Doctoral/Research	Baccalaureate	Master's	Associate's Colleges
Administrative/ERP/information systems	Administrative/ERP/information systems	Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure
Maintaining and upgrading network and IT infrastructure	Maintaining and upgrading network and IT infrastructure	Administrative/ERP/information systems	Administrative/ERP/information systems
Web services/Web-based systems	Web services/Web-based systems	Web services/Web-based systems	Web services/Web-based systems
Support Services	Support Services	Support Services	Support Services
Security and identity management	Student computing	Electronic classrooms/technology buildings	Online student services
Electronic classrooms/technology buildings	Instructional/course management systems	Student computing	Electronic classrooms/technology buildings
Advanced networking/Internet2	Electronic classrooms/technology buildings	Faculty development, support, and training	Distance education/virtual universities
IT staffing and human resources management	IT staffing and human resources management	Security and identity management	Instructional/course management systems
Instructional/course management systems	Security and identity management	IT staffing and human resources management	Student computing
Online student services	Online student services	IT funding challenges	IT funding challenges

stringency. The following made the top-ten list for all categories, with the first two ranking either first or second for all:

■ Administrative/ERP/Information Systems
■ Maintaining and Upgrading Network and IT Infrastructure

■ Web Services/Web-based Systems (ranked third for all but medium-large, where it was fifth)
■ Support Services (ranked fourth for all)

Other issues demanding institutional resources in at least seven out of ten of the demographic categories of schools are

■ Instructional/Course Management

Systems (all but master's)
■ Electronic Classrooms/Technology Buildings (all but medium-large)
■ Security and Identity Management (all but small and two-year colleges)
■ IT Staffing and Human Resources Management (all but two-year colleges and medium-sized institutions)

- Student Computing (all but medium-large and doctoral/research universities)
- Online Student Services (all but small, private, and master's institutions)

A couple of notable differences in this area are that last year seven out of ten demographic categories reported spending heavily on Faculty Development, Support, and Training, while this year only three categories have so reported. Also, Advanced Networking/Internet2 made the top ten for expenditures this year of only one category—doctoral/research universities—and Distance Education/Virtual Universities made the top-ten list of only two-year colleges (congruent with the finding reported earlier that this issue is still both strategic and growing in importance for schools in this Carnegie class). Finally, two demographic categories report large expenditures on Data Management: small and medium-large institutions. Once the economic climate improves, we might see more differentiation in the expenditures area.

Thanks for Your Participation

We thank those of you who took the five to seven minutes to complete the 2003 EDUCAUSE Current Issues survey. Your participation enables us to take an annual snapshot of what IT leaders think are strategic, emerging challenges related to information technology, issues that demand time and institutional resources. The survey summary can help you understand these challenges through the broader perspective of higher education in general and compare your concerns with those of your colleagues. You can also use this article to inform others on your campus about IT-related issues that are not challenges for just your campus, but prevalent throughout higher education—from developing professionals in your organizations to institutional leaders who might find the summary and issues descriptions helpful. We encourage you also to check the EDUCAUSE Current Issues Web site (http://www.educause.edu/issues/) from time to time for resources on the latest issues and for links to articles, papers, and books that can help you explore these issues further.

Top Ten Current Issues Defined

So what are the top ten issues for 2003? Below, members of the Current Issues Committee have described the top-ten IT-related issues you've told us are the most important for your institution to resolve for its strategic success (the top-ten list for Question 1), including some analysis to explain the rankings and year-to-year changes. We've also included the two unique issues on the list of those you said had the potential to become more significant in the coming year, that is, Business Continuity/Disaster Recovery Planning and Instructional/Course Management Systems (see the sidebar).

The questions raised in the descriptions below represent a capsule view of the wide range of issues foremost on the minds of campus IT leaders who responded to our survey. Although you might be tempted to immediately push to work on every issue at your institution, keep in mind that more than one campus has found that addressing any one of these issues can be so intense as to slow or even stop progress on the others. Your task is to work with your campus leaders to prioritize and then tackle the challenges that are most important for your institution to resolve for its strategic success.

