Supporting E-Learning in Higher Education

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Research Study from the EDUCAUSE Center for Applied Research
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Supporting E-Learning in Higher Education
EDUCAUSE is a nonprofit association whose mission is to advance higher education by promoting the intelligent use of information technology.

The mission of the EDUCAUSE Center for Applied Research is to foster better decision making by conducting and disseminating research and analysis about the role and implications of information technology in higher education. ECAR will systematically address many of the challenges brought more sharply into focus by information technologies.

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Each year, EDUCAUSE surveys its members to ascertain one perspective on higher education’s information technology (IT) priorities. Across all Carnegie classifications and all sizes of colleges and universities, survey respondents identified faculty development support and training as one of the top 10 issues most important to resolve for the institution’s strategic success.

As IT becomes more robust and easier to use, it increasingly permeates academic activities in higher education. Course management systems let instructors easily integrate technology into their instruction. Online communication and information access expand a course’s range to wherever and whenever an instructor or student logs on. Higher network bandwidth provides a quick and efficient conduit to accomplish these activities.

As an increasing number of institutions adopt e-learning strategies, their successes depend not only on the availability of technology but also on the extent to which faculty and students are supported as they explore and develop innovative ways to integrate technology into the learning experience. Pedagogical practices must be adapted, technical proficiency becomes more important, and a reliable and robust technical infrastructure must be maintained in order to use e-learning effectively. These demands translate into a host of new instructor and student support requirements that institutions must address.

To help members understand the breadth and depth of the support issue, the EDUCAUSE Center for Applied Research (ECAR) conducted research to learn about the evolving student and instructor support requirements for online distance-learning courses, hybrid courses, and traditional courses that leverage technology. Specifically, we intended to:
- ascertain current instructor and student support requirements;
- discover effective e-learning support practices for infrastructure, training, and course/curriculum development; and
- examine longer-term e-learning support challenges.

This research seeks to highlight effective e-learning resources and support practices at selected institutions. We focused primarily on centrally administered departments that offer e-learning resources across the entire institution, including central IT departments, instructional technology departments, and central faculty resource centers. The research examines the issues from support providers’ and users’ perspectives. From the provider perspective, ECAR examines central resource
organization structures, resource availability and effective practices, and the challenges presented by e-learning’s increasing popularity. From the user perspective, ECAR examines the e-learning course creation or adaptation process, challenges faced, and the effectiveness of support received for the process. The research also examines instructors’ and students’ technical proficiencies and support requirements.

**Important Contributions**

*Supporting E-Learning in Higher Education* is the third ECAR research study of 2003. This study is the result of 10 months of collaborative research conducted by ECAR and IDC, a provider of market intelligence and industry analysis. Richard Katz and I provided overall direction to the project, with important contributions from ECAR Fellows Robert Albrecht, Paula King, and Robert Kvavik. The IDC team was led by Paul Arabasz, director of consulting for IDC, with significant participation from Judy Pirani, president of Sheep Pond Associates. Dave Fawcett, senior consultant to IDC, played an important role as contributing author in the major study and is the primary author of several case studies. The work of the IDC team was augmented by numerous subject matter experts who provided significant leadership and thoughtful insight to the development of the online survey. A very special thanks to Carole Barone, vice president of EDUCAUSE; Susan Metros, deputy chief information officer at The Ohio State University; Kathleen Cristoph, director of DoIT, Academic Technology Solutions, University of Wisconsin–Madison; and Ruth Sabean, assistant provost, educational technology, University of California, Los Angeles, for their contributions.

Finally, we could not have conducted this study without the enormous goodwill and propensity to share that characterize our EDUCAUSE membership. Nearly 300 colleges and universities participated in the online survey in October 2002, and more than 50 individuals participated in telephone interviews and campus visits.

This study should be read in conjunction with other ECAR research bulletins and case studies on the topic of e-learning and instructional technologies in higher education. Higher education is fortunate to enjoy a professional IT community possessed of a great generosity of spirit and commitment to the common good. ECAR benefited enormously from this generosity during phone interviews and visits to numerous campuses while producing case studies that illustrate insights, techniques, and practices to be shared and emulated. This sharing of successes and failures represents an important source of experience for the reader. The complete list of individuals who generously gave their time and provided insights can be found in the Appendix of this study. We are indebted to each one of these individuals.

In particular, we would like to thank Stephen Harmon, director of instructional technology, College of Education, Georgia State University; Joel L. Hartman, vice provost for Information Technologies & Resources, University of Central Florida; David Baird, director, Innovative Technology Solutions for Learning, Colgate University; Paul Faber, dean of arts and sciences, Fort Hays State University; David DiBiase, head of the E-Education Institute, College of Earth and Mineral Sciences, The Pennsylvania State University; and John Harwood, senior director, Teaching and Learning with Technology, The Pennsylvania State University for their enthusiastic help and commitment to making e-learning a pervasive part of their institutions’ learning experience.
ECAR Background

ECAR was launched on January 1, 2002, to create a body of research and analysis on important issues at the intersection of higher education and IT. ECAR is fulfilling its mission through a program of symposia and through the publication of

- biweekly research bulletins oriented to senior campus functional executives;
- detailed studies designed to identify trends, directions, and practices in an analytically robust fashion; and
- case studies designed to showcase campus activities and highlight effective practices, lessons learned, and other insights from the practical experience of campus leaders.

Since ECAR’s inception, two symposia have been held and close to 60 research publications have been issued. Its success as a research center and business enterprise depends in large measure on our reception with EDUCAUSE members and sponsors. Our members, as always, have shown great confidence in us and have shown their support by subscribing to ECAR despite a difficult economic climate for higher education in 2003. These members understand that particularly in tough times it is wise to invest in good research and analysis. ECAR has been especially fortunate to enjoy the support of an unparalleled group of sponsors. While Cap Gemini Ernst & Young, Datatel, Hewlett-Packard, Microsoft, PeopleSoft, SCT, and WebCT provide significant financial support to ECAR, they are truly more than financial sponsors. These companies believe that impartial applied research on critical issues in higher education generates a more informed marketplace of both buyers and sellers. These firms are committed to understanding their customers and helping them make the most effective decisions related to their technologies and products. Most impressively, these sponsors understand deeply and respect the importance of intellectual independence in the marketplace of fast-moving ideas.

Finally, as we have toiled in this field, other ECAR fellows are managing other elements of the ECAR program. Under the energetic leadership of Richard Katz, ECAR Fellows Robert Albrecht, Judith Caruso, Robert Kvavik, Dewitt Latimer, James Penrod, Gail Salaway, and Toby Sitko have proven to be remarkable colleagues. The EDUCAUSE staff under Brian Hawkins’ leadership is unfailingly superb and cooperative. Without their help, this study would not have been possible. EDUCAUSE is an enterprise that takes pride in excellence and strives for stellar performance. It is an honor to be part of such a dynamic organization.

Mary Beth (O’Connor) Baker
ECAR Senior Fellow

Endnote

As information technology (IT) becomes more robust and easier to use, it increasingly permeates academic activities in higher education. Course management systems help instructors integrate technology into their instruction. Online communication and information access expands a course’s range to wherever and whenever an instructor or student logs on. Higher network bandwidth provides a quick and efficient conduit to accomplish these activities.

The use of technology in education, commonly defined as e-learning, has become a standard component in many courses. Technology applications are not limited to the classroom—they are also replacing some classroom sessions with virtual sessions or fully replacing classroom courses with online courses.

In October 2002, IDC and ECAR surveyed 274 institutions that use e-learning. Most of the respondents (86 percent) said they have implemented courses that use technology outside the classroom, and all have integrated technology into classroom-based courses. Eighty percent of the respondents said they offer hybrid courses that complement classroom sessions with virtual sessions, and 71 percent said they offer fully online courses.

Key E-Learning Issues

As institutions adopt e-learning, some important new issues arise:
- Institutions must provide an adequate and reliable technical infrastructure to support e-learning activities.
- Instructors and students must possess the technical skills to use e-learning tools.
- Instructors must redesign their courses to incorporate e-learning effectively into their pedagogy.

But as e-learning courses multiply, institutions question whether they can provide the necessary support resources to address these issues. More than 70 percent of survey respondents indicated that growth in instructors’ support demands will outpace their institution’s ability to provide the needed support. Sixty-five percent cited similar concerns for supporting students’ e-learning activities. Respondents stated that instructor training is a critical element in the success of e-learning courses.

Clearly, then, the support issue is becoming critical to the continued growth and success of e-learning in higher education. To help members understand this issue, the EDUCAUSE Center for Applied Research (ECAR) conducted this study of e-learning support practices to
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- ascertain current instructor and student support requirements;
- discover effective e-learning support practices for infrastructure, training, and course/curriculum development; and
- examine longer-term e-learning support challenges.

This research seeks to highlight effective e-learning resources and support practices at selected institutions. We focused primarily on centrally administered departments that offer e-learning resources across the entire institution, including central IT departments, instructional technology departments, and central faculty resource centers. Some respondents are from noncentral departments, where they represent a leading or significant source of e-learning and support at their institutions. While this research doesn’t intend to provide a definitive assessment on the overall state of e-learning in higher education, it does examine the state of e-learning at the responding institutions to shed light on the support requirements. The responding institutions do not exemplify the state of e-learning at all higher education institutions.

The term “e-learning” has many connotations and forms. In this study, ECAR focuses on three types of e-learning courses:

- **Online distance-learning courses**: The instructor conducts class sessions online—not via mail or telephone. This usually requires no face-to-face meetings between students and instructor either in the classroom or via video during the course.
- **Traditional courses supplemented with technology**: The instructor teaches all sessions in the classroom but incorporates technology in some or all classes (using PowerPoint, Web-based activities, multimedia simulations, online testing, and so on).
- **Hybrid courses**: The instructor combines elements of online distance-learning courses and traditional courses to replace some classroom sessions with virtual sessions.

For this study, the umbrella term “e-learning course” refers to all three course types.

**Research Methodology**

To accomplish this research, ECAR and IDC, a provider of technology intelligence and industry analysis, conducted a three-phase quantitative and qualitative research study. In the survey phase, 274 EDUCAUSE members that offer e-learning courses responded to an online survey about their e-learning activities and challenges, current e-learning resources, and the support infrastructure that provides these resources. ECAR and IDC supplemented these data with effective e-learning resource practices and strategies garnered from interviews with multiple sources at 19 higher education institutions that have illustrative e-learning programs. ECAR also produced case studies, published separately, that provide an in-depth look at how six leading e-learning institutions support e-learning, including lessons learned.

ECAR is pleased to present the findings and conclusions of this important research in this study.

**Diverse Factors Drive E-Learning Adoption**

Institutions interviewed for this research cited various institutional, user, and market drivers as spurring the adoption of e-learning. Some institutions designate e-learning as an institutional objective, for example, to support their charter of outreach, reach new markets in an area of specialization, or enhance the educational
process. Faculty interest—to improve teaching methods in general, to make courses more interesting for students, or to keep up-to-date in their academic field—spurs e-learning adoption at others. Institutions might use e-learning to help students fit learning into their increasingly hectic schedules and develop required technical skills for their professional development. At some institutions, online distance-learning courses have evolved from video-oriented courses. Some institutions reported the use of hybrid courses to alleviate overcrowded classrooms. For many institutions, e-learning is part of higher education’s evolution, and course management systems’ ease of use has encouraged e-learning adoption.

Several of these factors can be at work in any given institution, driving adoption of multiple e-learning applications. All survey respondents have integrated technology into classroom-based courses, and a high percentage of doctoral, master’s, and associate institutions reported they have also implemented hybrid or online distance-learning courses, or both (see Figure 1-1).

Survey respondents from associate institutions exhibit aggressive adoption of online distance courses. Over half adopted online distance-learning courses before 1999; at least one in four reported greater than 25 percent growth in online distance course offerings in academic year (AY) 2001–2002; and more than 84 percent anticipate growth in course offerings in AY 2002–2003. Associate institutions generally use online distance-learning courses to let busy adult students take classes when convenient.

Baccalaureate institutions approach online distance-learning courses more cautiously. Only one-quarter of baccalaureate respondents reported online distance-learning course activity. About three-quarters reported slow growth in

![Figure 1-1. Institutions Offering E-Learning Courses, by Carnegie Classification Base: Total Respondents (N = 274)](image)
courses (less than 10 percent) in AY 2001–2002, and only half anticipate growth in AY 2002–2003. Indeed, baccalaureate institutions may regard online distance learning as antithetical to the personalized education experience they promote.

Online distance-learning courses generally got an earlier start than hybrid courses, but hybrid courses have overtaken them in the past few years. Hybrid courses are now offered by a higher percentage of institutions than online courses (80 percent versus 71 percent), represent a higher percentage of overall courses offered in AY 2001–2002 (11 percent versus 5 percent), and enroll more of the institutions’ students (13 percent versus 7.5 percent). While recent growth has favored hybrid courses, both have similar anticipated growth profiles, and most respondents (about 70 percent) offering each course type expect some growth in their numbers in AY 2002–2003.

**Instructor E-Learning Challenges**

People we interviewed discussed the e-learning challenges that instructors face, including the time invested to create, teach, and maintain an e-learning course. They also noted student technical infrastructure limitations such as lack of bandwidth and computer hardware limitations.

Penn State’s John Harwood, senior director of teaching and learning with technology, summarized many instructors’ misperception that creating an e-learning course is as easy as bringing in their notes in Microsoft Word, having the instructional designer turn the handle like an organ grinder, and boom—out comes a great course. Interviewees pointed out several time-related challenges, including the time required to write rather than speak thoughts and to build interactivity into a course, as well as ongoing course maintenance (for example, updating Web links).

Time management also becomes essential when teaching an e-learning course. Instructors risk getting overwhelmed by students’ communications, especially from the one-to-one nature of instructor-student interaction in an online distance-learning course. As a result, providing adequate feedback can be a problem. For more effective time management, David DiBiase, head of Penn State’s E-Education Institute at the College of Earth and Mineral Sciences, recommends that instructors delegate student communication to teaching assistants. As online course enrollment grows, instructors should add assistants to manage the growing volume of e-mail; they do not need to answer every e-mail personally.

Taking advantage of e-learning technologies presents special challenges. When instructors teach an e-learning class, they must not only prepare for the class itself, but they must also develop contingency plans in case of technical problems. Paul Faber, dean of arts and sciences at Fort Hays State University, believes e-learning’s impact on the instructional process is just beginning, and offers an analogy to the development of movies. At first, directors filmed stage productions as seen by the audience. Over time, they added dimensions that are impossible with stage productions: close-ups, special effects, scene cutting, and so on.

“I think we are in a similar transition with e-learning,” Faber states. “The first use of the technology is to take a classroom and make it available at a distance [for online courses]. As time goes on, we learn to use the medium for its own strengths, to do things we never could accomplish in the traditional classroom. We are in the process
of learning how to move beyond making the classroom available at a distance and to integrate technology with learning theory.”

When we analyze interviewees’ comments, an e-learning course adaptation path emerges. Instructors start slowly, incorporating a simple course management system (CMS) tool or two into their courses. As they gain confidence, they begin to consider the pedagogical impact on their courses—how e-learning can enhance their courses in ways not possible in the classroom alone.

Instructors must consider students’ technical limitations—bandwidth and computer hardware, for example—when designing online distance-learning courses. Some might be tempted to add multimedia components or complex Web pages to courses, but students might not have the network access to use them effectively. To serve its global online student population, the University of Phoenix designs its online courses with the dial-up user in mind. Most courses use text-based materials and require extensive online text-based discussions. The institution shies away from any high-bandwidth material or activity.

Student E-Learning Challenges

Students encounter their own problems when taking an e-learning course. For example, Winston-Salem State University said many of its e-learning students lack confidence and experience with computers. Not all students, even those comfortable with using a PC for e-mail, Web browsing, or playing games, have the necessary skills to fully succeed in e-learning courses. They may lack skills in commonly used applications like Microsoft Word, Excel, or PowerPoint. Karen Harpp of Colgate University finds that she doesn’t have to teach them “how to use the technology,” but she does have to teach them “how to use it well.” Harpp cites student PowerPoint presentations that are “fabulously complex—students know how to scan, how to import . . . but the slides can be nasty,” containing so much content that she cannot read them.

Also, students do not have equal access to computing capability, which creates something of a digital divide among them. The access level differs for students who must use the computer lab versus those who own a laptop or desktop PC and can work at any hour in their rooms. Not every computer lab offers the same standards of technology.

Time management skills and self-motivation also influence student performance in e-learning classes, which are as time-consuming as traditional classes. Because online distance-learning courses in particular lack the structured environment that a classroom-based course provides to keep students focused, self-discipline and motivation are essential.

These issues also challenge institutions to make e-learning successful, compelling them to find ways to train students in the use of technology, ensure satisfactory computing access, and be sure that students understand e-learning’s time requirements.

A Web of Interconnected Resources

Given the challenges e-learning courses pose, especially for instructors, providing adequate support for e-learning activities is a complex proposition. Producing and teaching an e-learning course effectively entails a web of many resources, each facet or strand of which must be sound to ensure that the course succeeds as a whole. We can categorize the support resources required for e-learning into four areas, discussed in turn below:
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Technical Infrastructure, Training, Course and Curriculum Development, and Help and Assistance.

Infrastructure Resources

An institution’s CMS can make or break e-learning adoption. An easy-to-use CMS lets instructors adopt e-learning gradually by initially posting course materials online or adding a threaded discussion, for example. As instructors gain confidence with the e-learning tools, they can evolve their courses. CMS standardization provides a common platform on which to distribute knowledge and to replicate or extend effective standardized processes. Connie Bauer of Marquette University believes that standardized software helps spread knowledge within the instructor community in general. Pace University reported that developing a CMS template for each course encouraged instructors to post their specific course materials and take the first steps into e-learning.

Several institutions noted that as more instructors adopted technology in their classrooms, demand grew for standard-equipped and reliable technology-enabled classrooms. Rising e-learning course enrollment pushes student demand for computer access, resulting in overcrowded computer labs.

Continual planning is essential for keeping infrastructure up-to-date while achieving high return on investment. For example, institutions must not only provide adequate computer lab facilities but also equip them for multimedia applications as students’ needs evolve. Barbara Hoffman, University of Arizona, sees the growing demand for high-end multimedia tools as an emerging problem because students are graduating from high school expecting these tools. Pace addresses this issue by upgrading computer lab PCs and recycling the old ones to campus departments that do not need high-end computing capability.

Training Resources

Most institutions offer a menu of training resources for instructors, such as one-on-one consultation, classroom training sessions, and online tools, to address varying training needs and learning styles. While one-on-one training offers personalized attention, resource constraints dictate the use of at least some classroom training. Classes reach a broader audience and range from scheduled sessions on specific topics to more systematic training programs. Classes can help instructors achieve technical proficiency and provide a forum to exchange ideas. Institutions can personalize the classroom experience by augmenting teacher-led sessions with staff members who answer specific questions and address issues on the individual attendee’s desktop computer.

Licensed online training resources are gaining popularity for several reasons:

- They provide just-in-time training to supplement structured training sessions, giving instructors scheduling flexibility.
- They offer a wider variety of training courses than many institutions could provide on their own.
- If appropriately licensed, they can enable institutions to serve both instructors and students.

Other popular training techniques include short, focused training sessions. Some institutions hold brown-bag lunches to discuss a specific topic, or they schedule weekly drop-in sessions to let faculty discuss specific technical or pedagogical problems on-the-fly. Others strive to train faculty about course management systems in a practical context to provide training in “an operational setting.”
Course Development Resources

E-learning course creation is complex and time-consuming because instructors must reevaluate their courses and choose the most appropriate technical and pedagogical tools for e-learning applications. To facilitate the course development process, institutions recommend easing instructors into e-learning by gradually incorporating appropriate e-learning tools. Some institutions partner instructors and instructional technologists in formal e-learning course development programs that can last from six to 18 months.

