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
as 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](image) Base: Total Respondents (N = 274)
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:
Supporting E-Learning in Higher Education

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.

- Continuously 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/>.