No. 1: IT Funding Challenges

With an unsettled economy and substantial pressure to further reduce budgets below current levels, there is an urgent need to revisit funding and spending strategies for IT. Endowments are not producing revenues to offset rising costs, legislatures are forced to reduce funds for higher education purposes, and there is no indication that this financial climate will be short-lived. These are among the many reasons why colleges and universities are facing the onerous task of reducing budgets, reevaluating existing programs and services, and reengineering processes to improve efficiency. Major challenges include the following:
- IT organizations must find new, cost-effective ways to deploy technology and support the existing infrastructure.

- IT leadership must find the right balance between implementing new technologies and maintaining the infrastructure and support services, all with less funding.
- New strategies need to be identified to control costs but to continue support for campus infrastructure, user support, and new technologies. Such strategies must be cognizant of the total cost of ownership of resources including
  —Life-cycle budgeting for technology refreshment
  —Increasing demand for support services and bandwidth
  —The need to further secure the IT environment
- New funding models need to be sustainable and should consider all options, such as
  —Charging or taxing policies and fees
  —Leasing versus purchasing
  —Standardization of products, vendors, or platforms
  —Creative purchasing arrangements
  —Centralized versus distributed or replicated functionality or services
  —New funding sources
- IT leadership must explore cost savings, understanding the difference between cost savings and cost shifting. With vast deployments of resources, there may be opportunities for real savings through standardization, collective or volume purchasing, and reopening negotiations.
- To justify needed funding levels, the importance and benefits of the deployment and support of IT must be acknowledged as a strategic investment for the institution. It is time for strategic planning efforts within IT to evaluate and confirm the effectiveness of activities and services and to determine if they align with institutional strategic directions.
- Process or organizational changes may be in order as ways to provide the right set of cost-effective services.

No. 2: Administrative/ERP/ Information Systems

Of the nearly 500 institutions surveyed during the development of the EDUCAUSE Center for Applied Re-

Will These Issues Become More Significant in the Coming Year?

Two new issues made the top-ten list of issues that are expected to become more significant in the coming year. Are they on your campus's radar screen?

Business Continuity/ Disaster Recovery Planning

Information and communication systems and the technology infrastructure that supports them have become valuable assets for colleges and universities. In fact, it is hard to imagine a campus being able to continue business as usual without access to this set of resources. Thus the challenge of business continuity and disaster recovery planning takes on new meaning in our highly automated and networked world, especially after the experiences of September 11, 2001. Institutions now need to rethink their recovery assumptions. Information systems and the information that resides in them can be highly distributed across the institution, so efforts to manage and protect them will need to be broadly coordinated, will require creative leadership and cross-organizational cooperation, and will need to have the buy-in of the entire campus community, including trustees. Some questions that might be addressed in developing a continuity/recovery plan include the following:

■ What are the essential IT systems and services, how critical are they, and how viable will they be in a disaster? How long can the institution sustain an outage of these systems?

■ Who will be responsible for managing the crisis initially, and who will be on the incident management team? Have job descriptions been revised to address disaster planning? What are the responsibilities of the chief information or technology officer in a disaster?

■ How ready are people in the campus community to respond to a disrup-

tion? What information and training must be provided to the people who will be directly involved, and what awareness activities and other preparations need to be provided to the full community?

■ Has the institution developed a protocol for declaring how much of an emergency response is needed and where emergency response centers will be located? Has thought been given to how institutional public relations and liaison with the media will be handled?

■ What is the balance between acceptable risk and acceptable and one-time recurring costs? What is the right level of investment? Does the institution need to build continuity management costs into the operating costs of new systems and services?

Instructional/Course Management Systems

Technology-enhanced teaching and learning has quickly become a priority in higher education initiatives. A changing student population now expects any time, anywhere access to learning. Faculty commitment has moved from the "entrepreneurial loner" to a growing wave that demands consistent, accessible, shared tools and resources. Institutional support has been strongly responsive, putting new resources into the hands of students and instructors wherever possible.

Nowhere have we seen this change realized more quickly than in the rapid adoption of course management systems—in changing the classroom, implementing hybrid courses, and creating completely online instruction. Overnight, the CMS grew from unsupported software on local systems to enterprise services supported across the campus.

Thoughtful discourse gave way to action as students and faculty embraced a tool that provided structure for student learning, strong communication and collaboration options, online assessment, and the possibility of reaching diverse learning styles. With the CMS now an expected part of the curriculum, a number of issues have arisen.

■ Is "no significant difference"[2] enough to justify the cost and effort?