Steve Harmon, director of instructional technology in the College of Education at Georgia State University, stated that the online learning technologies an institution provides can greatly influence teaching, especially for faculty members with no background in instructional technology. He cites the need to support a wide variety of instructional techniques to suit instructor preferences and content requirements.

Support and Help Resources

Ranging from in-class software crashes to the simple how-to computer question, the scope and complexity of support grow as e-learning gains popularity on campus. Add the need for uninterrupted access to course materials and around-the-clock support for e-learning students and faculty, and support needs can easily strain an institution’s resources. Many of the institutions interviewed use the same staff to support all forms of e-learning (online distance, hybrid, and traditional courses with technology). Often the number of online distance-learning or hybrid courses is too small to justify different staff for each e-learning mode. The institution itself may be small or very centralized. Some institutions do segregate most resources to address either instructor or student needs.

Online training or help desk services, however, always service both instructors and students.

Today, about half of the survey respondents use staff members to handle e-learning support needs along with their other duties not related to e-learning. In two years, however, some institutions might move to more formalized staffing arrangements. Survey respondents expressed a preference for staff dedicated to e-learning support, often as part of a dedicated e-learning support group.

One tricky issue for the support staff is the need for 24 x 7 support. Instructors and students work on their courses days, nights, and weekends, so institutions must grapple with the amount of support to provide. Almost three-quarters of online survey respondents said supporting instructors’ needs posed a significant challenge. However, most institutions interviewed for the qualitative research phase did not cite this as a significant issue. They consider the CMS a mission-critical system, so they have already put the necessary support resources into place. These institutions may indicate the solution for others: If they consider e-learning vital, they must provide adequate staff for 24 x 7 support.

Long-Term E-Learning Support Strategies

E-learning’s growing presence in higher education will continue to accelerate support requirements. Institutions should consider the following strategies when planning how to meet future e-learning support needs.

Make CMS Training a Priority

During interviews, people at several institutions identified their CMS as a means to facilitate e-learning adoption. As noted above, it lets instructors experiment with e-learning and provides a standard platform for sharing
information and processes, thereby fostering the success of CMS courses. Once instructors decide to try their institution’s CMS, the future of e-learning may rest on whether they have a good or bad experience.

If instructors are not trained to use their CMS proficiently, they might be discouraged from adopting e-learning. Indeed, ECAR’s recent study, *Faculty Use of Course Management Systems* by Glenda Morgan, also discovered that the “training of faculty and instructional staff plays a key role in successful CMS adoption and use. Twenty-nine percent of the faculty and instructional staff surveyed cited training in CMS use as an important factor in their initial adoption or expanded use of a CMS. The most successful training offered is that delivered as close to the faculty as possible, on a small scale and including real examples rather than abstract or dummy courses.”

Evaluate and Adapt Support Resources to Meet Evolving Needs

Institutions that strive to create the optimal mix of e-learning support resources discover that this goal is elusive. Once instructors understand the basic CMS features, they quickly want to apply multimedia and other advanced technologies. Institutions must therefore constantly adapt their resources to meet evolving support requirements. Strategies include:

- Offering short focus sessions and online training to augment classroom training. Georgia State, for example, implemented online training resources in response to declining attendance in classroom-based training. As faculty experienced the power of e-learning, they preferred that medium to classroom training sessions.

- Adapting staffing to meet evolving requirements. Institutions reported that they must hire more instructional designers to meet growing demand.

- Continually evolving training course topics and design. John Moore described how Virginia Tech uses training and workshops as channels to help introduce faculty to new ideas, new interventions, and innovations. In response to evolving faculty needs, Virginia Tech has expanded from “one size fits all” to 12 different training tracks at its Faculty Development Institute.

Set Time Investment Expectations, Offer Time Management Training

Institutions interviewed emphasized instructors’ underestimation of the amount of time needed to create, adapt, and teach an e-learning course. Institutions should set instructors’ expectations at the beginning of the course design process to help them plan accordingly—for example, they might postpone other academic activities or get funding to hire help. The novice student, too, needs to better understand the time required to take an e-learning course.

We found it perplexing that despite vocal opinions about e-learning’s immense time investment, institutions did not make it a priority to offer time management resources. St. Philip’s College is one of the few exceptions, offering a series of self-diagnostic tools to help students determine whether they possess the right characteristics to complete an e-learning course successfully. Other resources—a Web page, informal workshops, or an orientation session at the class’s outset to outline time management strategies and tips—could help instructors and students address this problem.
Scale Resources to Meet Growing Support Demands

As e-learning support requests rise, they tax current resources. However, in this period of tight fiscal resources, institutions might not have the funds to expand resources accordingly. More than 70 percent of the institutions surveyed anticipate that funding will not keep up with growing e-learning support needs.

Institutions interviewed shared their resource scaling strategies. Some outlined straightforward actions—for example, turn every support request into an opportunity to promote technical self-sufficiency, or incorporate easy-to-use e-learning support tools. Institutions are also exploring other ideas to address growing support needs.

*Sharing costs among institutions.* Using regional or system-wide consortium-style licensing agreements for course management systems, especially when upgrading to an enterprise version, will let several institutions share rapidly rising costs.

*Leveraging resources in consortium, system, or open-source agreements.* Georgia State University is working with Georgia Perimeter College (a Georgia State feeder college) to develop objects for a commonly offered WebCT course. “We have already developed the course,” stated Carolyn Gard of Georgia State. “Now we’re reviewing the different modules that both schools plan to offer to create designs that will benefit both institutions.” Georgia’s university system is developing online versions of the core courses offered across the university system. “It gives us a set of fully developed online courses,” said Gard, who envisions more sharing at the state level so that support staff can be reallocated to fulfill other needs.

*Developing common processes and tools to achieve economies of scale.* The University of Central Florida (UCF) takes a systems approach and uses scalable processes. According to Joel Hartman, vice provost for information technologies and resources, UCF uses a heavily systematized process to develop and maintain course systems. Pace University’s James Stenerson, executive director of the Center for Instructional Technologies, agrees with this strategy. “You need to take a ‘course in the box’ kind of approach that faculty members can use to develop a course more quickly, but one that can be easily personalized,” Stenerson said. The University of Phoenix uses a top-down approach to its online distance-learning course development. Department heads and deans create the course framework and select its content, instructional designers create the course elements, and the instructor receives the course materials to teach.

Implement Locally and Cultivate Grassroots Support

Two ideas emerged for bringing some support closer to the instructors. First, institutions can augment central resources at the department level, especially by adding locally based instructional designers to fulfill department-specific pedagogical needs. Penn State’s DiBiase would like to decentralize instructional expertise to the academic departments by assigning one instructional design specialist per department, located nearby and familiar with the faculty members and their specialties. The consensus at Penn State, he said, is that this will encourage instructors to adopt e-learning.

Another potentially important resource that emerged from the institution interviews is grassroots support. Whether for technical assistance, pedagogical insight, or a reference suggestion, instructors frequently solicit help from colleagues with advanced technical skills or e-learning experience. Instructors can more easily consult their colleagues down the hall than locate the
appropriate institutional resource. Additionally, the local expert might have personal knowledge about the instructor’s work and be able to frame responses in a more relevant context, suggesting subject-specific information and pedagogical resources to use. Other resources institutions can employ to promote local or grassroots interaction include online faculty “lounges” or bulletin boards, or department-sponsored instructor study groups. As e-learning support demand rises, a strong grassroots support network can help off-load the central support load. To implement these ideas, central support departments should work with department heads to have an early user or core of early users in each department trained in the institution’s CMS.

**Gain Administrative Support and Create Pro-E-Learning Policies**

Several institutions emphasized the importance of gaining administrative leadership’s backing to create a cohesive institutional vision for e-learning and foster adoption. Administrative backing fosters the cultural change that accompanies e-learning.

Concrete actions are important, too. Instructors may wish to experiment with e-learning, but the required time investment could dissuade them from doing so, especially if the administrative climate does not recognize or reward instructors’ participation. Formal encouragements for faculty e-learning buy-in are important, especially if they include incentives related to promotion and tenure. Marquette University’s Connie Bauer, associate professor of marketing, offers a more concrete assessment of the difficulty instructors face in adopting e-learning: “Since research publications are still the major way to be rewarded and/or promoted, faculty members focus their time and energy there.” Bauer does not see this changing until the reward system does.

**Conclusion**

E-learning support is critical yet complex; it raises administrative, technical, and pedagogical issues. Its impact spans institutional constituencies: instructors, students, and staff. It requires a coordinated, institutional effort to succeed. Institutions need top-down vision and actions to set a positive environment that will foster e-learning development. They must also provide bottom-up support to promote an ad hoc, grassroots network of knowledgeable instructors. In between resides a web of centrally administered resources that must evolve uniquely to reflect each institution’s culture, academic programs, and characteristics.

Even with the best plans for meeting growing support needs, institutions must adequately fund support efforts or face the prospect of limited or no e-learning growth. This requires that institutions clearly determine their vision and objectives for e-learning and how they will support them.

**Endnotes**

1. “Technology” as used in this study refers to information technology and communications.
3. EDUCAUSE is an international, nonprofit association whose mission is to help shape and enable transformational change in higher education through the introduction, use, and management of information resources and technologies in teaching, learning, scholarship, research, and institutional management. The EDUCAUSE Center for Applied Research (ECAR) fosters informed decision making by conducting and disseminating research and analysis about the role and implications of information technology in higher education, <http://www.educause.edu/ECAR/>.
At many institutions, students’ academic experiences have changed in just a few years. Wireless networks, course management systems, multimedia, and other technologies add richness and complexity to the learning experience. Instructors and students can use a mixture of Web sites, multimedia, and traditional textbooks as learning tools. Course discussions can occur in a classroom, in a chat room, or via videoconference. Class time is now anytime, because instructors and students communicate, complete or review assignments, or access course information online at all hours.

Research Goals

While technologies offer many new learning possibilities, they also present new challenges. Instructors must adapt pedagogy, technical proficiency becomes vital, and effective e-learning requires a reliable and robust technical infrastructure. This translates into a host of new instructor and student support requirements that institutions must address. Many in higher education feel that these new demands will outstrip available resources (see Figure 2-1).

To help institutions manage this issue, the EDUCAUSE Center for Applied Research
(ECAR) and IDC, a provider of technology intelligence and industry analysis, investigated current e-learning activity in higher education to
- ascertain current instructor and student support requirements;
- discover effective practices in the areas of e-learning infrastructure, training, course/curriculum development, and support/help; and
- examine longer-term e-learning support challenges.

E-Learning Definitions
The term “e-learning” has many connotations and forms. This study focuses on three e-learning course types.
- **Online distance-learning courses**: The instructor conducts class sessions online—not via mail or telephone. This usually requires no face-to-face meetings between students and instructor either in the classroom or via video during the course. (Some instructors do require a face-to-face orientation meeting before course commencement.)
- **Traditional courses supplemented with technology**: The instructor teaches all sessions in the classroom but incorporates technology in some or all classes. Technologies might include PowerPoint, Web-based activities, multimedia simulations of key concepts, virtual labs, and online testing.
- **Hybrid courses**: The instructor combines the elements of online distance-learning courses and traditional courses to replace some classroom sessions with virtual sessions, online forums, or Web-based activities. These courses are also referred to as blended courses.

For this study, we use the umbrella term “e-learning course” to refer to all three course types.

### Research Scope
This study focuses primarily on institution-wide or central e-learning support practices. The term “central” refers to the combination of centrally administered departments and organizations that offer e-learning technical infrastructure, training, curriculum and course development, and support resources across the entire institution. Examples include central information technology (IT) departments, instructional technology departments, and central faculty resource centers.

This study examines both instructor and student e-learning support requirements. The term “instructor” includes an institution’s entire spectrum of teaching personnel. The quantitative research addressed instructor and student needs equally. The results indicate that institutions identify instructors as the greater support challenge. Therefore, the focus of the qualitative research shifted to emphasize instructor requirements.

This study intends not to provide a definitive assessment on the state of e-learning in higher education but to highlight effective e-learning resources and support practices at a sample of institutions. To accomplish this, ECAR and IDC conducted an online survey of the EDUCAUSE membership and overlaid these data with effective e-learning resource practices and strategies garnered from in-depth interviews with representatives of higher education institutions that have illustrative e-learning programs.

### Study Contents
The remainder of the study is structured as follows:
- **Chapter 3: Methodology and Participant Demographics** details the research scope and process.
- **Chapter 4: An Overview of E-Learning Activity** looks at the extent of current online distance-learning, hybrid, and technology-
in-the-classroom course activities at the institutions participating in the online survey.

Chapter 5: Drivers Behind E-Learning Initiatives examines the forces that have influenced e-learning development.

Chapter 6: Impact and Challenges of E-Learning focuses on user requirements and examines the challenges that arise when instructors and students teach or take an e-learning course.

Chapter 7: Central Support Providers for E-Learning examines the web of resources required to address equipment and technical infrastructure issues, ensure technical proficiency, develop or transform a course into an e-learning course, and assist while teaching or taking a course.

Chapter 8: Institutional E-Learning Support Practices illustrates select institutional strategies to create an optimal mix of infrastructure, training, course/curriculum development, and assistance resources.

Chapter 9: Challenges to E-Learning Support discusses how institutions must adapt resource offerings as instructors’ technical proficiencies rise and the penetration of e-learning course offerings grows.

Chapter 10: Lessons Learned, Trends and Issues, and Conclusions summarizes key findings and lessons learned from participating institutions, key trends in e-learning, and general conclusions on this research.
Supporting E-Learning in Higher Education
Volume 3, 2003

The EDUCAUSE Center for Applied Research (ECAR) and IDC conducted research to learn about the evolving student and instructor support requirements for online distance-learning courses, hybrid courses, and traditional courses that leverage technology. The research considers the issue from both the support provider and support user perspectives. From the provider perspective, ECAR examines central resource organization structures, resource availability and effective practices, and the challenges presented by e-learning’s increasing popularity. From the user perspective, ECAR examines the e-learning course creation or adaptation process, challenges faced, and the effectiveness of support received for the process. The research also examines instructors’ and students’ technical proficiencies and support requirements.

Overview of Study Methodology
This research proceeded in three phases:
- **quantitative research**, through an online survey of ECAR member institutions that have implemented e-learning;
- **qualitative research**, through in-depth telephone interviews with a sample of EDUCAUSE member institutions; and
- **field research**, using case studies of selected institutions.

In phase one, ECAR conducted an online survey of the EDUCAUSE membership to develop a baseline on the state of e-learning courses in higher education and their central support activities. With input from a small group of EDUCAUSE members, IDC and ECAR collaborated in developing the survey questionnaire. The general topics of the survey included:
- online distance-learning and hybrid course offerings, and student and faculty participation;
- student and instructor technical proficiency, e-learning activities, and support requirements;
- availability of instructor training and technical, course/curriculum, and support resources;
- support resource infrastructure; and
- current and future challenges to meeting support requirements.

ECAR received 274 valid responses to the survey, and IDC analyzed the survey results by several parameters:
- Carnegie classification (doctoral, master’s, baccalaureate, and associate institutions);
- private and public institutions; and
- institution size.

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We designed the second-phase interviews to drill down into the “whys” and “hows” of central-resource support models for e-learning. We recruited interview candidates from a group of willing respondents from the initial survey and on the basis of recommendations from EDUCAUSE staff and an ad hoc advisory committee comprising EDUCAUSE members involved in e-learning. We used several criteria to select candidates, including reputation as an e-learning leader, percentage of hybrid or online course offerings, and degree of faculty and student involvement in e-learning. During January and February 2003, ECAR invited 23 candidates to participate in qualitative interviews, and 19 institutions accepted the invitation.

ECAR and IDC created interview guides to solicit in-depth opinions on the issues raised in the survey research. With each institution, IDC and ECAR analysts conducted telephone interviews with support provider representatives (such as a central IT support manager, an instructional technology manager, or a representative from the institution’s faculty resource center) and with support user representatives (such as the academic senate chair of the instructional technology committee or an appropriate dean or department chairperson).

For the case study field research, ECAR and IDC chose six institutions from among the qualitative research participants and other institutions that have significant e-learning initiatives or have implemented noteworthy central e-learning support models. The goal of the case studies is to gain a deeper understanding of the various central e-learning support models and, by extension, what has worked well and what needs improvement. Institutions profiled in the case studies include:

- Colgate University,
- St. Philip’s College,
- the University of Central Florida,
- the University of Phoenix,
- the University of Southern California, and
- Virginia Polytechnic Institute and State University.

Although ECAR is publishing these case studies separately, this study reflects many of their key findings.

**Characteristics of Online Survey Respondents**

ECAR received responses to the online survey from 18 percent of the EDUCAUSE membership base (Table 3-1). Master’s institutions make up the largest portion of survey respondents (29 percent), though doctoral institutions had the highest rate of participation (25 percent).

<table>
<thead>
<tr>
<th>Carnegie Category</th>
<th>EDUCAUSE Members</th>
<th>Respondents</th>
<th>Percentage of Members</th>
<th>Percentage of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral</td>
<td>241</td>
<td>61</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>Master’s</td>
<td>404</td>
<td>80</td>
<td>20</td>
<td>29</td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>286</td>
<td>52</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>Associate</td>
<td>308</td>
<td>43</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Other (Canada and U.S. Other)</td>
<td>280</td>
<td>38</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>1,519</td>
<td>274</td>
<td>18</td>
<td>100</td>
</tr>
</tbody>
</table>
Professional institutions (art, business, medical/health, and engineering), tribal institutions, and Canadian institutions constitute the “Other” category. The majority of survey respondents represent smaller institutions, of which 56 percent have fewer than 5,000 FTEs (Figure 3-1).

Public institutions constitute 57 percent of the respondents. As Figure 3-2 shows, IT executives, including senior IT officers and CIOs, made up more than three-quarters of the survey respondents. Almost 70 percent of doctoral institution respondents were CIOs. Senior administrators include presidents and chancellors, whereas senior academic officers include deans.

Most respondents who answered the survey said their responses represent their institution’s view (Figure 3-3). This was especially true of associate institutions: 70
percent of respondents said they spoke for their institution as a whole. It is important to keep this perspective in mind when interpreting results. In addition to speaking from the perspective of the entire institution, most respondents also answered questions from the perspective of central support, which in some cases was information technology and in others was instructional technology.

**Interpreting Online Survey Results**

Recognizing that some biases might exist in the online survey responses, we should consider some important factors when interpreting the results.

We assume that the 18 percent of EDUCAUSE respondents who answered the survey are from institutions that have already invested heavily in e-learning and have possibly developed better supporting infrastructures than the universe of institutions. Nonrespondents will likely have implemented e-learning courses to a lesser extent, and some may not have yet implemented any e-learning courses. This results in a bias in the data on e-learning penetration. For example, the percentage of classes that are online, hybrid, and so on, may be higher than for the total universe of higher education institutions in the United States and Canada. We note throughout the study that the results are not representative of all higher education institutions.

The above point may be especially true for associate institutions. Respondents from these institutions reported a high percentage of online distance-learning courses. This finding rings true to anecdotal knowledge that many associate institutions have implemented online courses in light of their charter to provide outreach and adult education. But the survey result showing that 95 percent of associate institutions offer online courses is significantly higher than might be expected of the associate institution universe.

Most respondents indicated that they represent the views of the entire institution, and almost all represent a central support role. This is important, because a survey goal was to develop a picture of support for the entire institution.

Also, most survey respondents are senior information executives, who are generally in a good position to answer the range of survey questions, and with authority. But some
questions may be difficult for anyone to answer—for example, an evaluation of students’ PC usage capabilities. We have presented such results, but with cautions about the interpretation. These data are meant to provide perspective on support issues, not to be definitive statements about the technology usage capabilities of faculty and students.

**Characteristics of Interview Participants**

As discussed, the study sought to probe further into the online survey results by interviewing representative information technology administrators, instructional technology administrators, and faculty representatives. We sought not only to enrich the statistical data through in-depth discussions but also to gain additional perspective through user interviews. As previously mentioned, ECAR selected 23 candidate institutions for the second-phase (interview) research. Table 3-2 lists the 19 institutions interviewed by telephone for the qualitative research.

