



Supporting E-Learning at Virginia Polytechnic Institute and State University

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Preface

The EDUCAUSE Center for Applied Research (ECAR) produces research to promote effective decisions regarding the selection, development, deployment, management, socialization, and use of information technology (IT) in higher education. ECAR research includes

- ◆ research bulletins—short summary analyses of key IT issues;
- ◆ research studies—in-depth applied research on complex and consequential technologies and practices; and
- ◆ case studies—institution-specific reports designed to exemplify important themes, trends, and experiences in the management of IT investments and activities.

While technologies offer many new learning possibilities, they also present new challenges. Institutions must adapt pedagogical practices, ensure technical proficiency, and develop and maintain a reliable and robust technical infrastructure to use e-learning effectively. These demands translate into a host of new instructor and student support requirements that institutions must address.

To help institutions achieve these goals, 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 examines the issue from the perspectives of support providers and support users. 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. This research proceeded in three phases.

Phase 1: Online Survey

ECAR conducted an online survey of the EDUCAUSE membership to develop a baseline on the state of e-learning courses and their central support activities in higher education. It received 274 valid responses, which represents 18 percent of the surveyed EDUCAUSE membership. The survey's general topics included:

- ◆ online distance learning, 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;
- ◆ infrastructure and organization of support resources; and
- ◆ current and future challenges to meeting support requirements.

Phase 2: Telephone Interviews

We conducted 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; EDUCAUSE staff and an ad hoc advisory committee comprising EDUCAUSE members involved in e-learning also helped with recruiting. We selected candidates on the basis of several criteria, including reputation as a leader in e-learning, percentage of hybrid and/or online course offerings, and degree of faculty and student involvement in e-learning. During January and February 2003, ECAR invited 23 institutions 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 touched on in the survey research. IDC and ECAR analysts conducted telephone interviews with support provider representatives (for example, a manager from the central IT department, a manager from the instructional technology unit, or a representative from the institution’s faculty resource center) and support user representatives (such as the academic senate chair of the instructional

technology committee or an appropriate dean or department chairperson) from each institution.

Phase 3: Case Studies

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 case studies seek to gain a deeper understanding of the various central e-learning support models and, by extension, what has worked well and what needs improvement. We assume that readers of the case studies will also read the main report, which incorporates the case studies’ findings within the report’s generalized context.

ECAR wishes to thank the leadership of Virginia Polytechnic Institute and State University for their time, assistance, and diligence in support of this research. In particular we thank Earving Blythe, vice president for information technology; John Burton, professor of teaching and learning; Stephen Edwards, assistant professor of computer science; Edward Fox, professor of computer science; Valerie Hardcastle, professor of philosophy; Tom Head, director, instructional services; Betty Heath-Camp, professor of teaching and learning; Timothy Luke, University Distinguished Professor; Gail MacMillan, director of the digital library; Timothy Mack, professor and head of entomology, assistant dean; Anne Moore, associate vice president for learning technologies and director of information technology initiatives; John Moore, director, Faculty Development Institute and director, educational technologies; Mark Raby, associate director, eLearning support systems, Institute for Distance and Distributed Learning; Roy Robbins, associate director, planning, assessment, and research, Institute for Dis-

tance and Distributed Learning; John Rossi, professor and head of mathematics; Glenda Scales, assistant dean for distance learning and computing, College of Engineering; and Edward Schwartz, instructional designer, Faculty Development Institute.

We hope that readers of this ECAR case study will learn from their experiences.

Case Background

Virginia Polytechnic Institute and State University (Virginia Tech) is a comprehensive research university located in Blacksburg, Virginia. With more than 25,000 enrolled students, Virginia Tech is the state's largest higher education institution. It offers 60 bachelor's degree programs and 110 graduate programs in its eight colleges of agriculture, architecture, arts/sciences, business, human resources/education, engineering, natural resources, and veterinary medicine. With annual research expenditures of about \$170 million, the university consistently ranks among the top 50 research universities in the United States. It employs more than 1,600 faculty members.

Virginia Tech's e-learning activities are extensive and well respected. Technology in classes is the norm, not the exception. Anne Moore, associate vice president for learning technologies and director of information technology initiatives, estimates that 75 to 80 percent of the institution's courses contain some component of technology. Its online distance-learning courses and programs have won numerous awards from *U.S. News and World Report*, the American Distance Education Consortium, and the International E-Learning Conference and Exposition. Online offerings include more than 300 undergraduate courses, 14 master's programs, and more than 60 noncredit courses.