■ Does the CMS merely recreate the traditional classroom? Could the tools be used differently to provide a more learner-centered experience?

■ Are faculty creating material that will later be inaccessible to them? What happens when there's a change of institution or vendor? Who owns the course if it can't be extracted?

■ Does a one-size-fits-all framework hinder creative instructional innovation? Are IT services now providing CMS support to the exclusion of developing new resources?

■ Who should be at the table when selecting a CMS? How do we balance IT concerns for authentication, hardware, and security with faculty demand for support, administrative issues of pricing, student expectations of the tools, and library concerns over access and integration?

■ Are institutions losing learning resources (interdisciplinary course collaborations, team teaching, guest participation, student ownership of work) by accepting the course experience as a closed, one-semester container?

Adequate answers to these questions are still elusive but are high among the concerns of higher education as discussions grow more heated. Thoughtful response from multiple constituencies may determine the next-generation course management system.

search's 2002 research study on enterprise systems,[3] 45 percent of the respondents were either implementing or considering implementing ERP solutions within the next five years. Projects of this scope demand significant institutional resources and an increasing IT leadership focus. As we consider or launch an ERP project, we should draw on collective institutional experiences to discover best practices and lessons learned by colleagues. Some questions need to be addressed:

- What technological and functional factors are driving the ERP solution? What service and process improvements would be associated with a successful implementation? Are there viable alternatives, such as enhancing existing legacy systems?
- Is there strong executive leadership committed to support an ERP project? Is the institution prepared to migrate to an environment characterized by shared-data repositories versus traditional central data ownership?
- Will the new system integrate and interface successfully with existing course management systems, the institutional Web site, and portal developments? Has the impact on your existing technology infrastructure been thoroughly evaluated, addressing campus bandwidth, backup, storage, and security issues?
- Is the campus prepared to adapt its business processes to the embedded best practices configured in the ERP solution, to minimize or avoid customization? Have current processes and desired process improvements been identified, documented, communicated, and understood? Are the new functional and system requirements realistic?
- Will the implementation include participation by a broad representation of stakeholders, from both technical and functional areas? How will their expectations be managed effectively?
- Are internal personnel resources adequate? Do you have an implementation partner with sufficient higher education experience, seasoned staff, and a proven track record?
- Have you created a support plan to identify the roles and responsibilities of technical, functional, and user groups? Does the project plan include adequate training and support for system users both during implementation and on an ongoing, maintenance basis?
- If you have completed your implementation, is your institution now getting more timely and intuitive access to information, especially for strategic planning and decision making? Have reengineered processes improved operations and increased efficiency? Has the system optimized services for students, faculty, staff, and administrators?

No. 3: Security and Identity Management

The pervasive networked environment in which we work and the resultant highly distributed architecture for information and services present both opportunities and challenges for higher education institutions. The opportunities arise from greatly improved access and from the potential efficiencies of a self-service environment. The challenges result from the inherent difficulties in managing security and identity in a complex, distributed environment. Issues an institution needs to consider follow:

- How will your institution integrate the need for security with the tradition of open and free networking within the academic culture? Is it possible to isolate and secure the mission-critical areas of your network? How will a secure network impact the relationships of trust that exist among departments at your institution and other networks?
- What policies are currently in place at your institution with regard to security? What policies are critical for a secure network? What strategies can be used to increase the buy-in from leadership and the community that will be required in order to implement a secure network?
- Do you have strategies to manage security as new technologies become available, such as the recent influx of handheld devices that can connect to your campus network?

- Given the increasing importance and the complexity of electronic security, does your campus have the trained staff to undertake this job?
- Do you have the directory services necessary to manage the relationships among people, information, and services distributed across the network? Are those services interoperable with those at other institutions?
- Given the difficult budget circumstances that most institutions are facing, how will you make your institutional leadership aware of the value of investing in security and of the risks in not doing so?
- Many campuses are developing public key infrastructure (PKI) technologies as a means of authenticating the identities of network users and authorizing their access to licensed content and other valuable resources. PKI requires substantial policy decisions to distribute and manage certificates. Are you engaging all stakeholders in your PKI planning?
- Managing a distributed environment requires both a technical architecture and a complementary policy architecture. Is your campus planning and maintaining these?