Table 3-3 describes the interviewed institutions by Carnegie classification and institution type (public or private).

### Table 3-2. Telephone-Based Interview Participants

<table>
<thead>
<tr>
<th>Institution</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colgate University</td>
<td>University of Alaska Southeast</td>
</tr>
<tr>
<td>Fort Hays State University</td>
<td>University of Arizona</td>
</tr>
<tr>
<td>Georgia State University</td>
<td>The University of British Columbia</td>
</tr>
<tr>
<td>Hartford Community College</td>
<td>University of Central Florida</td>
</tr>
<tr>
<td>Maricopa Community Colleges</td>
<td>University of Southern California</td>
</tr>
<tr>
<td>Marquette University</td>
<td>The University of Texas at San Antonio</td>
</tr>
<tr>
<td>The Ohio State University</td>
<td>University of Washington</td>
</tr>
<tr>
<td>Pace University</td>
<td>Virginia Polytechnic Institute and State University</td>
</tr>
<tr>
<td>The Pennsylvania State University</td>
<td>Winston-Salem State University</td>
</tr>
<tr>
<td>Saint Philip’s College</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3-3. Telephone-Based Interview Participant Characteristics

<table>
<thead>
<tr>
<th>Carnegie Classification</th>
<th>Number</th>
<th>Public vs. Private</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctoral</td>
<td>8</td>
<td>Private</td>
<td>4</td>
</tr>
<tr>
<td>System</td>
<td>2</td>
<td>Public</td>
<td>15</td>
</tr>
<tr>
<td>Master’s</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baccalaureate</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>19</td>
<td>Total</td>
<td>19</td>
</tr>
</tbody>
</table>
4

An Overview of E-Learning Activity

Of the three major “flavors” of e-learning employed in the United States—fully online, hybrid, and technology-enhanced traditional—the last is most common. This represents a more incremental approach to e-learning adoption, whereas online distance-learning and hybrid courses typically require major adjustments and training in both technology and pedagogy. Of these two, hybrid courses were somewhat more common (offered at 80 percent of respondent institutions) than online distance learning (offered at 71 percent). As Figure 4-1 shows, this holds true across all Carnegie classifications except associate institutions. The following sections provide an overview of current e-learning activities and a look at how institutions expect to focus their activities in the near term.

**Online Distance Learning: A Model with a Track Record**

The adoption of online learning by established distance-learning programs may have encouraged participating institutions...
to adopt e-learning early. Online courses for distance learning are not a recent phenomenon; just over 50 percent of respondents implemented their programs in or before 1999 (Figure 4-2). Doctoral and associate institution respondents began their programs earliest. Few baccalaureate institutions offer online distance learning, having approached such programs cautiously.

The penetration of online distance-learning courses has been gradual. While many programs started before 2000, online distance-learning courses represented only 5 percent (survey mean) of the total courses offered in AY 2001–2002 at the institutions surveyed. As Figure 4-3 illustrates, most institutions reported growth in online distance-learning course offerings in AY 2001–2002. While the survey median is close to 10 percent growth, almost one-quarter of respondents reported growth that exceeds 25 percent.

A closer examination reveals that associate and doctoral institutions continue their aggressive development of online distance-learning courses; at least one in four
of these institution types reported growth exceeding 25 percent. Baccalaureate institutions continue their cautious approach; almost three-quarters of respondents reported less than 10 percent growth. We must note that this growth is on a small base at most institutions but still represents a significant degree of growing interest. While 70 percent of institutions anticipate growth in online distance-learning course offerings in AY 2002–2003, the expected growth is much lower than for the prior year’s growth (Figure 4-4). Only about one-fourth of the respondents reported growth of 10 percent or more. Growth expectations coincide with past experiences—for example, 84 percent of associate institutions anticipate growth. Baccalaureate institutions were the most conservative in their estimates, with just half of the respondents estimating or anticipating growth and 16 percent reporting a declining percentage of course offerings.

Respondents reported that 9 percent (total survey average) of tenure-track instructors teach online distance-learning courses, versus 7 percent of their non-tenure-track counterparts. Survey respondents say 7.5 percent of their students take online distance-learning courses (total survey average). Associate institutions, which report a higher percentage of course offerings, reported the highest percentage of student enrollment (10 percent) in online courses. Baccalaureate institutions, which lag in course offerings, reported that only 3 percent of students take an online distance-learning course.

**Hybrid E-Learning: A Study in Balance**

With hybrid e-learning courses, instructors and students straddle two academic worlds—the physical classroom and the online session—enabling instructors to mix both for optimal course enhancement. Because hybrid courses are not as radical a departure as teaching in the classroom-free online environment, instructors can experiment with e-learning and still use traditional classroom lectures as part of their natural progression of technology incorporation in their courses. “Most instructors are adapting traditional courses, incorporating the use of technology, maybe gradually moving to a hybrid format,” stated Connie Bauer, associate professor of marketing at Marquette University.

Survey respondents noted that hybrid courses evolved more recently than online distance-learning courses; 33 percent of institutions implemented hybrid courses
in 2000 or later, and 25 percent have not implemented hybrid courses. This might relate to the evolutionary process that some faculty members must experience to develop a hybrid course. First they must get comfortable with using technology in their courses; then they progress to designing and teaching a hybrid course. As Figure 4-5 shows, hybrid course implementation dates vary significantly by institution type. Many doctoral institutions (56 percent) began their programs before 1999, while one-third of baccalaureate institutions launched their hybrid courses in 2000 or later, and more than half have not implemented hybrid courses.

Despite their later implementation, respondents reported that hybrid courses make up a higher percentage of the total courses offered (11 percent) than online distance-learning courses (5 percent). Interestingly, associate institutions pursue hybrid courses less aggressively than they do online courses, and they reported the lowest percentage of hybrid course offerings by Carnegie classification.

As Figures 4-6 and 4-7 show, many institutions reported modest growth in hybrid course offerings for the past and
current academic years. Associate institutions in AY 2002–2003 show a particularly interesting trend: 14 percent reported a decline in hybrid course offerings, yet more than three-quarters reported an increase in online course offerings. Baccalaureate institutions lag in plans to increase hybrid course offerings; 42 percent plan to keep their hybrid course offerings at the same level in AY 2002–2003.

As with online distance-learning courses, respondents reported a higher percentage (total survey average) of tenure-track instructors teaching hybrid courses than their non-tenure-track counterparts (11 percent versus 8 percent). More students enrolled in hybrid courses (13 percent survey average) than in online distance-learning courses (7.5 percent) in AY 2001–2002.

Indeed, the incorporation of technology in the classroom could be considered just part of higher education’s evolution. Penn State’s John Harwood, senior director of teaching and learning with technology, cited an example: “The majority of faculty members are like my wife, who is a professor of French,” he explained. “She uses technology to reinforce and supplement, but she will always meet in the classroom three or four times a week. She does, however, change her classroom activities based upon her knowledge of her students’ activities outside of class. Simply having universal access to technology has changed her assumptions about pedagogy. That is nothing at all peculiar to Penn State; it is happening all over.”

As noted in ECAR’s study Faculty Use of Course Management Systems, many institutions cite course management system implementations as a primary driver to technology adoption in the classroom. “A major goal of course management software is to integrate a suite of teaching technologies into a powerful set of tools that make it easy for faculty to use technology in instruction.”

Several institutions interviewed agreed. Marquette’s Bauer described the general institution experience: “The availability of an institution-wide course management
system has made it easier for instructors to place materials online,” she explained. “Its usage has grown quickly over the last couple of years.” Virginia Tech’s Tom Head of instructional services agrees: “Increasingly, the faculty put full courses online through the Internet, and as course management software came on board, it allowed them to do that more easily.”

Colgate experimented with its CMS’s capabilities to stir up instructors’ interest. “Just after we installed our course management system, we took on a pilot project involving 25 faculty members across our four academic divisions to investigate the use of asynchronous threaded discussion,” recalled David Baird, director, innovative technology solutions for learning, Colgate University. “The success of that program interested many faculty members in using our course management system more broadly. From there they have utilized it in a lot of different ways.”

Students’ exposure to a CMS drives some instructors to adopt it. “A faculty member will come to us to adapt a course because the students used WebCT in another class,” explained Georgia State’s Karen Oates, information systems training manager, “and now they want one for this subject area. The students like it because they can get everything online—wherever. We have a large number of students who work full time, and they can do their coursework from their office.”

The University of Arizona’s CMS helps save money through reduced copying of course materials. “With the advent of our course management system at Arizona, there are many more instructors developing online resources for traditional courses,” explained Barbara Hoffman, associate director of the University of Arizona Center for Computing & Information Technology. “The budget situation has instructors looking for alternatives to paper distribution of course materials.”

Using technology in the classroom can enhance students’ academic experiences. At USC and Colgate, instructors use technology to enhance the learning environment. As a result, e-learning is used in areas where instruction and learning can derive significant benefit from the infusion of technology. The University of Arizona’s Hoffman concurred: “Increasing use of technology in courses is seen as improving the classroom experience.” It is a planned, not a whimsical, activity. “Technology as it enhances the in-class experience is fine by the faculty,” stated Colgate’s Baird. “But technology for technology’s sake is not the focus here.”

**Endnote**

A s intuition would imply, every institution has its own path of e-learning evolution—an outgrowth of each institution’s unique vision, student requirements, and faculty composition, among other things. As institutions move along this evolutionary path, technical and instructional support gain significance. Indeed, support programs often provide the foundation needed to grow programs to and beyond critical mass. Moreover, as programs grow and adoption deepens among both faculty and students, the nature and extent of support needs tend to grow along with them. Revealing the factors driving e-learning in the institutions that have adopted it lends insight into the types of support issues likely to emerge. We see a good example of this dynamic in how some institutions offer hybrid, or “mixed-mode,” courses to alleviate physical space shortages resulting from soaring enrollment. This ties the specific goal of freeing up classroom space to the support goals associated with hybrid courses (explored later in the study).

In short, we must understand e-learning’s drivers to understand why institutions adopt their e-learning models and, in many cases, their support approaches. The following section examines significant factors driving the first wave of e-learning adoption.

Institutional Goals: Primary Catalyst to E-Learning Development

This study found that the character of e-learning programs is generally a direct expression of an institution’s goals and vision. We see this in such attributes as whom the programs are targeted to, how they dovetail with the traditional curriculum, and the degree to which the institution integrates the e-learning support infrastructure into core support structures. The University of Central Florida (UCF) offers an example of an institution that has made an aggressive effort to weave e-learning tightly into its overall fabric. Joel Hartman, vice provost for information technologies and resources at UCF, pointed to the fact that e-learning is no longer viewed as “different” or “special” as the clearest sign of this integration: “We’ve come a long way toward reaching our original goal of getting the ‘e’ out of e-learning.”

For some institutions, e-learning programs’ nature and extent stem from a particular administrator’s vision—for example, a president, CIO, provost, or chancellor. One of the most prominent examples is Penn State, whose longtime CIO, Gary Auguston, has consistently advocated the progressive use of
technology in teaching since the mid-1980s. Instructors also served as bottom-up catalysts for e-learning as they tried to use the Web to deliver a richer, more engaging experience, keep up-to-date in their methods, or simply add a spark to their career.

Specific departments or schools, driven by unique circumstances, may also take the lead. “Where we see the push to totally online programs is in the schools and colleges where it is a strategic issue,” explained Carolyn Gard, director of university educational technology services at Georgia State University. “For example, our Robinson College of Business knows they need an online MBA program. Our College of Health and Human Sciences is attempting to address the statewide shortage of nurses by creating an online nursing program.”

E-learning can enhance an institution’s reputation, too. Colgate University sees it as a means to differentiate itself from peer liberal arts institutions. “One way to do that,” stated David Gregory, Colgate’s chief information technology officer, “is to have a very solid technology infrastructure that allows us to get new technology into the hands of faculty and students to push innovative teaching and learning.”

**E-Learning As a Vehicle for Community Outreach**

E-learning can address the unique needs of an institution’s targeted student community. Harford Community College aims some e-learning courses at the military population stationed at a nearby army base. “With their transient nature, e-learning courses accommodate their needs,” said Lou Marseilles, Harford’s technology director.

The definition of community encompasses cultural as well as geographic boundaries. St. Philip’s College serves the historically black and Hispanic communities. “The mission of St. Philip’s is to provide education to the community, and we do not limit the community to the surrounding geographic area,” explained Julia Briggs, director of instructional technology, St. Philip’s College. “Distance learning allows us to expand our sense of community even more.” Jeff Noyes, CIO and associate vice president for information technology at The University of Texas at San Antonio (UTSA), cited e-learning’s potential to reach Hispanic populations, whose strong sense of family obligations may prevent them from leaving their homes in small towns.

**Convenience and Lifestyle: The Practical Side of E-Learning**

In many cases, institutions develop e-learning programs to offer students added convenience relative to traditional classroom-based courses. E-learning’s lifestyle benefits include its ability to accommodate the schedules of such harried groups as full-time employees (in continuing education or graduate programs), single parents, or people living far from the physical campus. Glenda Scales, assistant dean for distance learning and computing at the Virginia Polytechnic Institute’s College of Engineering, pointed to research that supports this finding. “Our market study shows that our students want flexibility and convenience [regarding] when and where they take courses,” said Scales, “and that comes with an e-learning environment. That will be the driver for us.”

Ron Bleed, vice chancellor for information technologies at Maricopa Community Colleges, concurred: “We see e-learning as a way to give students more flexibility, to give them the best of both worlds—technology as well as student socialization. We want to increase access to students and to create a dynamic learning environment, which dovetail through e-learning.”
Three specific examples show how e-learning helps address concrete student issues.

- **Traffic (Georgia State University)**—“As an urban campus located in downtown Atlanta, most of our students and faculty commute, and it’s not always easy to get downtown,” noted Karen Oates, the university’s information systems training and instructional support manager. “We see e-learning helping both students and faculty to make this less of a requirement.”

- **Real-world technical skills (University of Texas at San Antonio)**—At UTSA, students can hone their technical skills through e-learning courses to better prepare them professionally in general or for specific job requirements. Anita Leffel, a lecturer in UTSA’s management department, said students lag behind if they leave the university without feeling comfortable with the technology they may encounter in the workplace.

- **Mimicking the workplace (St. Philip’s College)**—Many of St. Philip’s e-learning activities focus on the pragmatic goal of preparing students for the workplace technology environment they are likely to encounter. Briggs explained, “We see it as our mission to teach students in a way that simulates their likely workplace environment.”

### Online Learning Picks Up Where Video Left Off

One driver in the creation of online distance-learning courses is the evolution from other types of distance-learning programs. For example, the University of Washington was well positioned for the online distance-learning market by virtue of its long experience with distance learning in general, dating from its 1912 correspondence print programs. For the University of Alaska SE, it was a natural evolution in their 20–25-year program. The institution used mainframe-based discussion tools, and when Web-based alternatives became available, they moved to the Internet.

Maricopa, Fort Hays, and Virginia Tech augmented their video, interactive video, and satellite classroom programs when online distance learning provided a less expensive alternative. Tom Head, instructional services, Virginia Polytechnic Institute and State University, recalled, “In the early 1980s and 1990s, Virginia Tech had a very extensive distance-learning program originally using satellite and then two-way interactive base video. But we soon topped out with 50 sites across the state and a dozen classrooms on campus, because it was all we could afford and because of classroom space constraints. We conducted maybe 75 to 100 courses per semester using these facilities.”

Many institutions use online distance learning to reach a broader student audience. “We have a program in energy and geo-environmental engineering,” stated David DiBiase, head of Penn State’s E-Education Institute at the College of Earth and Mineral Sciences. “Pennsylvania used to be a world center in energy production, but our potential students for our graduate school are now located in the Middle East. Our program must reach a global audience to stay competitive.”

Online distance learning’s outreach capabilities provide a survival strategy for some institutions with geographically dispersed populations. Both Fort Hays State University and the University of Alaska Southeast use e-learning courses to reach students in sparsely populated areas. “If you look at the demographics, many smaller towns in western Kansas are losing student population,” explained David Schmidt, director of computing and telecommunications at...
Fort Hays State University. “Part of our e-learning initiative is survival on our part, to be proactive to keep our program flourishing.” Despite declining student populations, Fort Hays reported 30 to 35 percent annual growth in student enrollment in its virtual college between fall 1999 and fall 2002. At the University of Alaska Southeast, “there is not a sufficient local college-going population,” explained Michael Ciri, director of information technology services. “Ninety percent of Alaska’s population is located in three or four urban centers; the rest is spread across a huge area (one-third the size of the rest of the United States). We have had to make choices about how to reach out to areas that don’t have easy access.”

Other institutions view online distance learning’s strategic value as a tool to reach people who cannot fit a classroom-based course into their schedule. Penn State’s provost, Rodney Erickson, has funded the creation of a handful of high-enrollment, high-impact general education courses. Penn State’s John Harwood, senior director, teaching and learning with technology, expects heavy enrollment in the summer so that students can work while attending school, without delaying their graduation. The University of Central Florida’s Hartman said, “Online learning is essentially our way of recognizing that our older adult working, family-oriented student population finds this to be a more flexible mode of learning.”

**Expanding “Educational Bandwidth”**

Space needs drive hybrid course adoption at other institutions. Both the University of Central Florida and the Maricopa Community Colleges use hybrid courses to alleviate classroom shortages on their rapidly growing campuses. “Our rapid growth is outstripping our ability to build classrooms,” stated UCF’s Hartman. “Our hybrid online course model allows a three-hour course to meet one hour per week, with the remainder of activity online. This gives us the ability to improve educational quality by designing active learning, interactivity, and learning communities into classes of various sizes—particularly large classes—while freeing up classroom space. The mixed-mode model essentially hypothetically triples the number of courses that can be placed in a single classroom.” Maricopa’s Bleed believes that hybrid courses offer the most long-term potential at his institution because they save on physical facilities while increasing student socialization.

**The Hybrid Model: Delivering the Best of Both Worlds**

The hybrid course’s flexibility entices some instructors to try it. Jonathan Anderson, professor of public administration, University of Alaska Southeast, likes the multiple delivery mechanisms and options that hybrid courses offer; he doesn’t depend on one teaching methodology. The hybrid course’s delivery mix lets instructors focus class time on personal interactions. For example, the University of Alaska Southeast’s Ciri describes how, philosophically, the university tries to focus in-class time on activities best done in class and move other activities, like quizzes, to a Web-based asynchronous mode as much as possible. The result, he said, “is not a reduction of class time, but a more effective use of class time.”
As the number of e-learning courses grows at institutions, the academic experience changes for an increasing number of instructors and students. Both groups must adapt as the institutional support processes evolve. Course preparation might entail, for example, learning a new software application to convey a concept more effectively; students may express their learning efforts via text, audio, or video. This creates new challenges that students and instructors must confront and overcome. This chapter depicts e-learning’s impact on instructors and students, as gleaned from the research’s interviews and online survey.

Adaptation Rule in E-Learning Course Development

When instructors first decide to incorporate an e-learning element into their instruction, most adapt a current course. When we analyzed interviewees’ comments, a course adaptation path emerged. Many instructors start slowly, incorporating a simple course management system (CMS) tool. As they gain confidence, instructors begin to consider e-learning’s pedagogical impact on their courses and how to further enhance them. The sequential pattern that emerged from the research suggested the following:

- Instructors tend to start with less complex activities. “Obviously one of the major ways that the faculty members use the technology is simply by posting relevant documents in our course management system,” noted David Baird, director, innovative tehnology solutions for learning, Colgate University.

- Instructors then begin to focus on pedagogical aspects, even if it is just to consider how to best use CMS functions. “Adaptation requires commonsense judgments as to how to take standard classroom practices and plug them into the established structure of the software,” said Steve Lucas, reading instructor and curriculum developer, Maricopa Community Colleges. “For example, the faculty member must decide whether an activity is best for a discussion board or e-mail.”