To foster e-learning adoption, Virginia Tech provides an array of training, course

development, and assistance resources, led by its Faculty Development Institute (FDI). The FDI's ongoing faculty training program is structured in four-year cycles to teach one-quarter of the faculty each year. Since its inception in 1993, the FDI's sustained program has built a gradual awareness and appreciation of technology, fostering cultural change. The FDI has evolved into a catalyst for change by providing a forum to channel new ideas and technologies. It spurred the university to create an institution-wide coordinated strategy for technology in teaching and to adopt a student computer ownership requirement.

Drivers of E-Learning at Virginia Tech

Virginia Tech has a long involvement in distance learning, stemming originally from its satellite and interactive-based video courses in the 1980s and 1990s. "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," recalled Tom Head, director of instructional services. "We are conducting about 55 interactive video courses per semester using these facilities." To expand its offerings, the university turned eventually to online distance courses in addition to the video-based courses.

Outreach Program Sparks Internal Action

A more important driver was Virginia Tech's decision to create a conducive environment for e-learning. The first step was the development of the FDI. Earving Blythe, vice president of information technology, and E. Fred Carlisle, the William E. Lavery Professor of English and former senior vice president and provost, conceived the idea in early 1992. Virginia Tech had launched the Blacksburg Electronic Village Program to

push network connectivity out into neighboring communities to explore how civic, business, and other community organizations might use and share information when provided with Internet access.

The outreach program also prompted Blythe and Carlisle to look inward also at Virginia Tech's own technology usage. At the time, a significant segment of the university's 1,600 faculty members did not possess an adequate desktop computer, which would pose a problem when transitioning from a mainframe to a distributed computing environment. "As we talked about the Electronic Village Program's potential for people to leverage technology, we thought about our need to encourage faculty to integrate and leverage technology in the teaching and learning environment," Blythe said. "We identified two fundamental impediments: first, the virtual lack of help or advice to faculty in regards to the appropriate hardware or software for teaching; and second, faculty members' uneven literacy about relevant computers, networking, and software in regards to instructional technologies."

Successful Pilot Spawns the Faculty Development Institute

Blythe and Carlisle tested their conclusions. They organized a trial training program in the summer of 1993 for 60 faculty members: 20 each from the English department, the humanities program, and the math department—three disciplines that were launching curriculum reform efforts. The goal was to leverage new technologies in support of these curricular initiatives. This included the use of software such as Daedalus, Perseus, and Mathematica as fundamental tools. The workshops also provided basic computer training for e-mail, word processing, and other applications that were not mainframe based. Each participant received a computer, software, and networking capa-

bility—"the technology envelope that a faculty member utilizes in their everyday work," stated Blythe. Several organizations funded the pilot program, including Virginia's State Council of Higher Education and State Senate Finance Committee.

Blythe worked hard from the outset to get faculty buy-in, with the lofty goal that "not a single faculty member would walk away from the trial with a negative experience." The trial participants assisted with the program design to address their training needs. The IT department used their best staff to teach the training sessions and assigned one technical staff person for every four faculty members to assist with individual questions or problems. The department invited prominent faculty members from other institutions to discuss the integration of technology in their subject areas.

Faculty deemed the pilot a success. An estimated 65 percent of the participants incorporated technology in their teaching upon completion of the pilot, prompting the provost and IT to cosponsor an ongoing program. The former funded hardware and software expenses, the latter funded staff and the associated overhead costs, and the FDI was born. Today the FDI operates an ongoing training program that teaches one-quarter of the faculty each year, mainly in three-day workshops held in the summer, but increasingly on a year-round basis. More than 96 percent of faculty members have participated in the program at least twice, laying a foundation of technical proficiency that the university can leverage to promote e-learning and other activities across the entire institution.

E-Learning and Virginia Tech's Vision

From the beginning, the FDI was envisioned as only one of the components in the university's overall plan for e-learning.