No. 4: Maintaining and Upgrading Network and IT Infrastructure

The technological foundation that supports an institution's business and academic processes is its network and IT infrastructure. Many take for granted the infrastructure's existence and abilities not adhering to the basics. Like good tires on a vehicle, applications and services cannot function effectively or efficiently without a healthy, up-to-date network and IT infrastructure. Without quality-of-service (QoS) functionality, multi-layer networking, Fast- and Gig-Ethernet and proper planning, emerging technologies such as voice-over-IP (VoIP) and video-over-IP are incapable of being implemented. Without computers equipped with the proper processor speeds and enough RAM, new versions of software will bring computers to a crawl, leaving the end user with an inefficient tool to perform their work.

In addition to keeping the infrastructure up-to-date, maximizing resources on the network infrastructure pays dividends in overall operating costs. Providing the proper tools to monitor and shape network bandwidth might help maximize the lifetime of your network infrastructure. Some things to consider in maintaining and upgrading your network and IT infrastructure follow:

- Do you proactively plan for and implement a policy to replace computers and routinely upgrade network devices, as well as periodically evaluate and renegotiate software license agreements? Does your plan include benchmarks for network utilization to assist in the planning for future upgrades?
- Does your plan include identifying proper resources and assets to adequately support your infrastructure, including 24 × 7 network support? Do you have redundancy built into your network design to limit network outages? Is training a priority for those who support your infrastructure?
- What information do you use to size your network technology infrastructure? Who determines the applications that will run on the infrastructure and how much excess capacity is enough? Do you have the ability to shape your bandwidth for priority services, and can you limit or restrict recreational traffic on your network?
- Are your network and IT infrastructure ready for emerging technologies such as the convergence of voice and data, video-over-IP, wireless technologies, and mobile computing? How do you carve out time and money to pilot network and other infrastructure advances, while continuing to maintain and support the current investment?

No. 5: Faculty Development, Support, and Training

The future of technological successes at higher education institutions depends not only on the availability of technology but also on the extent to which faculty are supported as they develop innovative ways to integrate technology into the learning and research experience.

Effective support structures will be necessary, particularly those that facilitate faculty development, the sharing of pedagogical techniques, the exploration of new technologies, and the use of new tools, both online and in the technology-equipped classroom.

Technology professionals must collaborate with and assist faculty in these endeavors, developing and maintaining a significant knowledge-base of current academic issues related to technology—for example, distributed learning, teaching and learning strategies, intellectual property and copyright challenges—so that faculty feel comfortable and confident in the support they receive from the IT organization. Some of the questions to ask as we strive to meet these goals follow:

- How can our institutions develop, structure, organize, maintain, and coordinate faculty support efforts in ways that leverage limited campus resources and diffuse innovations in teaching with technology that align with institutional goals?
- Are we being proactive in efforts to introduce faculty to new software, the capabilities of the Web, and classroom technologies and to assist them with developing their knowledge of and skills with emerging technologies?
- Are we effectively assisting faculty with designing, implementing, and supporting Web-enhanced, Web-centric, and Web-based courses? Are we assisting and collaborating with faculty in the development and implementation of effective models for using technology to enhance teaching and research, ensuring that such models are scalable and sustainable?
- Are we facilitating the delivery of education by providing access to instructional materials and building online learning communities for students any time and anywhere, in a systemic fashion?
- Are we ensuring that both Web and classroom technologies are easy to use and intuitive, that the technologies available to faculty work reliably and well, and that appropriate train-

ing is available for the use of these technologies?
- Are we creating a support structure for faculty such that teaching with technology is an exciting, easy transition and not a burden fraught with difficulties?

No. 6: IT Strategic Planning

There are many good reasons why a university or college should embrace IT strategic planning. Chief among these is providing the necessary future direction and purpose for IT support, especially in periods of growing demand and declining funding. If not effectively planned, these activities certainly risk being unclear, incomplete, or obsolete.