- Instructors rethink their course concepts accordingly. “The adaptation process for the electronic course was about starting over completely,” said Anita Leffel, a lecturer in the management department at The University of Texas at San Antonio. “Faculty had to build the template and plan extensively. They were developing the technical and instructional aspects of the course in parallel so that the instructional technology would fit within
the technical constraints. One cannot be thought of in a vacuum from the other. It is a very iterative process, based on trial and error, with lots of sampling and sketches.”

- **Instructors then begin to reference other teaching models.** Roger Caldwell, professor of soil, water, and environmental science at the University of Arizona, stated, “It depends on what an instructor is trying to do. If someone is interested in building a simulation or trying to communicate a certain concept, he reaches out to places in his own field for a resource link or to a resource like MERLOT.”

As instructors gain experience, they tend to move from strict course conversion to true innovation, using technology in new ways and within new courses. “The majority of courses that we have running were adapted from a classroom mode of presentation,” explained Paul Faber, dean of arts and sciences, Fort Hays State University. “We’ve seen that a faculty member typically designs his first e-learning course with a strong resemblance to his classroom-based course,” Faber said. “But as time goes on and he gains more experience, he begins to use the medium a little differently, with more freedom to structure it in a more unorthodox, freestyle way.”

When instructors teach an e-learning class, they must add technology to the many issues they already juggle. “The teaching and learning process is very fine tuned, a fact that is not evident until you try to tinker with it,” said Geoff Spedding, associate professor of aerospace and mechanical engineering at USC. “The flow of thought is disrupted in the class (when there are technical problems). The consequences of one small change can be far-reaching. The result of this ever-present threat of downtime means that the instructor needs to be ready to think on his feet and react in a flexible manner. Students are amenable and flexible, and willing to cut the instructor some slack. After a while, however, the students expect the problems to be fixed. It is not acceptable to impose these problems continually.”

### E-Learning’s Time Requirements Challenge Instructors

Perhaps the most frequently cited challenge of e-learning was the amount of time required to develop and maintain an e-learning course. Respondents often used such words as “shock,” “surprise,” or “drastically underestimated” when describing how much time they and their colleagues spent on e-learning relative to their traditional courses. Discussions with e-learning faculty suggest several key underlying drivers of this time burden.

- **Instructors need to rethink and fundamentally restructure e-learning classes.**

In many if not most cases, faculty spend substantial time and effort reengineering the course to adapt it for online delivery. This represents a significant amount of added effort for instructors, because many have fine-tuned their pedagogical approach for traditional lecture-oriented presentation.

- **Instructors need technical and pedagogical training.**

By and large, instructors tend not to initially comprehend that e-learning instruction differs fundamentally from traditional approaches and requires a major commitment of time and training.

- **Additional time is needed to communicate with students.**

The increased communications requirements (principally e-mail) are without a doubt the “800-pound gorilla” of e-learning. Audrey Mosley, faculty coordinator for distance learning at St. Philip’s College, frequently hears faculty concerns about e-learning’s added demands. “One
of the biggest issues we’ve seen is the enormous volume of correspondence with students, and the time that it requires,” Mosley said. “For the majority of faculty that teach both Internet-based classes and traditional classes, it’s been a real challenge balancing the time commitments between the two [modes].” St. Philip’s employed a straightforward solution: it imposed a limit of 20 students per Internet-based class.

♦ New e-learning faculty tend, on average, to be marginally less technologically sophisticated.

Early faculty adopters of e-learning tended to be more cutting-edge “pioneer” types, and as such they were highly motivated to make it work. It’s not at all surprising that the next wave of adopters—while far from Luddites—are somewhat less motivated and/or equipped to address the issues inherent in offering e-learning courses. Comments by Julia Briggs, St. Philip’s College, reinforce this notion: “At the beginning, the pioneering faculty were willing volunteers, and because of this were eager to learn all these things. The second wave of faculty is not entering the program with the same level of enthusiasm, and they are surprised at some of these differences. They’re amazed at how labor-intensive and time-consuming it is—at the amount of time it takes to develop and teach the course, and the time required to respond to e-mail alone.”

**Technical Issues Assume a New Importance to Faculty**

When adapting e-learning courses, interviewees identified several technical issues that hamper instructors’ activities. The lack of course prototypes and software standards raises the need for a common course development platform. Others identified the technical limitations of course management software, though we couldn’t determine through the interviews whether lack of training or the software itself causes these problems.

David DiBiase, head of Penn State’s E-Education Institute at the College of Earth and Mineral Sciences, pointed also to support staff’s lack of technical expertise. “To make an e-learning course compelling—especially in our field (earth and mineral sciences)—requires the development of multimedia: Flash, Shockwave, and technical simulations,” he explained. “That causes problems, because a person who has the technical skill and the understanding of our field to make compelling content is not always available.”

When teaching, one respondent said, challenges can be as basic as how to write and easily distribute equations in an online environment. Others cited lack of technology proficiency—confusion when operating software, lack of awareness when the server crashes, and real or perceived CMS shortcomings. The University of Arizona’s Caldwell cited lack of technical consistency in the classroom: “Are things going to work when I’m in the classroom? Will the Internet be up? Do I need to bring back-up materials on a disk? Will the last instructor have left things in good shape? These [issues] may be more basic than you’d expect, but dependability is still a major issue.”

Unreliable technology can hinder instructors’ ability to monitor student activities. “Students can claim to log in—either distance learning or resident—when the system is down,” said Thomas Berner, professor of journalism and American studies, Penn State. “If it does not come back up, the students can then use that as their excuse when they are late with their assignments.”

To resolve technical problems, one instructor brings back-ups to class for emergency use. Martha Marinara, assistant professor of composition at the University of Central Florida, reported that she receives
considerable technical support from her students during class. The fact that students have selected online courses tends to make them a bit more technically sophisticated, Marinara feels, and consequently better able to help the instructor.

E-Learning Technical Issues for Students

When designing e-learning courses, instructors must consider students’ technical limitations—bandwidth and computer hardware, for example. The University of Arizona’s Caldwell believes some faculty members create Web pages with too many graphics. This is not a problem for students in dorms, but many University of Arizona students live off campus and have varying degrees of online access and bandwidth. Instructors might also develop courses using large monitors, while students will display the pages on smaller monitors. To serve its global online student population, the University of Phoenix designs its online courses with the dial-up user in mind. Most courses use text-based materials and require extensive online text-based discussions. The institution shies away from any high-bandwidth material or activity.

Technical infrastructure deficiencies on the student side can impede course activities, especially in an online distance-learning environment. “One constant problem for online distance-learning courses is the technology and the knowledge at the other end,” explained Fort Hays’s Faber. “Students often do not have the proper equipment, particularly for some of the courses that require a higher bandwidth. We do not have a single set of user requirements for all courses; otherwise we would have to tame down some of the classes or set the requirements at the high end. We always find some students enrolling in a class in which they do not have quite the proper hookup.”

To help online distance-learning students prepare, Fort Hays communicates technical requirements prior to the start of classes. “We post an expanded description or syllabus for each course—something that is well beyond what we publish in our catalog or class schedules,” Faber said. “We try to make that publicly accessible on a Web site months before the semester begins. Once the student registers online for a class, it stimulates an automatic response that describes the technical requirements for that particular course. Also we mail a postcard to the student three weeks before the class with logon information.” Before students enroll in their first online distance-learning course at the University of Phoenix, counselors review technical requirements with them and students sign a form stating their awareness of the requirements.

Students’ E-Learning Activities and Challenges

E-learning changes the student’s experience as well as the instructor’s. Class time does not necessarily mean passively taking notes in a lecture. E-learning frequently requires hands-on activities, whether participating in an online discussion or creating a Web page about research activities. This introduces new issues and challenges for students, including computer experience and confidence, computer ownership, technical problems, and time management.

Students enrolling in an e-learning class must not only master the course’s subject matter but also possess the technical skills to participate in the course and study effectively. This may represent a minimal technical challenge for many students, but this is not universal. “There is an assumption that all students grow up with technology and know it,” stated Colgate’s Baird. “In fact, our students display a great spectrum of
abilities and comfort levels with computers.” Other institutions, like Winston-Salem State University, identified lack of confidence and experience with computers as a challenge facing many of its e-learning students. Age may make a difference. Marquette’s Jon Pray, associate vice provost for educational technology, noted that most of their online distance-learning students were adults who might not be quite as prepared for the technology experience.

Even students who are comfortable using a computer might not possess all the necessary skills. “I like to say that students are computer savvy, but not computer literate,” stated Penn State’s Berner. “They know about it; they can play the games real well, but when I taught a computer literacy course, all the students identified themselves as experts. Upon the course’s completion, many admitted under questioning that they did not know 90 percent of the Word or Excel features I showed them. The students get only so far in using the computer on their own.”

ECAR’s study Faculty Use of Course Management Systems substantiates this observation: “[Faculty members] consistently report that their students seem to have inadequate technology proficiency and that this inhibits their CMS use. Complaints about students’ technological literacy focus on their lack of technical-problem-solving skills and basic technology-literacy skills such as file management.”

While Karen Harpp, associate professor of geology, Colgate University, noted students’ rising technical proficiency in her classes, she finds she doesn’t have to teach them “how to use the technology, but how to use it well.” Harpp cited student PowerPoint presentations that are “fabulously complex—students know how to scan, how to import, how to do everything . . . but the slides can be nasty. There is too much content on the slide, so I can’t read it.”

Also, not every student owns a computer. James Stenerson, director of the Center for Instructional Technologies at Pace University, is surprised at how many students need the institution’s learning resource centers for computer access, creating something of a digital divide among the student population. The access level differs for students who must use the computer lab versus those who tote their laptop with them or can work all hours in their room. Not every computer lab possesses the same technology. As students gain technical proficiency, noted the University of Arizona’s Barbara Hoffman, associate director, Center for Computing & Information Technology, “an emerging problem is access to higher-end tools (multimedia), and the number of students who use them is growing each semester.”

Even students using mainstream applications encounter technical problems. A common problem is slower dial-up speeds at home, especially in rural areas that rely on online distance-learning courses. These students cannot take courses effectively unless instructors scale back course activities accordingly. ECAR’s study Faculty Use of Course Management Systems noted the same problem: “Widespread problems with student access to technology certainly contribute to faculty perceptions that students have weak technology skills....Many faculty report that students do not have access with enough bandwidth to use the CMS effectively and that access itself isn’t always reliable.”

As with their instructors, time management skills and self-motivation impact student performance in e-learning classes. “Some students complain that if they actually completed all the interactive activities, it would take a lot of time,” said Penn State’s John Harwood, senior director, teaching and learning with technology. “They don’t realize that it is just like a traditional course where they must complete all the assignments...
and attend class. It is time-consuming.” Penn State’s DiBiase noted, “Disorganized individuals are not going to have a good experience. Students and faculty members both need good time-management skills.” He noted that older students tend to have better luck with online distance-learning courses because they have developed better time management skills.

Dave Szatmary, vice provost of educational outreach at the University of Washington, underscores how important self-motivation is for students to succeed at e-learning. “Students don’t have to come into a classroom to have knowledge poured into their heads. They have to take the initiative.” This can be such a problem that St. Philip’s created a series of self-diagnostic tools to help students determine whether they possess the right characteristics to take an e-learning course successfully. The University of Phoenix’s online distance-learning pedagogy forces students to take responsibility. Each course is very small, capping at around 10 students. Because the course work is team oriented, peer pressure forces students to keep up.

During class, instructors cannot assume that students understand fully the reasoning behind the incorporation of every e-learning tool. Penn State’s Berner makes it “a point to tell students why I am using the technology, what the expectations are, and why it is to their benefit to use it—to get them more greatly involved in the class.”

While instructors and students both face challenges in using technology for e-learning, most institutions identify faculty as the greater support requirement, for several reasons. Winston-Salem State University believes that peer learning is less common and less productive among faculty than among students. According to Colgate’s Baird, students are more daring and tend to figure out problems on their own. As the number of e-learning courses grows, “it penetrates past the early adopter crowd,” explained Marquette’s Pray. “We now help instructors who are interested but cautious.” The University of Arizona’s Hoffman believes that support needs continue to increase because “once faculty members gain familiarity, they want to do more and more.”

**Instructor and Student Technical Challenges**

E-learning’s success rests on the fundamental requirement that instructors and students possess adequate technical skills to use e-learning tools effectively. The survey explored the challenge this poses by asking respondents to assess instructors’ and students’ computer skills and identify significant technical challenges accordingly. (Note that information technology administrators—not instructors or students—completed the survey.) The findings discussed in this section represent the respondents’ impressions and not their firsthand experiences with these issues.

Instructors might also want to learn computer skills to become better teachers. Gerry Philipsen, an instructor at the University of Washington’s Department of Communication, believes that “as a late adopter, the need to use these technologies pushes me more.” While he sees students “cutting him slack” on technological sophistication and generally adapting to his limitations, their expectations nonetheless prod him to expand his capabilities. For others, this process is not as easy; lack of time, for example, may impede a person’s ability to gain adequate computer skills.

To roughly gauge any potential problems in this area, ECAR asked online survey respondents to segment their student and instructor populations into five user categories to provide an indicative (not defini-
tive) assessment of their current computer expertise.

- **Leading edge**: Experiments frequently with emerging/cutting-edge computer applications/technology.
- **Early adopter**: Uses advanced features in generally adopted computer applications and might experiment with emerging or cutting-edge applications and technology.
- **Mainstream user**: Uses generally adopted computer applications proficiently on a regular basis but is not prone to experimentation.
- **Reluctant**: Tries to use generally adopted computer technology but has problems using basic features.
- **Avoider**: Uses computers as little as possible.

Figure 6-1 compares respondents' assessments of students' and instructors' computer skills. The differences are not significant when comparing all instructor and student skill levels or examining them by Carnegie class. Most instructors interviewed, too, assessed their colleagues' skills as covering a spectrum of levels. They believe their colleagues possess the technical skills to create and teach an e-learning course, citing easy-to-use software, familiarity with course management software, and good training. Department area and subject matter can affect technical proficiency with instructional technology tools, as explained by Virginia Tech's Glenda Scales, assistant dean for distance learning and computing: “We are in the College of Engineering, and the expectation is that our students and faculty are familiar with technology. The key is effectively blending instructional technology into the teaching and learning process.”

At least one institution noted that as their faculty's technical proficiency rose, instructors' interests shifted to pedagogy. “Many faculty members in our School of Nursing are advanced users,” stated Lianne Connelly of Fort Hays's Department of Nursing. Over time, she added, her faculty has evolved substantially in technical competency and the pedagogical issues have moved to the
forefront. Although survey respondents assessed computer skills similarly for students and instructors, they identified different technology challenges for supporting them. As Figure 6-2 illustrates, online survey respondents believe the most significant student support challenge is to enable students to use e-learning technology as much as needed by providing an adequate network infrastructure and keeping up with their technology demands. Survey respondents cite different support challenges for instructors. Respondents identified “lack of knowledge to design courses with technology” and “lack of confidence to use technology in teaching”—core e-learning activities described earlier—as significant technology support challenges (Figure 6-3). Interestingly, as e-learning courses multiply, some challenges decrease in significance, suggesting that as e-learning becomes more commonplace, instructors become more comfortable using the technology.
**E-Learning and Support Requirements: Exploring the Connection**

Whether transforming a course for an online distance-learning program, Web surfing a topic in class, or creating a multimedia presentation, some instructors and students will need assistance with their e-learning activities. Indeed, survey respondents estimate that 22 percent (total survey average) of students taking an e-learning course and 54 percent of instructors involved in e-learning requested support.

As a result, providing support for e-learning gains priority. Figure 6-4 shows that many institutions make e-learning support a priority, especially for traditional courses using technology—the most prevalent e-learning course type.

Institutions place an overall higher priority on supporting technology use in traditional classrooms for several reasons. St. Philip’s Briggs summarizes most institutions’ situation: “The bulk of emphasis is now placed on using technology to support traditional courses. That’s simply where the numbers are.” But in other institutions, supporting online distance-learning or hybrid courses is important because of institutional priorities. The bottom line is that whether it’s an online distance-learning course, a hybrid course, or technology use in a traditional classroom, e-learning presents a host of new support requirements, and institutions must provide the appropriate resources to address them.

**Endnotes**


2. Ibid., p. 76.
Instructors’ and students’ e-learning activities span many different areas and create a wide range of challenges and needs. To address specific needs, institutions organize support provider networks. Each institution develops a distinct support network because size, location, academic programs, and culture all combine uniquely to determine which areas provide e-learning support.

This chapter presents general organizational and staffing characteristics of central e-learning support providers. “Central” refers to the combination of centrally administered departments and organizations that offer e-learning technical infrastructure, training, curriculum and course development, and support resources across the entire institution. Examples include central information technology (IT) departments, instructional technology departments, and central faculty resource centers.

Organizational Profile of Centralized E-Learning Support

Institutions organize their central e-learning resources in various ways. A separate instructional technology unit may reside within the central IT group. “We carved out this group that is not encumbered by desktop support or supporting network infrastructure,” said David Baird, director of innovative technology solutions for learning at Colgate University. “There are people in other areas of information technology to take care of all those things.” Winston-Salem State University’s Center for Innovative Teaching, Technology, Learning, and Evaluation also falls under the central IT support organization.

Other institutions delineate more sharply between central and departmental support. For instance, USC’s Center for Scholarly Technology provides some faculty support, especially for hybrid courses, but the individual schools handle most technical and instructional support. This stems partly from USC’s culture, which promotes strong school organizations. In contrast, USC centralizes support for technology elements that are leveragable across schools, such as e-mail, whereas cutting-edge technology has no central authority.

We observed several organizational models that emerged as institutions addressed specific e-learning course types, pedagogy, and student versus faculty requirements. First, most institutions interviewed use the same staff to support online distance learning, hybrid courses, and technology use in classrooms. Often the number of online distance-learning or hybrid courses is too small...
to justify different staff for each e-learning type. The institution itself may be small or very centralized. Winston-Salem State University believes using the same staff for all e-learning courses conserves staff time; one central unit can shift people as needed without regard to course type specialization. USC believes using a single e-learning support staff reduces costs and achieves staffing economies of scale.

Second, institutions might use a mixture of staff to contribute both technical and pedagogical knowledge and expertise. At Colgate, a joint library and IT team provides faculty e-learning support. Marquette uses grants to contract with School of Education faculty members to provide pedagogy-related support. The University of Central Florida’s e-learning program is guided by IT, instructional technology, and academic administration representatives who meet for several hours every week to discuss strategy, program development, coordination, and policy issues.

Third, some support resources, such as online training or help desk, tend to help both instructors and students, but most resources focus on one or the other. However, a few institutions reported that the instructional technology area will help students in certain instances to answer specific questions or facilitate a class project. In fact, at the instructor’s request, Colgate will train students in a specific class on the required technical tasks, such as Web page design, to help them complete a class project and will offer assistance throughout the project.

Finally, e-learning support varies at the school or department level. Some departments and schools have strong e-learning programs and the funding to operate or contract their own e-learning support resources directly. At Ohio State, the lack of centralized resources encouraged the university to develop a decentralized approach to e-learning. Other institutions offer informal support at the school or department level to augment central support. At Harford Community College, resident experts work in each building and provide basic support informally.