“The training had to be buttressed by other resources; our overarching theme was widespread, grass roots, and over time a deeper adoption of technology into faculty members’ everyday life,” stated John Moore, director, FDI and director, educational technologies. As a result, in 1993 the institution developed the Instructional Development Initiative (IDI), which “is part of the university’s ongoing plan for creating an educational environment for the 21st century.”¹ The IDI’s goals are structured into three components:

- ◆ *Faculty development*, to provide faculty access to training “to investigate, create, and utilize alternative instructional technologies,”² and to provide state-of-the-art technology with which to use these skills.
- ◆ *Student access*, to provide access to computer labs, ensure students have a base level of computing skills, and advise them about computer equipment selection.
- ◆ *Course development*, to assist faculty with course development and to improve classrooms and online systems to facilitate their technology use.

The key point regarding IDI is that its goals interrelate and were addressed cohesively and simultaneously in its planning and implementation. This, in turn, provided a comprehensive e-learning support infrastructure that fostered the commonplace faculty adoption of technology in learning. The result today is Virginia Tech’s extensive e-learning activities in both the classroom and online distance learning.

Supporting E-Learning at Virginia Tech

Technical competency is not an issue for either faculty or students. The FDI has

completed two cycles of training across the entire faculty body, creating a base level of technical competency. Since 1998, undergraduate students have been required to own a personal computer to provide the tools to support their course activities and to prepare them for their postgraduate careers. The support challenge is to keep up with the faculty members’ and students’ evolving requirements. To address this, the FDI modifies its curriculum annually. The university also continues to broaden and evolve its e-learning resources accordingly. The next two sections, E-Learning Support Infrastructure and E-Learning Technical Resources, delve more deeply into these topics.

E-Learning Support Infrastructure

Today both IT and the provost’s office continue their involvement in e-learning support in three areas:

- ◆ Learning Technologies, a subunit of IT, provides broad faculty assistance with the implementation of technology in teaching. Many of its resources support the IDI.
- ◆ The Institute for Distance and Distributed Learning (IDDL), which reports to the vice provost for academic affairs, provides course development and teaching assistance for online distance-learning courses.
- ◆ The Center for Innovation and Learning funds specific e-learning course development projects.

Learning Technologies: Supporting Technology in Teaching

The Learning Technologies subunit of IT provides training programs, resources, and infrastructure to enable faculty members

to design, teach, and evaluate technology in teaching. Learning Technologies, led by Anne Moore, includes almost 40 staff members. Within Learning Technologies' broad charter, Education Technologies is the hub for most of the e-learning-related activities and manages the following resources:

- ◆ *The Faculty Development Institute:* The FDI operates an ongoing training program that teaches one-quarter of the faculty each year and significantly influences the university's e-learning activities. This group is explored in detail in the section "A Closer Look at the FDI."
- ◆ *The New Media Center:* Increasingly, faculty members and students use multimedia in their coursework and research. The New Media Center is a regional hub serving southwest Virginia with multimedia training and support with state-of-the-art labs and a training classroom. Its open lab provides high-end multimedia hardware and software for audio/video capture and editing, graphics, Web development, 3D animation, and desktop publishing. Audio/video bays offer professional-level production and editing facilities.
- ◆ *Element K:* These online training courses provide just-in-time training for students, supplement faculty's FDI training, and alleviate waiting lists for staff training classes. Education Technologies chose Element K primarily for its online training courses in Web development, multimedia development, and Adobe and Macromedia products. Students' rising demand for multimedia resources and the New Media Center's limited operation hours made Education Technologies especially cognizant of the need for multimedia training tools.
- ◆ *Online course support:* The OCS group manages the online course management systems, Blackboard and Courseware.

OCS staff teach the FDI workshops and provide consultation in course design and development. OCS also provides an extensive online support gateway for faculty and students. In spring 2003, 86 percent of Virginia Tech students were active Blackboard users.

- ◆ *Computer-assisted teaching stations:* Sixty of these stations are available to display computer and Web-based presentations and materials in classrooms.

Two other Learning Technologies areas also provide some e-learning support. The VT labs department manages more than 1,000 computing stations in its 13 general computer lab facilities. The digital imaging department provides high-resolution technology resources and design expertise for the university at large, including faculty assistance for their course development activities.

The Institute for Distance and Distributed Learning

In 1999, Virginia Tech created the IDDL to provide a structured process to create and support online distance-learning courses. Director Tom Wilkinson and his staff of 19 offer a suite of resources that encompass course design, support, marketing, and evaluation.