IT strategic planning provides the mechanism for involving the various campus constituency groups in determining and prioritizing IT functions and services enhancements. The challenge for the IT department will be sustaining the momentum of the IT strategic planning process while confronting the day-to-day operational IT mission. Some key IT strategic planning issues include the following:

- What is the campus's vision for teaching, learning, business processes, and related support systems? How well does the campus community understand the stated vision? Is the role of IT clearly defined within that vision and the institutional strategic planning process?
- Is there a succinct, unambiguous institutional mission statement, congruent with the campus vision? Are specific goals and objectives linked to the vision and mission statements, with metrics established to determine whether or not those goals and objectives have been achieved?
- Is there a separate formal IT strategic planning process in place? If so, is it clearly aligned with the institution's strategic planning process? Is there a formalized process for getting the institution's approval of the IT strategic plan?
- Who are the stakeholders in the planning process? How can they and/or their interests be included? Are there established advisory committees

included in the IT strategic planning process?

■ How does the institution's budget process align with the IT strategic planning process? How are priorities resolved to ensure that appropriate funding decisions are made regarding IT investments?

■ Has an assessment been completed to articulate the current IT environment and issues? Have new IT functions and services been identified that are needed to support the institutional vision, mission statement, goals, and objectives? Will critical or new skills be required? What are the major obstacles in achieving the IT goals?

■ Is there a defined process for assessing, maintaining, and modifying the IT strategic plan as needed?

No. 7: Web Services/ Web-based Systems

Web services is a relatively new term used to describe new software standards that allow for integration of different applications as well as the secure exchange of data over the Internet. The term can be misleading, as it is often thought to refer to the myriad of services offered through a Web interface. In fact, Web services refers to a set of standards that enable "conversations" to occur between applications as easily as they occur between Web browsers and servers. These services are available over the Internet or private (intranet) networks, they use a standardized XML messaging system, and they are not tied to any one operating system or programming language. When mature, Web services will shift the focus of the Web from human-centric to application-centric.

We have all faced the frustration that the lack of application integration standards has caused, especially in campus environments where many applications are customized, costly to maintain, and complex to create. We need software integration opportunities that will help integrate core systems with other business functions for improved efficiency and greater information power. Web services hold the promise of accomplishing these efficiencies. Some key considerations follow:

■ Web services are still in the development and refinement stage, particularly as they relate to security standards. Many technical issues still need to be resolved; however, institutions would be wise to anticipate the use of Web services technology as they develop strategic plans.

■ Future plans should include consideration of middleware technologies such as portals, central directory services, and security systems. The centerpiece of the latter will be strong institutional authentication and identity management systems that control access, support single sign-on, manage trust relationships, and protect privacy.

■ At some point, vendors will need to offer a standard approach to data integration, interchange, and interface. Single sign-on and standard authentication with standards-compliant portals, as well as Web services components that are ready for integration into such portals, will become the foundation for future, fully enabled Web services.

■ For now, we should approach new purchases expecting vendors to be increasingly sensitive and responsive to our desire for standard integration and to begin to support this incrementally while working toward full integration.

No. 8: Distributed Learning/ Teaching and Learning Strategies

Distributed learning has been defined as using a wide range of information technologies to provide learning opportunities beyond the bounds of the traditional classroom to facilitate a learner-centered educational model that promotes active learning.[4] As it grows on our campuses, it is being integrated with more traditional learning to create hybrid learning experiences that enrich teaching and learning for both students and faculty. Distributed learning presents new opportunities, issues, and challenges:

■ How can we best provide faculty the support necessary to develop distributed courses and programs or to incorporate distributed learning elements into more traditional learning?

How do we ensure that faculty develop and maintain the IT and information literacy skills necessary to develop quality distributed learning experiences? How do we further the development of learning object repositories such as MERLOT (see <http:// www.merlot. org/Home.po>), and encourage faculty to adopt new teaching strategies using learning objects?

■ How do we ensure that tenure decisions recognize faculty contributions to distributed learning within our institutions? How do we address the workload implications of developing new teaching strategies related to distributed learning?

■ How do we ensure that students have the personal learning skills, time management skills, and technology skills necessary to a successful distributed learning experience?

■ How do we equip classrooms, libraries, residences, and other campus spaces to best accommodate e-learning, especially to create a seamless integrated environment for our students?

■ How do we facilitate collaborative relationships among faculty, instructional designers, librarians, and media specialists to ensure the development of commercial course management systems that are pedagogically sound systems? What are the opportunities and barriers associated with open source development and open architectures for such systems, and how can we ensure interoperability?

■ How can new technologies such as wireless, mobile laptop computing, personal digital assistants (PDAs), video-conferencing, videostreaming, virtual reality, and gaming environments enhance distributed learning?