**Staffing of Centralized Support Organizations**

While many institutions formally define their e-learning support organizations, their staffing tends to be more ad hoc. Table 7-1 shows that many institutions today use staff members to handle both e-learning and non-e-learning support needs. In the

<table>
<thead>
<tr>
<th>Area</th>
<th>Time Frame</th>
<th>Staff Devoted Part-Time to E-Learning (Percentage of Institutions)</th>
<th>Staff Fully Dedicated to E-Learning (Percentage of Institutions)</th>
<th>Groups or Depts. Fully Dedicated to E-Learning (Percentage of Institutions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Technical Support</td>
<td>Now</td>
<td>53</td>
<td>29</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Next 2 Years</td>
<td>31</td>
<td>44</td>
<td>25</td>
</tr>
<tr>
<td>Instructor Technical Support</td>
<td>Now</td>
<td>48</td>
<td>38</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Next 2 Years</td>
<td>31</td>
<td>50</td>
<td>20</td>
</tr>
<tr>
<td>Instructor Training</td>
<td>Now</td>
<td>52</td>
<td>34</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Next 2 Years</td>
<td>40</td>
<td>40</td>
<td>19</td>
</tr>
</tbody>
</table>
next two years, however, many respondent institutions expect to move to more formalized staffing arrangements. Indeed, survey respondents expressed a preference for a dedicated e-learning support staff, often as part of a dedicated e-learning support group.

Though some institutions do have department- or school-level support, most primarily use central IT or instructional technology staff to support the instructional uses of technology (Figure 7-1). Doctoral institutions have the highest number of FTEs supporting e-learning; baccalaureate institutions have the lowest (Table 7-2).

![Figure 7-1. Source of Personnel (Percentage of FTEs) that Support Instructors and Students for E-Learning](image)

<table>
<thead>
<tr>
<th>Institution Type</th>
<th>No. of FTEs that Support Students with Online Distance-Learning, Hybrid, and Traditional Courses with Technology</th>
<th>No. of FTEs that Support Instructors in the Instructional Use of Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate (N = 40)</td>
<td>4.8</td>
<td>6</td>
</tr>
<tr>
<td>Baccalaureate (N = 49)</td>
<td>1.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Master’s (N = 77)</td>
<td>4.3</td>
<td>5.8</td>
</tr>
<tr>
<td>Doctoral (N = 57)</td>
<td>9.6</td>
<td>12.2</td>
</tr>
<tr>
<td>Total (N = 258)</td>
<td>4.9</td>
<td>6.4</td>
</tr>
</tbody>
</table>

Table 7-2. Central IT FTEs Providing E-Learning Support (Survey Average), Base: Total Respondents (N = 258)
The Future of Staffing

Just over half of respondents said the number of central support instructional technology FTEs will remain constant through this academic year, as shown in Table 7-3. Many institutions expect to add support staff to meet the demands created by the growing number of hybrid and online distance-learning courses. Only at the doctoral level, however, do we see a significant percentage of institutions expecting to add e-learning support FTEs.

Table 7-3. Change in Instructional Technology FTEs for AY 2002–2003, Base: Total Respondents (N = 250)

<table>
<thead>
<tr>
<th>Institution Type</th>
<th>Central Support Will Increase (Percentage of Institutions)</th>
<th>Central Support Will Stay the Same (Percentage of Institutions)</th>
<th>Other Areas Will Increase (Percentage of Institutions)</th>
<th>No Change (Percentage of Institutions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associate (N = 38)</td>
<td>26</td>
<td>58</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Baccalaureate (N = 47)</td>
<td>28</td>
<td>57</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Master’s (N = 75)</td>
<td>32</td>
<td>52</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>Doctoral (N = 56)</td>
<td>43</td>
<td>38</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Total (N = 250)</td>
<td>34</td>
<td>51</td>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>

Note: Percentages may not add to 100 due to rounding.
Providing adequate support for e-learning activities is a complex proposition. It entails a web of many resources to produce and teach an e-learning course effectively. Each strand must be sound to ensure that the course succeeds. For example, a technology-mediated course will not succeed if it is hampered by inadequate network bandwidth or a lack of instructor or student proficiency in course management software. Areas like information technology (IT) or the faculty resource center help maintain this resource web, but at many institutions an ad hoc grassroots network of veteran e-learning instructors reinforces it. This chapter segments these resources into four groups:
- technical infrastructure,
- training,
- course/curriculum development, and
- help and assistance.

We focus on resource availability, areas that offer resources, and effective support practices. Although institutions offer various kinds of central e-learning resources, Figure 8-1 underscores how the “personal touch” remains the most important communication.
method. This preference may become significant as the number of e-learning courses rises, prompting institutions to scale their resources accordingly. In AY 2003–2004, respondents indicated, the personal touch will remain very important, but slightly less so than today; tools-based methods will grow only slightly in importance.

The survey asked how central support resources spend their time supporting e-learning—that is, what percentage of their total effort goes to various activities. The results (Table 8-1) show that respondents estimate they spend the most time on basic technology issues—assistance with hardware, networks, and technology (25 percent), and technology training for instructors (20 percent). As we will show later in the study, other support resources often handle e-learning pedagogical support activities.

Factors Governing E-Learning Resource Choices

Because the e-learning resource web is complex, selecting the correct mixture of resources is a challenging proposition. “There are never enough resources,” Pace University’s James Stenerson, executive director, Center for Teaching, Learning & Technology, explained. “When you are dealing with a diverse population of faculty, you can’t deliver everything, so you have to make choices.”

Pedagogy drives some decisions. “Everything we do is in terms of pedagogy,” said Georgia State’s Carolyn Gard, director of university educational technology services. “We are in the information technology organization, but we don’t push technology for its own sake. We don’t bring technology in unless we think it is a good tool.”

Table 8-1. Breakdown of Central Support Effort for Instructional Use of Technology

<table>
<thead>
<tr>
<th>Technology Issue</th>
<th>Share of Effort (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assist with Hardware, Network, Technology</td>
<td>25</td>
</tr>
<tr>
<td>Technology Training for Instructors</td>
<td>20</td>
</tr>
<tr>
<td>Assisting with Pedagogy Issues; Adapting Courses</td>
<td>12</td>
</tr>
<tr>
<td>Assisting in Tech Tools and Resource Selection</td>
<td>11</td>
</tr>
<tr>
<td>Managing Network Availability and Capacity</td>
<td>10</td>
</tr>
<tr>
<td>Creating E-Learning Course Elements</td>
<td>8</td>
</tr>
<tr>
<td>Troubleshooting Network Outages</td>
<td>7</td>
</tr>
<tr>
<td>Online Material or Copyright Research</td>
<td>3</td>
</tr>
<tr>
<td>Intellectual Property Management</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
</tr>
</tbody>
</table>
Fort Hays’s Dennis King, director, Center for Teaching Excellence and Learning Technology, explained, “We set our priorities on effective content and course delivery and put the resources in place.” Focus groups, academic committees, and informal instructor input provide important feedback. Coordination among all involved institutional parties ensures the proper mix of resources and avoids overlap.

Just as important is providing tools that instructors will use. The type of courses they teach is a factor. “In general, a faculty member is going to do something for himself. They want to be involved in the creation of the online materials,” said Virginia Tech’s Glenda Scales, assistant dean for distance learning and computing, College of Engineering. “For something as easy as a course management software problem, they tend to solve it themselves. If it is advanced, who they approach depends upon what they want to do and the level of detail that they’ll engage with the tool. Our faculty works very closely with the Institute for Distance and Distributed Learning to obtain assistance with using a variety of e-learning resources that are supported centrally by the university.”

An instructor’s technical proficiency also plays a role in this decision. “Most of our faculty would lean on the one-on-one help first,” stated Bobby Moser, dean of food, agricultural, and environmental science and vice president of outreach and engagement at The Ohio State University. “Once they understood the technology, they would want to move toward tools they could access on their own—whether it is off the Web or wherever it might be.”

**IT Infrastructure Support Mainly Centralized**

One basic requirement is the provision of an adequate technical infrastructure on which to deliver e-learning courses. This requirement entails networks with adequate bandwidth, easy-to-use course management systems, and properly equipped classrooms and computer labs. At most institutions, the central IT organization manages most equipment and infrastructure resources (Table 8-2). This underscores the importance of economies of scale in maintaining and supporting large enterprises such as colleges and universities.

**Infrastructure Is Critical to E-Learning Success**

Institutions interviewed for the study identified three areas of particular importance for e-learning infrastructure:

- course management systems,
- well-equipped classrooms and computer labs, and
- computer access for students.

As noted in chapter 6, a CMS plays an important role in e-learning’s adoption by providing an easy means for instructors to incorporate technology initially into their classes. The comments of Ian Helfant, a Colgate instructor, support this notion: “Because all faculty have to use e-mail, it’s essentially taken for granted. The same thing has begun to happen with our course management software, and that’s driven by the fact that a large and growing portion of the faculty have begun to use it in varying degrees.” As CMS use grows within an institution, its overall importance to the institution has tended to increase along with it. For example, several institutions now consider their CMS to be mission critical, and they provide 24 x 7 support and system redundancy to ensure reliability. The University of Texas at San Antonio, for example, is installing a mirrored CMS server 20 miles away.

While most institutions use one CMS, a few grapple with multiple platforms. This creates additional maintenance, infrastruc-
As long as the range of applications like WebCT and Blackboard are heterogeneous,” explained Maricopa’s Steve Lucas, reading instructor and curriculum developer, “the help desks need to be application specific, which makes them less efficient by definition.” And it is confusing to students who need to learn two CMS applications.

CMS standardization provides a common platform on which to distribute knowledge and to replicate or extend effective standardized processes. Marquette’s Connie Bauer, associate professor of marketing, believes standardization helps spread knowledge among instructors because they use the same software. Institutions like Pace develop a template in the CMS for each course, to encourage instructors to post their materials.

As course management systems gain popularity, they create greater server storage and traffic issues. “Our Division of Information Technology has some challenges in keeping the technology up and running when faculty and students want to access the systems at all hours of the day,” said Pace’s Stenerson. “Instructors are getting materials up on the course management system, copying materials over from previous semesters, and getting teaching assistants onto the system. In addition, student and faculty enrollments are being updated daily. A few weeks into the semester, this has smoothed out.”

Storage and traffic issues require some institutions to upgrade their CMS, which creates another issue: cost. Interviewees commonly cited rapidly rising costs of course management systems in general, especially when upgrading to an enterprise version. The most popular solution under consideration is consortium licensing, either at the regional or system-wide level, to share costs.

Table 8-2. Organizations That Handle E-Learning Equipment and Infrastructure Resources
Total Respondents \((N = 260)\), Multiple Responses Allowed

<table>
<thead>
<tr>
<th>Resource</th>
<th>Central IT Organization (Percentage)</th>
<th>School or Department (Percentage)</th>
<th>Central Faculty Resource Center (Percentage)</th>
<th>Other (Percentage)</th>
<th>Don’t Provide (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network/Communication Infrastructure</td>
<td>93</td>
<td>8</td>
<td>5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>In-Classroom Networking/Communications Support</td>
<td>92</td>
<td>8</td>
<td>7</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>In-Classroom Hardware Support</td>
<td>80</td>
<td>15</td>
<td>12</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Classroom Modifications or Smart Classrooms</td>
<td>76</td>
<td>17</td>
<td>14</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Classroom Hardware Procurement</td>
<td>76</td>
<td>17</td>
<td>14</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Hardware Procurement for Instructors</td>
<td>68</td>
<td>32</td>
<td>8</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Real-Life Showcases of Instructional Technology</td>
<td>39</td>
<td>17</td>
<td>45</td>
<td>9</td>
<td>7</td>
</tr>
</tbody>
</table>
As more instructors adopt technology in classrooms, several institutions cite growing demand for standard-equipped and reliable technology-enabled classrooms as critical to success. “We have about 350 general-purpose classrooms,” said Penn State’s John Harwood, senior director, teaching and learning with technology. “Each has an Internet connection; about half are equipped with a podium or projection system. The goal is to provide an absolutely consistent, predictive interface for faculty that teach in the classroom. A certain percentage of the time, things are not going to work. It is terribly traumatic and discouraging for faculty and students when a class that has been well-planned and scheduled can’t be taught as planned simply because of a technology problem.” When classrooms are not properly equipped, some institutions (such as St. Philip’s College) augment them with portable technology or rolling-cart alternatives. Instructors reserve the equipment in advance to be delivered to the class.

Student computer labs are an extremely important component of e-learning programs. Rising e-learning course enrollment pushes student demand for computer access, resulting in overcrowded computer labs because current facilities may be too small and too few in number. Rising student technical proficiency creates another problem. “We have pretty good access to computer labs across campus,” stated the University of Arizona’s Barbara Hoffman, associate director, Center for Computing & Information Technology. “An emerging problem is access to higher-end tools (multimedia). The number of students who use them is growing by the hundreds each semester for sophisticated audio tool use, or manipulating visual images. More students graduate from high school expecting to do work with multimedia.”

Pace University faced two other equipment issues: printing and CD burning. Printing is a significant issue, as students tend to print many things that they access online. One solution is to charge students for every page printed above a set limit. Additionally, Pace moved to CD burners from disk drives a few years ago when faculty began to use multimedia applications, because floppy drives could not handle the larger file sizes.

One interesting finding that needs more study is the impact of student computer ownership. Some institutions, like Virginia Tech, require students to own a computer; others still grapple with this issue. “It revolves around whether a student is disadvantaged by not owning their own computer,” stated Colgate’s David Gregory, chief IT officer. “If they don’t own their computers, the students have to use the computers that we provide them in our public labs. We don’t currently provide network storage for them, so that means they have to carry around Zip disk drives or floppies to save their work.”

Effective Practices in E-Learning Infrastructure Support and Management

Effective planning emerged as one of the most important practices. Since infrastructure is complex and costly, institutions need to invest wisely, especially when budgets are tight. Instead of implementing technology for technology’s sake, the University of Alaska SE’s Michael Ciri, director of information technology services, advises institutions to look for simple uses of stable technology. “Faculty are frequently criticized for not adopting technology more readily,” he explained. “Technologists need to understand first what is required of the instructional process and work to that. You have to be invested in the learning process.”
Planning is an ongoing process of keeping infrastructure up-to-date while achieving the greatest return on investment. “It is important when implementing any new technology that you plan for regular technology refresh,” stated the University of Arizona’s Hoffman. For example, technological and equipment advances will turn today’s state-of-the-art classroom or computer lab into tomorrow’s outdated facility. Pace, however, extends its equipment life cycle by recycling its computers from its computer labs (about 160 per year) and donating them to departments on campus that have much older equipment.

**Prevailing Organizational Models for E-Learning Training**

Technical proficiency empowers instructors to create and teach their e-learning courses as independently as possible. Yet instructors’ differing time commitments, requirements, and learning styles mean a “one-size-fits-all” training approach will not work well. As a result, most institutions use a combination of one-on-one instruction, classroom training, and online training resources. Eventually, technical proficiency fosters an alternative resource—a grassroots network of knowledgeable cohorts who answer impromptu questions.

Table 8-3 summarizes the training resources that survey respondents offer at their institutions. Virtually all institutions surveyed offer technology-oriented training, either in group or individual training sessions or in the classroom, as well as pedagogically oriented training. Most institutions also train instructors in the use of e-learning tools and evaluate their progress.

At most respondent institutions, the central IT organization manages training resources, though other campus organiza-

<table>
<thead>
<tr>
<th>Resource Offered</th>
<th>Percentage of Institutions Offering Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sessions, Workshops, Courses for Technology Training</td>
<td>100</td>
</tr>
<tr>
<td>One-on-One Instruction or Consulting Sessions for Technology Training</td>
<td>97</td>
</tr>
<tr>
<td>On-Site Classroom Network or Technology Training Class</td>
<td>93</td>
</tr>
<tr>
<td>One-on-One Instruction or Consulting Sessions for Pedagogy Issues</td>
<td>92</td>
</tr>
<tr>
<td>Sessions, Workshops, Courses for Pedagogy Issues or Methodology</td>
<td>91</td>
</tr>
<tr>
<td>Pilot Training to Test E-Learning Elements in Classrooms</td>
<td>83</td>
</tr>
<tr>
<td>Evaluation of Instructors’ Effectiveness with E-Learning Tools</td>
<td>69</td>
</tr>
</tbody>
</table>
tions are involved in pedagogically oriented training (Table 8-4).

**Flexibility a Key Ingredient in Training Program Success**

Most institutions’ overall goal is to promote instructors’ technical sufficiency, empowering them to create and teach their e-learning courses as independently as possible. This is a noble goal, but not a totally realistic one. No matter how technically proficient an instructor becomes, he requires help occasionally, whether to get up to speed on Web page design or to take a quick refresher on a Microsoft Excel function. Because needs vary, institutions tend to offer a menu of training resources from which the instructor can choose. Institutions interviewed discussed the benefits of several resources, including one-on-one sessions, classroom training, online tools, and grassroots support.

Instructors interviewed tend to prefer one-on-one training, whether for a quick answer to a question or in-depth training. “It is driven by immediate practical needs as opposed to proactively seeking skills,” stated the University of Washington’s Gerry Philipsen, professor of communication. “I think the scheduled educational programs have some value to plant the seed as to what is out there,” Fort Hays’ Paul Faber, dean of arts and sciences, elaborated. “But the best help is to call or e-mail resources [for] a quick response—for example, how to insert one minute of streaming video into a PowerPoint presentation.”

Judy Doherty, director of technology education, Colgate University, believes the short-term time investment in one-on-one training reduces longer-term support burdens. “Because it is so customized, the person seeking assistance accomplishes exactly what they need. There is very little if

<table>
<thead>
<tr>
<th>Resource</th>
<th>Central IT (Percentage)</th>
<th>School/Department (Percentage)</th>
<th>Other (Percentage)</th>
<th>Don’t Provide (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Training Workshops, Courses, Sessions</td>
<td>82</td>
<td>8</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>One-on-One Instruction, Consulting, or Technology Training Sessions</td>
<td>73</td>
<td>17</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>On-Site Classroom Network or Technical Training Classes</td>
<td>72</td>
<td>13</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Pilot E-Learning Classroom Programs</td>
<td>51</td>
<td>16</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>One-on-One Instruction or Consulting for Pedagogy Issues</td>
<td>46</td>
<td>21</td>
<td>23</td>
<td>9</td>
</tr>
<tr>
<td>Pedagogy Issues: Workshops, Courses, Sessions</td>
<td>43</td>
<td>19</td>
<td>29</td>
<td>9</td>
</tr>
<tr>
<td>Evaluation of Instructors’ Effectiveness with E-Learning Tools</td>
<td>17</td>
<td>23</td>
<td>27</td>
<td>34</td>
</tr>
</tbody>
</table>

Note: Percentages may not add to 100 due to rounding.
any follow-up support when you are able to accurately meet needs.”

Classroom training, ranging from scheduled sessions on specific topics to more systematic training programs, obviously reaches a broader audience to help instructors achieve technical proficiency or provide a forum to exchange ideas. “We provide a variety of resources, like workshops, self-paced tutorials, the New Media Center, and maintaining the course management system infrastructure,” said John Moore, director of the Faculty Development Institute (FDI) and director of educational technologies, Virginia Polytechnic Institute and State University. “But if you do the arithmetic, you just can’t have enough instructional designers and producers to help 1,600 faculty members.” Virginia Tech’s strategy is to take a holistic approach with its FDI to annually train one-quarter of its faculty in a four-year repeating cycle. “We have to make faculty more and more self-sufficient because we are never going to have enough staff to support them in great depth,” explained Moore. “With our Faculty Development Institute, the whole idea is to make them increasingly self-sufficient by periodically refreshing their training, their desktop, their connectivity, and providing continuing opportunities for just-in-time learning and support.”

Other institutions offer intensive workshops and programs, frequently when classes are out of session. Pace’s course development days run before the semester starts. They encourage departments to run their own sessions with help from the central IT organization.

More institutions offer online training tools to provide just-in-time training to supplement structured training sessions. Instructors who cannot squeeze a two-hour training session into their schedule can take an online training course whenever it is convenient. The University of Washington, for example, has developed its UWired program, but other institutions license training from online providers such as Net G or Element K, or they invest in electronic resources for the library. Online training resources also help institutions offload some of the training burden, because the providers offer a wider variety of training courses than many institutions could possibly provide on their own. For example, Element K offers more than 400 online courses. In many cases, institutions negotiate licensing agreements that allow students as well as instructors to access online courses, enabling institutions to serve both constituencies with one resource.

One benefit of instructor technical proficiency is the development of a grassroots support network among colleagues to supplement formal training resources. “Faculty members love to share with other colleagues in the department,” said Georgia State’s Karen Oates, information systems training and instructional support manager. “They know who the gurus are in the department, and most gurus love helping others.” This can be true especially for the spur-of-the-moment question: it is quicker sometimes to consult the colleague down the hall than to locate the appropriate central resource. Additionally, this colleague might have greater familiarity with the instructor’s work, enabling him to frame his response in the context of that work. “Faculty members go to technology-enabled colleagues first because of the convenience and comfort,” stated Georgia State’s Stephen Harmon, director of instructional technology, College of Education. “If colleagues can’t help them, the next step is the educational technology services at the university level. Educational technology’s downside is that this is their entire job. Sometimes they give a more in-depth answer than the faculty member wants. The faculty member will think, ‘Here is a colleague who has as little time as I, and...’
he will give me a 30-second answer for my question.”

Effective E-Learning Training Practices: A Sample

Institutions interviewed for the study employed numerous effective training practices. Although we could use many variables to segment institutions’ approaches to training, one of the most basic (and useful) is the level of standardization. Specifically, how standardized, or uniform, are the institution’s training protocols? At a high level, we can see respondent training approaches falling along a continuum. At one end are highly standardized practices that stress a common base of core competencies and are taught in a classroom-like setting and tempered with discussions of real-world wisdom from experienced e-learning faculty. The University of Central Florida’s Interactive Distributed Learning for Technology-Mediated Course Delivery (known as IDL6543) represents a good example of this model. Its goal is to provide faculty with the technology skills needed for teaching online and a collaborative, cross-disciplinary arena for discussion and hands-on development work.

The other end of the spectrum could be called “cafeteria-style” training. This model is characterized by a more open-ended training regimen that is essentially driven by the faculty member. This approach is premised on the idea that faculty can ascertain their needs and fill gaps on an as-needed basis, and that the institution can provide the resources to meet these training requirements. Unlike the standardized model, the “as-needed” model fits well with institutions that practice a more decentralized approach to training—one that cedes a high degree of control to departments or schools (as at USC). This model also fits well within budget-constrained environments, where a large-scale centralized training infrastructure is not a viable option (for example, the Maricopa Community College District).

Between these two ends of the spectrum are models with elements of both; their appeal typically derives from their mix of rigor and flexibility. A good case in point is St. Philip’s College, which employs a modular approach. Under its model, St. Philip’s faculty is obliged to take certain modules (such as pedagogical techniques), but they can opt out of those they don’t truly require. This model arose from the institution’s trial and error, when it became clear that the previous model had become too “one-size-fits-all” for the diversity within St. Philip’s faculty.

At a more granular level, we uncovered several other findings related to training practices during the interviews. First, institutions can meld one-on-one training with group training’s broader reach. For example, Pace strives to create the personal experience in a classroom environment by staffing the sessions so that there is almost one-on-one support available to attendees. A teacher instructs the class, but enough staff members attend to reinforce and demonstrate specific functions on an attendee’s desktop computer as necessary. For example, the instructor may discuss Web page design in general while staff members help attendees with their specific Web design needs.

Second, as instructors’ proficiency rises, their pedagogy and technical training needs evolve, forcing institutions to modify classroom-training curriculum. At Virginia Tech, for example, “Some technically advanced faculty felt that the Faculty Development Institute did not meet their needs any longer,” stated Moore. “So we used their feedback to create new training options, like tracks that
teach advanced tools like GIS and AutoCAD and how it is used within the teaching and learning perspective.”

Third, short, focused training sessions are gaining popularity because of instructors’ lack of time and the relative ease of digesting smaller chunks of information. Georgia State holds a WebCT clinic on the first Friday of the month. “What seems to work best are short, focused professional development activities,” said Georgia State’s Harmon. “For example, we show faculty members a single item over a one-hour brown-bag lunch. They seem to embrace that type of professional development much more readily than attending a day or half-day course.” Colgate has a weekly “technology studio” every Friday afternoon to advise faculty members on specific instructional technology problems on a drop-in basis. At the University of Arizona, some colleges offer their own local two-hour training sessions, which are popular. Roger Caldwell, professor of soil, water, and environmental science, prefers fewer and shorter sessions and feels “cheat sheets” of information may be more effective than overwhelming people with a lot of material at one time. USC automatically invites (through e-mail) all attendees of their initial tutorials to an annual roundtable discussion to learn more tips and “how-to’s.”

Finally, numerous institutions strive to train faculty about course management systems in a practical context. Fort Hays is planning a mock Blackboard course that teaches faculty members in an operational setting. Georgia State offers a training session that relates its CMS to Chickering and Gamson’s “Seven Principles for Good Practice in Undergraduate Education.” This approach provides a pedagogical context on the reasons to use a particular tool. “Those particular workshops are more effective; otherwise it tends to be a ‘how to,’ as opposed to the ‘whys’ and ‘whens’ which couch the appropriate application of these tools in an educational and instructional context,” said Marwin Britto, director of instructional technology, College of Health and Human Sciences, Georgia State University. “It certainly gives faculty members food for thought.”

ECAR’s study Faculty Use of Course Management Systems also discovered that the “training of faculty and instructional staff plays a key role in successful CMS adoption and use. Twenty-nine percent of the faculty and instructional staff surveyed cited training in CMS use as an important factor in their initial adoption or expanded use of a CMS. The most successful training offered is that delivered as close to the faculty as possible, on a small scale and including real examples rather than abstract or dummy courses.”

Training is also gaining importance to increase students’ technical proficiency. At Harford Community College students who take online distance-learning classes come to campus for an orientation, minimizing their support issues as they develop a better understanding of how the technology operates. Virginia Tech has begun to explore how to apply their Faculty Development Institute in a graduate student environment. “We have a new graduate dean who is interested in transforming graduate education,” said Anne Moore, associate vice president for learning technologies and director of information technology initiatives at Virginia Tech. “We are working on a proposal that builds on 10 years of our FDI experiences in helping faculty integrate technology in learning to integrate technology-enriched approaches to pedagogy in graduate studies. We aim to extend successful practices in faculty development as a foundation for rethinking graduate education and benefiting future generations of faculty.”
Curriculum/Course Development Resources

The study’s interviews revealed that e-learning course creation is a complex process, offering instructors many technical and pedagogical options. To facilitate course development, several institutions interviewed recommended easing instructors into e-learning through the gradual incorporation of appropriate e-learning tools. They also stressed personal interaction through formal mentoring programs, one-on-one consultations, or the grassroots network of veteran e-learning instructors. The aim is to help instructors design an effective course to suit their particular course characteristics.

Table 8-5 illustrates the curriculum and course development resources identified by survey respondents. With the exception of learning object repositories, almost all institutions offer authoring tools and other resources that require personal interaction such as creation of e-learning course materials and curriculum adaptation for e-learning. As with training resources, baccalaureate institutions tend to not offer all curriculum/course development resources, reflecting their low level of e-learning activity compared with other Carnegie classes.

As Table 8-6 shows, institutions tend to separate the organization of technology- and pedagogy-oriented resources. Central IT organizations are more likely to handle technically oriented tasks, while many institutions reported that a central faculty resource center is as likely or more likely to handle pedagogical tasks.

Asked to rate the relative importance of support resources, respondents identified

<table>
<thead>
<tr>
<th>Course/Curriculum Resource Offered</th>
<th>Percentage of Institutions Offering Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-the-Shelf Authoring Tools and Software Applications</td>
<td>98</td>
</tr>
<tr>
<td>Authoring Tools and Software Application Support</td>
<td>96</td>
</tr>
<tr>
<td>Creation of E-Learning Course Materials</td>
<td>92</td>
</tr>
<tr>
<td>Online Material Research and Review</td>
<td>91</td>
</tr>
<tr>
<td>Curriculum Adaptation for E-Learning</td>
<td>90</td>
</tr>
<tr>
<td>Copyright Research and Approval</td>
<td>87</td>
</tr>
<tr>
<td>Learning Object Repositories</td>
<td>71</td>
</tr>
</tbody>
</table>
support for e-learning course creation and curriculum adaptation as most important (Figure 8-2).

**Lessons Learned in E-Learning Course Development**

Adapting or creating an e-learning course can be a time-intensive proposition for instructors simply because there is so much to learn and contemplate in addition to normal teaching and research activities. Many instructors start out with a vague notion about e-learning but have no real understanding about how to transform a course. Some institutions, like Georgia State, advocate a gentle initiation into e-learning. Georgia State’s Gard noted, “To get people started, we don’t espouse the philosophy that the instructor has to go out and learn everything, and then create the course himself. We help him along. We’ll create the course, set up the prototype, and teach the instructor how to use it in his teaching and instruction successfully. Then we let the instructor develop and grow at his own rate.”

Many institutions interviewed promote partnerships between instructors and instructional technologists to address both technical and pedagogical issues. At Maricopa, for example, the learning technology area will either personally mentor the instructor or direct him to a staff member with comparable experience and a similar course or set of issues. The instructor leverages the staff member’s experience in working out his specific problem or issue. UCF takes this a step further and dedicates course designers to specific functional areas to provide a high level of customization and familiarity.

Institutions may also formalize processes or programs that the instructor must follow during his e-learning course development. At Fort Hays, “The faculty member submits a proposal form signed by the dean of the

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**Table 8-6. Organizations That Handle E-Learning Course/Curriculum Resources**

Base: Total Respondents (N = 260), Multiple Responses Allowed

<table>
<thead>
<tr>
<th>Resource</th>
<th>Central IT (Percentage)</th>
<th>School or Department (Percentage)</th>
<th>Central Faculty Resource Center (Percentage)</th>
<th>Other (Percentage)</th>
<th>Don’t Provide (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authoring Tools/Software Procurement</td>
<td>65</td>
<td>18</td>
<td>29</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Authoring Tools/Software Application Support</td>
<td>63</td>
<td>15</td>
<td>32</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>E-Learning Course Material Creation</td>
<td>44</td>
<td>24</td>
<td>36</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Online Material Research and Review</td>
<td>22</td>
<td>25</td>
<td>37</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Curriculum Adaptation for E-Learning</td>
<td>28</td>
<td>25</td>
<td>44</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Customized Applications/Template Creation</td>
<td>52</td>
<td>18</td>
<td>28</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Copyright Research and Approvals</td>
<td>15</td>
<td>18</td>
<td>25</td>
<td>36</td>
<td>13</td>
</tr>
<tr>
<td>Learning Object Repositories</td>
<td>29</td>
<td>10</td>
<td>28</td>
<td>15</td>
<td>29</td>
</tr>
</tbody>
</table>
Virtual College and the chair/dean of the faculty member’s department,” explained Dennis King, director of Fort Hays’s Center for Teaching Excellence and Learning Technology. “A contract is made, and then the instructor meets with our group to discuss instructional design issues. It is a lengthy development period—at least a semester—that the faculty works on the course. I would like it to be a year.”

Penn State’s Department of Earth and Mineral Science also has a lengthy course development program. “The institute makes it a point of conceiving these projects during a 12- to 18-month period,” explained David DiBiase, head of the E-Education Institute, College of Earth and Mineral Sciences. “The first offering of the course is the project’s midpoint. We follow up on a daily basis for at least one offering of the course to help the instructor with his teaching and problems. We get him through the first offering and then we back off.”

As instructors gain experience in instructional design, a grassroots support network emerges. “The single resource that is most valuable to faculty members is the help and counsel of other faculty members,” said Fort Hays’s Faber. Peers understand subject-specific pedagogical issues and may recommend subject-specific informational and pedagogical resources to use.

**Web-Based Tools Key to E-Learning Support**

Ranging from in-class software crashes to the simple “how-to” computer question, the scope and complexity of support grows...
as e-learning gains popularity on campus. Add to the mix the growing need for immediate support action and for 24 x 7 access to course materials, and support can easily strain an institution’s resources. Institutions outlined several effective practices for managing assistance resources, including outsourcing help desk functions, hiring student tech support workers, fostering grassroots assistance, encouraging department/school-level support, and using online help tools. As Table 8-7 illustrates, almost all institutions offer online resources. The percentage of institutions offering personal support, including support group meetings and in-class support or mentoring, is slightly lower.

As Table 8-8 illustrates, central IT and faculty resource centers both provide support. A high percentage of survey respondents identified the central faculty resource center as handling many interpersonal support resources, while central IT handles the technology-based support resources.

**Table 8-7. Availability of E-Learning Support/Assistance Resources**

<table>
<thead>
<tr>
<th>E-Learning Support/Assistance Resource Offered</th>
<th>Percentage of Institutions Offering Resource</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer or Web-Based Instructional Tools</td>
<td>97</td>
</tr>
<tr>
<td>Online Reference Resources</td>
<td>97</td>
</tr>
<tr>
<td>Listservs</td>
<td>83</td>
</tr>
<tr>
<td>E-Learning/Technology Telephone Help Desk</td>
<td>82</td>
</tr>
<tr>
<td>Support Group Meetings</td>
<td>81</td>
</tr>
<tr>
<td>Online Community Tools</td>
<td>80</td>
</tr>
<tr>
<td>In-Class Support or Mentoring While Teaching</td>
<td>74</td>
</tr>
</tbody>
</table>

**Table 8-8. Organizations that Handle E-Learning Support Activities**

<table>
<thead>
<tr>
<th>Support Activity</th>
<th>Central IT (Percentage)</th>
<th>School or Department (Percentage)</th>
<th>Central Faculty Resource Center (Percentage)</th>
<th>Other (Percentage)</th>
<th>Don’t Provide (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer/Web Instructional Tools</td>
<td>69</td>
<td>13</td>
<td>28</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>E-Learning Telephone Help Desk</td>
<td>62</td>
<td>5</td>
<td>18</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Listservs</td>
<td>58</td>
<td>10</td>
<td>22</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Online Community Tools</td>
<td>50</td>
<td>8</td>
<td>23</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Online Reference Resources</td>
<td>37</td>
<td>15</td>
<td>32</td>
<td>37</td>
<td>3</td>
</tr>
<tr>
<td>Support Group Meetings</td>
<td>35</td>
<td>11</td>
<td>41</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>In-Class Support while Teaching</td>
<td>22</td>
<td>21</td>
<td>33</td>
<td>10</td>
<td>26</td>
</tr>
</tbody>
</table>
Asked to rate the importance of support resources, survey respondents pointed to computer-based or online tools as the most important ongoing resources, perhaps perceived as a means to scale existing support resources (Figure 8-3).

**24 x 7 Support: A Key Issue**

Given the Web's anytime/anyplace nature, we could reasonably assume that the rise of Web-based e-learning would create the need for 24 x 7 e-learning technical support. Most survey respondents rated 24 x 7 support as a significant challenge, but the in-depth interviews revealed a split on the issue. Interview respondents generally believe 24 x 7 support is not a challenge in the current time frame. In particular, some of these institutions see the provision of around-the-clock CMS support as a key piece of their e-learning support strategy and appear to have put adequate resources in place. Other institutions may not yet have reached this conclusion and therefore still face the challenge of 24 x 7 support. Fort Hays's approach supplements personal support with technology during early-morning hours. “We expect to institute a chat system,” said Fort Hays’s David Schmidt, director of computing and telecommunications. “We plan also to expand access to our Web-based knowledge base from just the switchboard to our off-campus people, too.”

The University of Alaska SE’s Ciri feels it is also a time-management issue. “If students wait until the middle of the night before an assignment is due and something goes wrong,” he said, “then they learn to start their assignment earlier.” He would rather place resources where they have the most benefit.

### Effective Practices in E-Learning Technical Support

Interviewees outlined several effective practices to help meet growing support requirements:

- **Outsourcing**—Turning over help desk activities to contractors frees up personnel
for other activities. For example, Colgate reassigned four help-line staff to other positions when it outsourced its help desk.

- **Leveraging students**—Colgate and other institutions use students to supplement professional support staff. For example, Colgate has started a program of student Microsoft Office certified assistants to help their peers. Its Student Operated User Resource Center (SOURCe) peer support program uses student analysts to provide on-call technical assistance to students in their dorm rooms.

- **Localizing support**—Other institutions employ resources that promote local or grassroots interaction. “For the faculty that I have spoken with, the online faculty lounge area of WebCT is popular,” noted Georgia State’s Harmon. “They use that more than the seminars or help desk.” Fort Hays’s Liane Connelly, assistant to the chair, Department of Nursing, agreed: “The department has a department bulletin board, so an instructor can post a problem at 3:00 a.m., though a colleague may not answer it until 10:00 a.m.” Virginia Tech’s Center for Excellence in Undergraduate Teaching sponsors faculty study groups for the university.

- **Leverage online tools**—Online tools can supplement personal assistance and track support requests. At St. Philip’s, support is primarily person-to-person with the senior multimedia specialist, but it employs online FAQs, orientations, and other online resources also. Georgia State’s College of Education uses a 24 x 7 online request form to track any technical or instructional technology requests to central resources. The University of Phoenix operates an online writing lab that provides reference materials, instructional tools, and exercises to help students improve their writing skills. Students can submit papers electronically for grammar and style review by professional writers and teachers.

### The Future of E-Learning Support

With infrastructure resources, institutions seek to build more technology-equipped classrooms and labs or update current ones to keep up with growing demand. For example, the Commonwealth of Virginia passed a bond issue for classroom improvements at Virginia Tech. In July 2003, $4.5 million will be available to renovate classrooms over several years, with completion scheduled for 2008.

Growing interest in multimedia prompts the development of new resources. Institutions like Colgate, Virginia Tech, and the University of Arizona have built or plan to build facilities for multimedia. “We opened a small lab, the QuickTime Virtual Reality Lab,” said the University of Arizona’s Hoffman. “It is doing amazing work in a number of areas and is getting kudos. It’s the centerpiece for a grant proposal to expand it.” Colgate is about to begin construction on a $40-million library/multimedia center. The number of multimedia training sessions and consultations will continue to rise at many institutions to meet growing instructor demands.

As course management systems gain popularity, institutions continue to grapple with increasing traffic and server issues. While enterprise solutions seem to be a logical answer, financial issues represent a major roadblock. At least one institution, Ohio State, is migrating from a multiplatform to a single-platform environment. The University of Alaska SE is evaluating how to adopt the same CMS as other Alaskan higher education public institutions.

Institutions reported a greater emphasis on instructional technology as instructors’ requirements shift from technology to
pedagogy. Georgia State and Winston-Salem State University both reported the need to hire more instructional designers. The continued or expanded use of online training resources supplements personal training resources, enabling institutions to shift current resources. “We found many faculty members did not have the time to sit in a face-to-face training session,” explained Georgia State’s Gard. “So we replaced most sessions with e-training. We have one person to manage and market it, enabling us to refocus other staff.”

Endnotes

3. The response percentages add up to more than 100 percent because of multiple responses and show that the resources are sometimes offered by two organizations.
One of the key themes discussed earlier in the study is the steady growth in the number of e-learning courses offered by respondent institutions. Although their core strategic motives might vary, we found that institutions generally sought to:
- institutionalize e-learning, thereby transforming the entire teaching and learning experience;
- accommodate growing student enrollment;
- sustain academic diversity; and
- gain a competitive advantage.

Whatever the reason, all share the same reality: the need to foster a supportive climate in all phases and facets of their e-learning program. An important dimension of these programs is the support faculty receives from their institutions and departments as they develop and maintain their e-learning curricula. ECAR’s study *Faculty Use of Course Management Systems* touched on the importance of administrative support for course management systems (a key driver of e-learning adoption): “Administrative leadership plays a strong role in shaping and encouraging faculty CMS use. Where strong and positive administrative leadership is exercised, it has resulted in extensive and effective faculty CMS use. Where there is little or poor leadership, adoption rates are lower, CMS use is less effective, and use often engenders student resistance and resentment.”