■ How do we relate educational theory to best practices and learning outcomes for a distributed learning environment? How do we usefully compare traditional classroom learning, distributed learning, and hybrid learning experiences?

■ How do we build an appropriate model to assess different kinds of distributed learning as well as to assess how well course management systems are meeting institutional needs?

No. 9: Enterprise-level Portals

Portals are rapidly becoming a desirable approach to information services management and delivery. They not only provide a gateway to all of an institution's information and services, but also an opportunity to standardize service delivery.

Campuses have been steadily moving information services into the Web environment, sometimes with the help of vendors who deliver Web-ready front-ends to campus systems, other times by building those front-ends themselves. Portals serve some important functions that leverage this work as well as add desirable features by providing a vehicle for

■ the institution to create a brand as well as to offer a self-service environment of quick and easy access to integrated applications;

■ delivering services based on roles (student, faculty, staff, alumni, and so forth), and opportunities for single sign-on and authenticated access;

■ delivering universally used services such as e-mail, campus directories, calendars, discussion forums, digital drop boxes, course management tools, and online registration through a single interface;

■ individuals to personalize and customize views, to access services they use the most (through channels, for example), and to feel like part of a special community; and

■ delivering robust search and indexing features across multiple types and sets of information.

The challenges to successful implementation are numerous, but some of the more significant questions to ask with respect to portals follow:

■ Are you providing the best possible experience to meet your users' needs? Are the modules loading fast enough? How satisfied are your users?

■ If you have implemented a single sign-on process with access based on the user's role, who should be granted access—students, faculty, staff, parents, alumni, corporate partners, friends of the institution?

■ How do you identify opportunities to integrate instructional materials directly

into the portal and increase their use by faculty and students? What type of training is required?

■ What are the pros and cons of build versus buy versus open source approaches? Do you have time to build your own portal? Can you afford the increasing license and maintenance fees of vendor products?

■ How do you resolve the political battles—for example, which services will be available through the portal and when, and which ones will get the prime real estate?

No. 10: Online Student Services

Use of the Internet by citizens and consumers continues to grow as a primary means of interaction with organizations and individuals. Campuses respond by expanding the range and number of online services to accommodate student expectations. Effective implementation of these services requires a strong commitment that is reflected in the institution's strategic goals and priorities. The most effective approaches depend on extensive integration of the various campus systems that provide information and support.

As the types and uses of online services become more numerous and powerful in the broader community, campuses will be challenged to keep pace in providing students with the services they have come to expect and demand. Key questions emerge from these discussions:

■ In the development of such complex, integrated systems, how can campuses ensure that key stakeholders across the organization are appropriately involved? How are the necessary internal and external partnerships developed? How can the process ensure that the systems and services are learner-centered rather than provider-driven?

■ In what ways might the use of a customer relations management (CRM) model be relevant in the campus set-

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ting? What efficiencies could be realized in using a CRM approach to serve students, employees, and alumni?

- How should campuses address issues of equitable access to all students regardless of location, enrollment status, or disability?
- In developing systems that provide convenient and flexible services across functional areas, how are standardization issues addressed? Do planning processes allow for examination of the underlying business systems as opposed to simply automating existing practices? Can a rational strategy for phased implementation be developed?
- Since many learners are served by multiple providers, how might consortial approaches be used in developing online services? Which services may be best coordinated and shared across campuses? In light of the new ways of reaching and serving students, what new components might need to be added to the list of student services currently provided?
- While progress is evident in the administrative core areas of registration, admission, and financial aid, how can institutions expand online services in advisement, counseling, and tutoring? How can online services be used to build community? *e*

Acknowledgments

Endnotes

1. The Current Issues Survey is monitored by the EDUCAUSE Current Issues Committee (see the sidebar), whose members review and recommend the set of issues to be presented each year.
2. See <http://teleeducation.nb.ca/no significantdifference/>.
3. *The Promise and Performance of Enterprise Systems for Higher Education* is an ECAR research report published in 2002. It can be purchased through the ECAR Web site, <http://www.educause.edu/ecar>.
4. This definition is derived from the California State University Center for Distributed Learning (see <http://www.cdl.edu/html/dist.html>). See also the wealth of information on this topic at the NLII Key Themes Web site at <http://www.educause.edu/nlii/keythemes/>.

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