Most respondents (83 percent) see their institutions as generally supporting the incorporation of technology into their instructional practices, as Figure 9-1 shows. The
nature of this support varies from “gentle” or “passive” support to highly activist approaches. Among the former is Colgate’s: “We help those who wish to be enabled and let them tell their colleagues about it,” said David Baird, director, innovative technology solutions for learning. “We get more interest through word of mouth and gentle leading than through any top-down kind of approach.” By comparison, according to Joel Hartman, vice provost for information technologies and resources at the University of Central Florida (UCF), “Faculty are recommended by their college or department to teach a specific course in one of our online modalities because it’s now part of their strategies, but faculty are not required to participate.” Virginia Tech uses a mixed approach: it does not mandate attendance in its Faculty Development Institute (FDI) but does tie hardware, software, and network upgrades to FDI participation.

Formal policies are important, however, especially for promotion and tenure consideration. “When a faculty member expends a great deal of time and effort to improve his or her instructional effectiveness by developing an e-learning course, that effort may count more toward tenure and promotion in some colleges and less in others,” UCF’s Hartman explained. “Partially as a result of these differences, the level of faculty participation varies from college to college. However, roughly half of the faculty engaged in online learning hold the rank of associate or full professor, which suggests that it is increasingly likely that members of departmental tenure and promotion committees are cognizant of the role and importance online learning plays within the institution.” By contrast, Marquette’s Connie Bauer, associate professor of marketing, said, “Since research publications are still the major way to be rewarded and/or promoted, faculty members focus their time and energy there.” She doesn’t see this changing until the reward system does—even among younger faculty.

While tenure and promotions represent longer-term incentives to faculty e-learning adoption, institutions have also needed to offer short-term “carrots” to tip the perceived benefit balance. As Table 9-1 shows, more than two-thirds of respondents have defined practices to encourage instructors to integrate technology with instruction. Stipends and release time are the two most frequently identified; only 12 percent offer special considerations for promotion or tenure. While almost a third of institutions overall reported no special practices, baccalaureate institutions are even less likely to have defined any, with 42 percent offering no special practices. Perhaps this shouldn’t be surprising, since baccalaureate institutions also tend to lag overall in e-learning course offerings. In contrast, only 10 percent of associate institution respondents offer no incentives.

Equally important to e-learning’s success is policy coherence across the organization. UCF’s Hartman called this the importance of “a holistic approach” to developing and supporting e-learning. “Different schools or colleges value the three basic things that faculty are supposed to do—teaching, research, and service—in different ways,” he said. “In the College of Education, where e-learning was born at UCF, research into teaching and teaching effectiveness is highly valued. In other colleges, it may be less so. It has to do with the relative teaching-versus-research focus in the respective colleges.”

To achieve coherence across e-learning practices, survey respondents believe adequate funding presents the leading institutional challenge to supporting instructors’ technology use in class, as Figure 9-2 shows.
Table 9-1. Institutional Policies to Encourage Technology Integration with Instruction
Base: Total Respondents (N = 258), Multiple Responses Allowed

<table>
<thead>
<tr>
<th>Incentive</th>
<th>Associate Institutions (N = 40), Percentage</th>
<th>Baccalaureate Institutions (N = 48), Percentage</th>
<th>Master’s Institutions (N = 77), Percentage</th>
<th>Doctoral Institutions (N = 57), Percentage</th>
<th>All Respondents (N = 258), Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stipends</td>
<td>65</td>
<td>35</td>
<td>57</td>
<td>46</td>
<td>47</td>
</tr>
<tr>
<td>Release Time</td>
<td>75</td>
<td>19</td>
<td>47</td>
<td>44</td>
<td>43</td>
</tr>
<tr>
<td>Special Consideration for Promotions/Tenure</td>
<td>13</td>
<td>15</td>
<td>12</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>31</td>
<td>25</td>
<td>44</td>
<td>30</td>
</tr>
<tr>
<td>Mandatory (No Special Considerations)</td>
<td>10</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>No Institutional Practices</td>
<td>10</td>
<td>42</td>
<td>25</td>
<td>26</td>
<td>29</td>
</tr>
</tbody>
</table>

Figure 9-2. Respondents’ View of Institutional Challenges to Support Instructors’ Use of Technology in Class
Base: All Respondents (N = 260)
The Importance of Administrative Support

As mentioned, institutions interviewed stressed the importance of building a common vision about e-learning’s role in their institutions and promoting it from the top down. A common vision provides a communication platform from which administration and instructors can build consensus and buy-in either through task forces or advisory committees. It lets an institution create a set of e-learning expectations and promote cultural change as these expectations filter down throughout the institution. “We’ve understood that e-learning is at root an instructional activity,” UCF’s Hartman said. “It has to fit into the faculty culture and the campus environment, and finally it has to meet institutional goals.”

The Changing Nature of E-Learning Support Requirements

During e-learning’s introductory phase, instructors and students become accustomed to adapting, teaching, and taking e-learning courses. At this point institutions focus primarily on establishing a base skill set—for example, CMS proficiency and basic computer skills. Over time, resource requirements evolve as training begins to yield higher proficiency, new hires and students possess better technical skills, and late or reluctant computer adopters retire. As early adopters gain mainstream technical skills, some institutions have noted that new technical requirements emerge. In some cases, the technical issues evolve from basic “how-to” support to more advanced issues. One key example is multimedia.

Technical proficiency also spawns more pedagogical requests. “Every new faculty member comes to us a lot more computer savvy, and the need for basic training declines,” noted Colgate’s Judy Doherty, director of technology education. “The next time we see current faculty, their requests represent the next notch up—moving from how to scan a picture to how to use a series of images across courses or use more visual aids in their instruction.” Fort Hays’s Dennis King, director, Center for Teaching Excellence and Learning Technology, concurred: “Three or four years ago, we spent a lot of our time teaching the technology as well as trying to teach the content. Now I think we have centered enough on the effective uses of the technology that we can focus on the content.” The shift to pedagogical needs proves especially important because some institutions do not offer resources to address pedagogically oriented course/curriculum and support requirements.

As needs change, institutions like Virginia Tech evolve training course topics and design accordingly. “We use our training and workshops as channels to help introduce faculty to new ideas, new interventions, and innovations,” explained John Moore. “Our early training work was ‘one size fits all.’ We respond to emerging faculty needs by adding program tracks and online training. For example, we now offer 12 different training tracks at the Faculty Development Institute; [that’s] 12 choices to learn rather different topics in each of those three-day workshops. One track is an independent study approach, so if ‘none of the above’ suits the faculty member, then we’ll try to do something on a custom basis.”

Others review resources constantly to provide the optimal mix. “If it is not giving you a good bang for the buck, you have to replace it or find something else,” explained Georgia State’s Carolyn Gard, director of university educational technology services. “You cannot keep your core services relevant if you don’t discontinue your old services.” Staff member departures also present an opportunity to evaluate staffing needs and ad-
just accordingly. One area for staff expansion is instruction design, to address the growing emphasis on pedagogical issues.

Institutions interviewed find they must scale as well as evolve e-learning resources over time. This is especially true if institutions must support both early adopters’ evolving needs and the basic technical needs of the second wave of e-learning participants, who, as St. Philip’s Julia Briggs, director of instructional technology, suggested, “have a steeper learning curve than the initial innovators.” Current resources may no longer be able to handle the resulting support volume.

Institutions interviewed suggested various solutions, some of which are just plain common sense: for example, use each support request as a means to promote technical self-sufficiency or to incorporate easy-to-use tools to facilitate adoption, training, and support. Other solutions also emerged:

- **Integrate resources as much as possible to promote greater efficiencies.**

  Colgate’s Case Library and Information Technology Center is centralizing IT staff, librarians, networking infrastructure, multimedia facilities, and library collection into one location. “We are taking a traditional library where students and faculty go to consume information and transforming it into a place to access content, to manipulate it, and to create unique and new content,” said Colgate’s David Gregory, chief IT officer.

- **Use technology as much as possible to refocus staff members.**

  “We are constantly looking for ways to let a software package do something for us where we once used personnel,” said Georgia State’s Gard. “One example is lab management software.” Other examples include online training tools, tutorials, and FAQs.

- **Leverage resources in consortium, system, or open-source agreements.**

  For example, Georgia State is working with Georgia Perimeter College (a Georgia State feeder college) to develop objects for a commonly offered WebCT course. “We have already developed the course,” said Gard. “Now we’re looking at the different modules that both schools will be offering, to create designs that will benefit both institutions.”

Georgia’s University System has an advanced learning technology group that is developing an online version of many core courses offered across the university system. “It gives us a set of fully developed online courses,” Gard said. “I see more sharing at the state level as it gives us rich resources that we don’t have the staff to create ourselves.”

- **Develop common processes and tools to achieve economies of scale.**

  A good example is UCF, which employs a highly systematized process to develop and maintain its online courses. “We take a systems approach and use scalable processes,” explained UCF’s Hartman.

- **Augment central resources at the department level.**

  For example, an institution might use locally based instructional designers to fulfill department-specific pedagogical needs. “We feel that instructional expertise has to be decentralized in the departments—one instructional design specialist per department,” said Penn State’s David DiBiase, head of the E-Education Institute, College of Earth and Mineral Sciences. “Everyone agrees that faculty members will be more inclined to adopt e-learning when there is somebody right down the hall that is familiar with them and their specialty.”

### Funding Increasing E-Learning Resource Demands

The need to enhance e-learning support resources comes at a time of tight budgets, with public institutions facing significant cuts in their state revenue allocations. Pri-
Private institutions that depend highly on rising tuition and endowments face similar pressures. “As more technology is used,” stated Pace’s James Stenerson, executive director, Center for Teaching, Learning & Technology, “there hasn’t been a corresponding growth in the budget.” He estimates his area needs an overall 10 percent budget increase to address technology needs. These pressures have made funding one of the most important challenges to institutions with current e-learning programs. In fact, the largest proportion of respondents identified the issue of securing funding for e-learning as a major challenge to their programs (Figure 9-2).

Figures 9-3 and 9-4 reflect the same general sentiment. Indeed, fewer than half of the institutions surveyed feel that funding is adequate for e-learning support for both faculty and students; the same level of sentiment was expressed for all e-learning types. Just one in 10 respondents feel strongly that e-learning is adequately funded. Lack of funding threatens to curtail e-learning activities at some institutions. Specific departments or colleges will create new e-learning courses only if the funding is available. At other institutions, lack of funding threatens some basic e-learning support resources.

Although the budgetary issues are difficult to overcome, respondents have considered some potential solutions:

- Leverage consortia and system-wide solutions to scale resources and spread costs across several institutions. This solution is particularly popular for course management systems, through either licensing agreements or open-source solutions.
- Increase reliance on fees, such as student technology fees, to fund resources such as online training.
- Recycle department dollars whenever possible, especially redirecting staff money as it arises from a staff resignation or retirement. “Times are tough and new money is hard to come by,” stated Penn State’s DiBiase. “Recycled funds are always available, and if you can get people to think strategically about it, a lot of things are possible. People retire, and as things change administratively, you can reallocate funds.”

**Measuring the Effectiveness of E-Learning Support**

Stacks of e-mail and glowing testimonials are the qualitative feedback that e-learning support providers receive from satisfied instructors about their experiences. Such comments lift department morale, but in difficult financial times, more substantive measurements may be needed to justify additional expenditures for e-learning support. These may not be easy to find.

Course management systems can provide some statistics—the number of instructors using it, the number of students enrolled in a class, and so on—but these do not show the entire picture. “We keep looking for the best metric. In some ways if you only look at faculty use, you get a skewed figure,” explained Penn State’s John Harwood, senior director, teaching and learning with technology. “In a department where all its faculty members teach low-enrollment courses and course management usage is high, you would say that we have a lot of faculty teaching with technology. The overall impact on Penn State, however, is small. That has a very different implication from faculty use at the College of Business, which is huge at Penn State.”

Another commonly used quantitative tool is the survey, used to assess students’ e-learning class experiences or instructors’ central resource experiences. For example, the University of Washington uses student and instructor evaluations not only to assess
the course’s content and the faculty member’s performance but also to solicit opinions about technical help, course design, and the learning management system.

But Penn State’s Harwood described the real problem. “With our technology systems, I can pull a lot of data,” he stated. “What I can’t access easily is how people feel about things, so we use the surveys to take the temperature of our users. But I don’t have solid data on our impact or our success. I can give you numbers, but I think our numbers are really soft.” Colgate’s Gregory stated, “I need nonanecdotal data or nonspecious research that shows the effectiveness of e-learning. If I am going to invest in an enterprise version of our course management system, I want some hard data that says here is how it has improved student performance.”

Colgate mentioned using the Teaching, Learning, and Technology Group’s Flashlight program as one way to study and assess technology’s impact in its classes. Virginia

![Figure 9-3. Perceived Adequacy of IT Spending to Support Various Modes of Students’ E-Learning Needs](chart1)

![Figure 9-4. Perceived Adequacy of IT Spending to Support Various Modes of Instructors’ E-Learning Needs](chart2)
Tech has performed some quantitative measures comparing its Math Emporium (a computer lab-based course alternative to classroom-based math instruction) to similar classroom-based courses. “To build our Math Emporium, we received a Pew Course Redesign Grant. This enabled us to get really good metrics on costs, retention, persistence rates, and more by using algorithms designed for the grant process,” said Virginia Tech’s Anne Moore, associate vice president for learning technologies and director of information technology initiatives.

“For students who have taken courses at the Math Emporium, we found failure rates are down, persistence rates are up, retention rates are up, and, over time, the students’ GPA has averaged out to the usual curve.” The Math Emporium courses also cost less than traditional classroom-based math classes. Moore said that teaching the course traditionally in a classroom cost $74 per student, versus $24 per student in the Math Emporium. With faculty salary increases and improved economies of scale over several years, the differential increased from $91 per student in the traditional course versus $21 per student in the technology course.

Moore admitted, however, that “when you compare a standard course with a course that is technology based, you are comparing apples and oranges. What you want to know, regardless of delivery mode, is whether the students are learning the things that they should know and be able to do after studying a subject, and whether they are engaged in the kinds of activities that underpin learning.”

Endnotes


Supporting E-Learning in Higher Education

Volume 3, 2003

EDUCOASE CENTER FOR APPLIED RESEARCH

This chapter concludes the study by looking at three key areas:

- the key elements that make up a successful e-learning initiative—lessons learned;
- some key trends taking place in e-learning (not limited to the research done for this study), the promise of these trends, and the issues they will raise; and
- general conclusions on this research and its meaning for e-learning support in higher education.

Lessons Learned

One of this study’s principal goals was to identify and describe the key elements that make up a successful e-learning initiative. This list includes not only institutions’ strategies, tactics, and practices but also the lessons they have distilled from experience. The following sections discuss the most important and broadly relevant lessons learned in the course of the study. We present the findings, organized into three broad areas—institutional issues, faculty and department issues, and student issues—as a mix of statements and attributed quotations.

Institutional Issues

Provide academic administration support.

“One of the biggest challenges of e-learning has related to our culture—the fact that we’re old and tradition bound. We’ve learned that unless we secure adequate academic administration support for e-learning initiatives, everything else is a battle.” (St. Philip’s College)

Establish realistic online course standards.

“When online courses are evaluated for fitness, it’s clearly important to maintain high standards. The big question—and one that’s potentially troubling—is how high to set the bar. If you raise the bar too high, then you run the risk of driving away instructors because it’s harder than regular courses. What’s the incentive? There’ll be instructors who say, “You’re telling me that I have to work more and I have a higher standard? Why do it?” If we want faculty to do this on a large scale, we need to put in standards that are not so high that they’re prohibitive.” (University of Southern California)
Anticipate resource pressure.
Support burdens can strain institutional resources, especially when instructors and students access courses 24 x 7. Providing online support tools or outsourcing help-desk functions can relieve some of the burden.

Expect the nature of support requirements to evolve.
E-learning is a relatively new phenomenon. As adoption deepens and broadens, so will the nature and intensity of support requirements. Institutions must evaluate e-learning resource needs constantly to keep infrastructure up-to-date and to better serve instructors’ evolving technical and pedagogical needs. Institutions interviewed identified several evolving areas, including greater demand for multimedia training, a preference for shorter but focused training sessions, continual review of training topics, and greater demand for instructional designers. Online training and help tools are also gaining popularity.

Leverage where you can.
Leveraging resources to handle rising support demands is also important, especially as tight budgets force institutions to use resources as effectively as possible. Examples include
- leveraging resources in consortium, system, or open-source agreements to develop online distance-learning courses and CMS course modules, or to fund CMS upgrades;
- developing common processes and tools to achieve economies of scale; and
- augmenting central resources at the department level to enable the development of specialized instructional design teams that understand an academic area’s particular requirements and nuances of course design.

Provide adequate infrastructure support and demand reliability.
“The quality and reliability of the technological infrastructure is critical. If we’re able to keep this technological infrastructure up and running, it’s going to make the option of teaching e-learning courses a lot more appealing to faculty members.” (St. Philip’s College)

“In order for e-learning to work, it needs to be completely transparent. This means it has to have extremely high performance, including low network latency, high transaction throughput, and a stable, non-crash-prone platform. These types of infrastructure issues can be completely crucial for core parts of the course, such as giving quizzes or an online lecture. Without this stability and performance, the student experience is disrupted instead of improved. When things don’t go right, it becomes evident that the teaching and learning process is very fine-tuned and can easily be disrupted by inadequate technology performance.” (USC)

Strengthen incentives.
Although many institutions offer stipends or release time to encourage e-learning activities, expanding these incentives to include considerations for promotion and tenure could prove valuable. This holds true especially for younger teachers who have to balance career interests with e-learning’s rigorous demands.

Start slowly.
“Slow but steady” characterizes the e-learning course development approach advocated by many institutions interviewed. It is a time-consuming and complex process to reevaluate courses and select appropriate technical and pedagogical tools for e-learning applications. Institutions interviewed advised instructors to tinker
with, not overhaul, courses. Also popular are programs that match instructors with instructional technologists, either by assignment or in a formal e-learning course development program.

**Institutionalize practices.**

Interviewees stressed the importance of building a common vision about e-learning’s role in their institutions and promoting it from the top down. A common vision provides a communication platform from which administrators and instructors can build consensus and buy-in either through task forces or advisory committees. A vision and supporting collaborative governance make it possible to create a set of e-learning expectations and promote cultural change as these expectations filter down through the institution. The University of Central Florida’s institutionalized approach is key to its e-learning success: “We’ve understood that e-learning is at its core an instructional activity. It has to fit into the faculty culture and the campus environment, and finally it has to meet institutional goals. We approached it from that point of view.”

**Require holistic involvement across the institution.**

“For e-learning to be successful, it needs to be from the ground up—grass roots. You need to have faculty working with support staff figuring out all the different support systems and how things can be pulled together, [so that] people like the registrar understand the problems and issues of faculty. Moreover, faculty need to make more decisions on how the e-learning programs are going to be pulled together. It is much less successful if there is an administrator telling you what to do and how to do it.” (St. Philip’s College)

**Recognize emerging importance of outcomes.**

“One of the emerging issues we’re seeing around e-learning is the importance of outcomes. USC is up for re-accreditation and has to have a self-study completed by 2005. For the first time, learning outcomes for e-learning is a factor in the evaluation. So as we as an institution devote a lot of effort and attention to looking at e-learning outcomes, it will give us a better handle on what works, but it may also add a bit more challenge.” (USC)

**Secure administrative support as the foundation for e-learning growth.**

“It’s very important to have strong administrative support at the highest level. In the beginning we didn’t have it, but we also didn’t need it that much because [faculty] pioneers were willing to take charge and the administration was willing to try it. As it’s grown, the need for structure and the need for more academic administrative support has become overwhelming. Getting that administrative support—and an understanding of why it was necessary—was difficult because it was outside the everyday experience of deans and vice presidents. However, once that was in place, it really helped us by adding structure and control. It allowed us to focus on higher-enrollment courses and thereby serve the biggest part of the population. That administrative support was critical to being able to add that structure.”

(St. Philip’s College)

**Faculty and Departmental Issues**

**Offer rich and diverse e-learning training resources.**

It is important to offer a menu of training resources—one-on-one consultation, classroom training sessions, and online tools—to address instructors’ different training needs and learning styles. While most prefer one-on-one training for its personalized attention, classroom training ranging from scheduled classes on specific topics to more systematic training programs...
reaches a broader audience to help instructors achieve technical proficiency and provide a forum to exchange ideas. Institutions can personalize the classroom experience by augmenting teacher-led sessions with staff members to address specific questions and issues on the individual attendee’s desktop computer.

**Encourage faculty resourcefulness.**

“When the Instructional Innovation Center will help faculty early on, faculty are expected to be entrepreneurial to keep up with the ongoing demands of the class. It’s akin to teaching them to fish, but not fishing for them. If faculty are having problems with their e-mail management, then the Instructional Innovation Center will provide suggestions on how to fix it, but will not fix the problem.” (St. Philip’s College)

**Focus on teaching, learning, and pedagogy—not tools.**

“Successful faculty development results from an instructional approach, not from an emphasis on technology. It’s typical for IT organizations to approach e-learning training as an exercise in learning tools, like WebCT or PowerPoint training. We see our role as helping faculty think about teaching and learning and pedagogy, and that’s a big factor in our success and that of the faculty. We focus very much on what our faculty do and what they need, and we do a lot to try to make them succeed on their own terms in this new environment.” (USC)

**Leverage multimode instructional benefits.**

“We’ve seen a trend where faculty that have developed an online course but also teach traditional courses import many aspects of their e-learning course to their traditional instruction methods. In this way, there’s been a valuable cross-pollination between the two [modes].” (St. Philip’s College)

**Provide adequate support for e-learning faculty.**

“E-learning instructors can fail because people on high do not understand the intense commitment required of faculty members to be successful in e-learning or the fact that these faculty members are working on evenings and weekends doing all kinds of things to make sure their courses are successful. And we don’t have the monetary incentives to help them along, except while they’re developing the course. Nor do we provide the kinds of support—like a teaching assistant in each department to help all of the distance-learning instructors with phone calls or e-mail—that allow faculty members to focus on teaching.” (St. Philip’s College)

**Reward innovation.**

“Our belief is that at the beginning of the adoption curve there are about two percent or so who are pioneers—they’re ready to do something innovative, and they don’t mind failing. Then come the early adopters, late adopters, and then nonadopters. The Teaching and Learning Services organization operates with the assumption that the e-learning curve is different; that curve isn’t really about technology per se, it’s about pedagogy. We need to start fresh again in our thinking about how the curve is going to play out. Our belief is that there’s going to be a very small population who are really going to know how to do something pedagogically innovative. But they are going to need a lot of help and a lot of hand-holding. This will be followed by a wave of early adopters who are not true pioneers but know how to effectively use these new e-learning tools.” (USC)
Evolve faculty training programs over time.

A study by the Research Initiative for Teaching Effectiveness showed that after instructors redesign their first course, they often return to course development and Web services resources to redesign additional courses. This indicates that once faculty adopt e-learning and see its benefits, they become active proponents. (University of Central Florida)

“We as a training and support resource needed to take into account that faculty sophistication profiles were changing and that as a result a ‘one-size-fits-all’ approach—especially one developed with early adopters in mind—was not going to work. We needed to make sure that faculty realize that even though they know their subject matter, they don’t know e-learning. We needed to help them understand that the pedagogy is different from technology and that they needed to structure the class differently for the class to be effective.” (St. Philip’s College)

Student Issues
Keep students plugged into e-learning classes and encourage faculty–student contact.

“From an instructional standpoint, the key issue is making sure that students keep up to counter the perception that it is ‘just an Internet class’ and can be done at any time. Students often feel that they are drifting in space, especially if they don’t communicate enough with the instructor. To keep retention rates up, students and faculty need to strike the right balance between too much and too little correspondence.” (St. Philip’s College)

Prescreen student e-learners.

“As long as students self-advertise, retention will always be a problem within e-learning classes. We have people who signed up for e-learning courses who don’t have a computer. While that’s okay because they can take them on campus, it’s not the ideal person for the e-learning course.” (St. Philip’s College)

Trends and Future Support Issues in E-Learning

E-learning in higher education is in its infancy. The Gartner Group, a market research firm, predicts that by 2005, competitive differentiation between higher education institutions on the basis of e-learning capability will widen dramatically as a result of a larger product marketplace with more tiers. Support for this critical endeavor is also new and is being crafted successfully in ways consistent with support for other major technology applications. While this study anticipates increasing support demands associated with growing faculty experience and the emergence of multiple instructional media, e-learning’s future also suggests some trends and directions that might be discontinuous and for which planning should begin now. These include:

- the evolution of new e-learning support roles and the need to rethink instruction as a team-based activity;
- the emergence of viable online learning-object sources and the resulting support issues related to digital rights management, quality assurance, technical standards and integration, and stimulation of a faculty culture of reuse;
- management of course materials’ “afterlives,” in particular, establishing standards for the retention or destruction of online course records and the integration of such records into mainstream institutional practices related to information privacy and access;
real changes in faculty incentives that recognize the value of effort and outcomes invested and realized in support of e-learning; and

- intensified interest in accounting for learning outcomes in a meaningful way, including the emergence of e-portfolios as a strategy for enhancing the record of student activity, engagement, and performance.

Instruction As a Team-Based Activity

Currently, higher education instructors perform several roles simultaneously: instructor, mentor, researcher/academic, and course implementer/developer. For higher education to take advantage of e-learning opportunities, instructors must successfully integrate the additional roles of technologist and instructional designer, supported to a greater or lesser extent by their e-learning support organizations. Some early team-based course-authoring tools rely on typical faculty roles (author and content manager) as well as newer ones such as content editor, graphic designer, and production coordinator, making the “team” almost like a film production company.

Mitigating the impact of these additional roles, or functions, presents a significant challenge for the continued growth of e-learning in higher education. Faculty members, instructional designers, librarians, information technologists, and others will likely work in teams to assure the quality, reliability, and scalability of e-learning offerings. Interestingly, some e-learning proponents outside higher education are pushing strongly to move some e-learning support burdens to publishers and other owners of the intellectual property associated with e-learning. In other cases, commercial e-learning proponents promote shifting IT support burdens to learning technology infrastructure and tool vendors.

The Promise and Perils of Online Learning Objects

One of the most significant technology trends is the adoption of standards for learning objects. For years, the IMS Global Learning Consortium, the Advanced Distributed Learning Network, and others have worked to define an Internet architecture for learning by developing and disseminating standards and specifications. More recently, the Multimedia Educational Resource for Learning and Online Teaching (MERLOT) has been promoting the development and dissem-ination of online learning objects through standards and the management of a peer review process designed to “allow faculty from any institution of higher education to decide if the online teaching-learning materials they are examining will work in their courses.”

The emergence of a robust marketplace of academically legitimate learning objects could simultaneously raise the quality of global postsecondary instruction and liberate instructors from mundane and repetitive instructional tasks. Further, developers can write learning objects to exploit various learning styles, making it possible for faculty to help students realize their fullest potential. The evolution of such a marketplace will likely be slow and difficult, constrained first by technical obstacles, second by the absence of new business models to support micropayment-enabled object trade, and finally by faculty skepticism of others’ course content and reticence to shift roles from “sole producer” to “integrator.”

Despite these very real and seemingly intractable problems, too many faculty, too many institutions, and too many publishers see the overwhelming potential in learn-
ing objects to ignore them. The eventual widespread adoption of such capabilities suggests major new support requirements to facilitate rights management, operate standards-based application and network environments, develop tools such as course templates to facilitate instructional learning object use, and provide ongoing education and support to individual educators as they make the difficult transition to roles as integrators.

Managing the “Afterlives” of Online Learning Content

Course management systems create new potential for promoting and capturing a rich and unprecedented dialog among students and between students and instructors. Indeed, there is evidence that faculty believe using these systems increases the level and quality of student-faculty communications. The creation and retention of course archives, along with related and revolutionary trends concerning digital content, have led to the emergence of institutional repositories as a new support strategy “to apply serious, systematic leverage to accelerate changes taking place in scholarship and scholarly communication.”

The vision of institutional repositories, as expressed in the MIT DSpace initiative and elsewhere, is a collection of the intellectual works of an institution's faculty and students—a record, as Lynch describes it, of “the ongoing intellectual life of the institution.” The creation and management of such institutional repositories represent a significant future support activity associated, in part, with e-learning. This trend’s implications for e-learning support include managing the instructional record throughout its life cycle, including decisions related to student privacy protection, and preserving this aspect of the institution’s intellectual life.

Incentives for Fostering E-Learning

E-learning in higher education began as either the adventurous efforts of individual faculty inspired by the potential of information and communications technologies or as a few institutions’ highly centralized and frequently unsuccessful efforts to expand their institutions’ franchises via online distance-education efforts. Since those early years, a software industry has emerged to promote e-learning on the enterprise level, many instructors have embraced the idea, and several institutions—such as the University of Maryland, Penn State, and the University of Central Florida—have made significant and successful institutional commitments to e-learning.

Still, the early evidence suggests that while the idea of e-learning has gained widespread acceptance, many faculty either await further evidence of course management systems’ efficacy or use only a portion of these systems’ capabilities. Real progress in using technologies to enhance the learning experience and learning outcomes will result from improvements in technologies’ quality (and support) and from teaching faculty’s motivation to use them. Currently, these systems are in their infancy and therefore require considerable knowledge, expertise, and effort from users. Further, the full exploitation of these technologies depends on the widespread diffusion of knowledge emerging in the learning and cognitive sciences. Finally, colleges and universities that are committed to fully integrating e-learning into their instructional mixes need to move beyond small grant programs that surface and reward early adopters. Longer term, colleges and universities, particularly research universities, will need to recognize that effective e-learning is a competitive differentiator and that investment in this activity will prove significant. In particular, higher
education institutions will need to adjust faculty incentives, notably those related to promotion and tenure, to encourage and recognize the time and effort investments that exemplary e-learning efforts will demand.

**A Focus on Learning Outcomes**

As e-learning gains widespread acceptance, and especially as students move to optimize their schedules and budgets by balancing online courses with “on-the-ground” offerings, pressure will mount for colleges and universities to exchange course credits with one another. The novel and important articulation agreement between community college members of the League for Innovation and the University of Phoenix is one early manifestation of this growing pressure. As this pressure grows and as employers press increasingly for assessments of student performance that they can translate into meaningful expectations of future employees, our students and our institutions will be expected increasingly to demonstrate the learning outcomes of the educational experience. While many demands associated with the pressure toward more refined learning outcome assessments will fall on faculty, new developments such as e-Portfolio will likely create significant new support demands.

The idea of e-Portfolio is new, so key definitions of its nature and scope are still under discussion and refinement. For many, e-Portfolio represents the integrative “glue” that ties together disparate elements of the evolving IT-enabled teaching and learning environment. These elements include:

- learning objects and their scholarship (faculty portfolio), including scholarship related to objects as artifacts, objectives, and evidence;
- templates for course content, workflow, and presentation;
- interfaces with course management systems, student information systems, and other administrative applications; and
- portability between institutions, grading systems, and more.

The e-Portfolio agenda is ambitious, and, once again, its support and cultural aspects will far exceed its technical complexity. Nevertheless, there is momentum, leadership, and investment resources for the teaching and learning movement, which reflects trends that Levine and other higher education scholars anticipate.

**Final Conclusions**

We can make a convincing argument that e-learning has reached a critical mass in higher education—as a core, maturing method of learning—and is now poised for potentially significant growth. The transformation of e-learning is a natural (and perhaps predictable) outcome of its adoption curve. In the first phase of its adoption, e-learning was largely the province of leading-edge pioneering faculty. While in some cases institutional support performed a function akin to “cloud seeding” to encourage the germination of e-learning initiatives, most early activity came about as a result of faculty innovation and without substantial institutional support.

Like other initiatives rooted in entrepreneurial, decentralized activities, e-learning faces the challenge of achieving coherence within the institution and, ultimately, reasonable standardization. The factor that played the biggest role in raising e-learning to the next level of its evolution was the
development and formalization of support infrastructures at various levels (institutional, school level, and/or department level). This support was critical because it provided a set of processes and resources that could help move e-learning initiatives forward at institutions. How? By articulating training priorities; by finding and addressing technological and pedagogical “pain points”; by providing course development resources; and by providing a bridge between faculty and administrative goals and priorities. These activities and more.

E-learning’s next phase will see both broader and deeper adoption. Institutions currently offering e-learning programs will increase and enrich their mix of offerings. As institutions evolve and grow their initiatives, e-learning will also tend to move inexorably toward closer integration with institutions’ broader mission—a goal one study participant characterized as “taking the ‘e’ out of e-learning.”

Because no single model describes how e-learning is adopted, it is difficult to articulate a set of universal challenges to institutions trying to move their e-learning programs to the next level. At a general level, though, it is safe to say that institutions on the whole will need to reexamine how e-learning fits into their missions and strategies and how to reflect this in institutional resource allocations. Most institutions will need to evolve the infrastructure and roles that have supported e-learning in its earlier stages—structures and roles that made sense in the embryonic and early growth stages but may not be appropriate for the next stages. The degree of adjustment needed will of course vary with each institution’s culture (centralized versus decentralized, for example). In sum, institutions must organize their support resources and infrastructure in a way that can be scaled up as e-learning faculty, students, and courses increase.

A key issue related to scale is technical and training support. To fully understand this, we must recognize that growth in e-learning adoption has both quantitative and qualitative dimensions. That is, while the number of faculty and student adopters will clearly grow, the attributes (technical sophistication, for example) that affect the amount of support they will need will also change. Because e-learning adoption is in many ways self-selective, later-stage faculty adopters may well prove to be comparatively less technically savvy than the first wave of adopters. On a practical level, this may mean a longer learning curve or training track. It may also require institutions (or schools and departments) to offer more-flexible training programs to accommodate the growing divergence of technical skills that comes with broader adoption. The trick will be to balance the need for a standardized track—having pedagogical training at its core—with this need for flexibility.

Student issues present similar challenges. While students’ collective technical sophistication by all accounts grows each year, skills barriers will continue to present a challenge to institutions offering e-learning. All institutions will face this challenge to some extent, but some classes of institutions (such as public community colleges) may find this of greater significance than others. This will compel institutions catering to a less technically savvy student population to establish mechanisms to help students determine if e-learning is appropriate for them. Likewise, these institutions may be more likely to require technical training and support for e-learning students.

One clear theme emerging from the research is the importance of funding for
e-learning support. Put simply, e-learning’s successful growth will depend on program development, which in turn will require adequate funding. While funding models vary considerably, both within and across institutional categories, e-learning funding will likely fare best when it is aligned closely with the institution’s broad goals. These goals may range from increased outreach to lower classroom utilization to market expansion. In any case, securing stable, long-term funding will be critical to e-learning’s success as an established, integrated learning modality. Higher education can also benefit by reducing support needs from the corporate e-learning environment, moving the e-learning support burden to their content suppliers over time, and, in the future, supporting e-learning content standards development.

Finally, as discussed earlier in this chapter, the emergence of standards at an industry level will play a key role in the future of e-learning. Standards, now more promise than reality, face significant challenges, but they appear to be critical to the continued growth of e-learning. Higher education e-learning support organizations will be challenged to support standards creation and ultimately to reinvent themselves to meet the new requirements of standards.

Clearly, the continued evolution and growth of e-learning in higher education institutions will depend heavily on institutions’ ability to build effective models to support e-learning activities.

Endnotes
6. Ibid.
7. Morgan, op. cit.
8. This program is described at <http://www.league.org/league/membership/articulations/UOP.htm>.
Appendix
List of Interviewees in Phase Two Qualitative Research

Colgate University
David Baird, Director, Innovative Technology Solutions for Learning
Judy Doherty, Director, Technology Education
David Gregory, Chief Information Technology Officer
Karen Harpp, Associate Professor of Geology
Ian Helfant, Assistant Professor of Russian
Ray Nardelli, Instructional Technology Specialist

Fort Hays State University
Liane Connelly, Assistant to the Chair, Department of Nursing
Paul Faber, Dean of Arts & Sciences
Dennis King, Director, Center for Teaching Excellence and Learning Technology
David Schmidt, Director of Computing and Telecommunications

Georgia State University
Marwin Britto, Director of Instructional Technology, College of Health and Human Sciences
Carolyn Gard, Director, University Educational Technology Services
Stephen Harmon, Director of Instructional Technology, College of Education
Karen Oates, Information Systems Training and Instructional Support Manager

Harford Community College
Louis Marseilles, Director for Technology

Maricopa Community Colleges
Ron Bleed, Vice Chancellor Information Technologies
Steve Lucas, Reading Instructor and Curriculum Developer

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Marquette University
Connie Bauer, Associate Professor, Marketing
Jon Pray, Associate Vice Provost for Educational Technology

The Ohio State University
Susan Metros, Deputy CIO and Executive Director for Educational Technology and Distributed Learning, and Professor, Design Technology
Bobby Moser, Dean of Food, Agricultural, & Environmental Science and VP of Outreach and Engagement

Pace University
Frank Mannle, Director, User Services Department
James Stenerson, Executive Director, Center for Teaching, Learning & Technology

The Pennsylvania State University
Thomas Berner, Professor of Journalism and American Studies
David DiBiase, Head of the E-Education Institute, College of Earth and Mineral Sciences
John Harwood, Senior Director, Teaching and Learning with Technology

St. Philip’s College
Julia Briggs, Director, Instructional Technology
Bob Kemmerer, Technical Services Manager
Audrey Mosley, Associate Professor, Department of English
Bess Porter, Instructor, Health Information Technology Department
Karen Sides-Gonzales, Coordinator of Instructional Innovation Center

University of Alaska Southeast
Jon Anderson, Professor of Public Administration
Michael Ciri, Director of Information Technology Services

University of Arizona
Roger Caldwell, Professor, Soil, Water, and Environmental Science
Barbara Hoffman, Associate Director, Center for Computing & Information Technology

The University of British Columbia
Michelle Lamberson, Director, Office of Learning Technologies

University of Central Florida
Joel L. Hartman, Vice Provost for Information Technologies & Resources
Linda Hennig, Coordinator, School of Nursing
Judy Lee, Coordinator, Online Educational Media Master’s Program
Martha Marinara, Assistant Professor, Composition
Steve Sorg, Director, Center for Distributed Learning
Barbara Truman-Davis, Director of Course Development and Web Services
University of Southern California
Sue Gautsch, Director of Teaching and Learning Services, Center for Scholarly Technology
Mike Pearce, Deputy CIO
John Silvester, Vice-Provost for Scholarly Technology
Geoffrey Robert Spedding, Associate Professor, Aerospace and Mechanical Engineering

The University of Texas at San Antonio
Anita Leffel, Lecturer, Department of Management
Jeff Noyes, CIO and Associate Vice President for Information Technology

University of Washington
Jacqueline Brown, Director of Technology Outreach and Partnerships
Gerry Philipsen, Professor of Communication
Oren Sreebny, Assistant Director for Client Services, Computing & Communications
Dave Szatmary, Vice Provost, Educational Outreach

Virginia Polytechnic Institute and State University
Earving Blythe, Vice President for Information Technology
Tom Head, Director, Instructional Services
Anne Moore, Associate Vice President for Learning Technologies and Director of Information Technology Initiatives
John Moore, Director, Faculty Development Institute and Director, Educational Technologies
Glenda Scales, Assistant Dean for Distance Learning and Computing, College of Engineering

Winston-Salem State University
Carolyn Anderson, Associate Director of the Center for Innovative Teaching, Technology, Learning, and Evaluation
Cecilia McDaniel, Interim Associate Vice Chancellor for Lifelong Learning and Professional Development and Director of Distance Learning
Rebecca Wall, Professor of English
Joyce Williams-Green, Associate Provost for Instructional Research and CIO