- ◆ *eLearning Design and Development* provides a systematic instructional design and development process for online distance courses. Resources include multimedia production services, online course research and development, and assistance in creating e-learning communities.
- ◆ *eLearning Support Systems* provides faculty and staff with numerous resources, including schedule and enrollment services, student technical orientation and support, and server/infrastructure access.

- ◆ *Marketing and eInitiatives* assesses market potential for online courses and provides marketing assistance.
- ◆ *Planning, Assessment, and Research* offers evaluation services for Virginia Tech's online distance-learning courses and analyzes national e-learning trends to aid in IDDL planning.

The Center for Innovation and Learning

As e-learning courses gained popularity at Virginia Tech, some faculty members felt the university needed a coordinated and strategic approach to course-development. The Center for Innovation and Learning provided this focus by awarding course-development grants to faculty on the basis of specific university needs. For example, the university wanted to infuse technology initially into its high-enrollment core curriculum courses; the center awarded course-development grants accordingly. The next institutional priorities included high-enrollment upper-level courses, then online distance-learning courses. The Center for Innovation and Learning has awarded more than \$3 million to create more than 100 projects, including several graduate online programs and the math emporium, a computer lab-based alternative to classroom-based math courses.

E-Learning Technical Support Resources

4Help is the main support resource for faculty, students, and staff. It offers limited 24 x 7 personal support to monitor infrastructure outages and answer general computing question. Web pages, online training, and online reference tools supplement personal off-hours support. 4Help includes the following technical resources:

- ◆ An operations center, staffed 24 x 7, re-sets passwords, monitors system outages

for critical services like Blackboard, and answers general computing questions.

- ◆ A help desk, which operates Monday through Friday, 8:00 a.m. to 5:00 p.m., and Sunday, 5:00 p.m. to 8:00 p.m., answers questions about Internet connectivity, central computing resources, Microsoft Office, and administrative systems.
- ◆ Resident computer consultants—student employees who provide on-site support to resident students, typically Sunday through Thursday evenings, while classes are in session.
- ◆ Answers.vt.edu is an online knowledge base that contains more than 1,600 answers to computing and technology questions.
- ◆ Microsoft TechNet lets faculty and staff access an online collection of Microsoft resources, including current technical information, 14 resource kits, service packs, a knowledge base, and the entire Microsoft software library.
- ◆ An online gateway, the general 4Help Web site, provides access to all Virginia Tech online computer services and resources and to individual Virginia Tech Web sites that cover specific areas like the Blackboard course management system (CMS), viruses, the Banner ERP system, and the e-mail system.

Virginia Tech's Faculty Development Institute

The FDI offers multiday workshops to “provide faculty with the knowledge and the resources to take advantage of the use of instructional technology in their teaching.”³ Faculty participants receive their periodic equipment, software, and networking upgrades upon attendance.

The FDI holds most of its workshops during the summer. Each department determines its participants the preceding fall,

enabling deans to select attendees on the basis of department curriculum or research requirements. Participants meet with the FDI staff the preceding winter to discuss their training needs and shape the following summer session's curriculum. Since its inception in 1993, approximately 3,500 participants have attended FDI training.

John Moore and Edward Schwartz, instructional designer, manage the program. Moore handles planning, department interaction, and faculty computer equipment procurement; Schwartz manages the workshops, assisted by Eddie Watson, coordinator of instruction. Building on earlier programmatic development work led by Ed McPherson, FDI training coordinator, 1997–2002, Schwartz and Watson actively collaborate with other faculty members and staff to teach workshops, and they employ several graduate students during the summer to assist with program logistics. At its

summer peak, up to 50 people are involved in the FDI program.

FDI Program Evolution

Since the FDI is a faculty-driven program, Moore and Schwartz constantly revise the program, changing at least one-third of the program content annually and the entire workshop structure every four years. There have been other broad program changes, too.

- ◆ *Track evolution*—Initially a “one-size-fits-all” program approach provided basic technical training to faculty members, but greater knowledge led to a demand for choice. Now the FDI offers numerous tracks focused on core technical skills, specific software tools, and independent study. Table 1 compares workshop tracks in 1997 and 2002.
- ◆ *Fall and spring workshops*—As more faculty members spent their summers conducting research outside Blacks-

Table 1. FDI Workshop Tracks, 1997 and 2002

Summer 1997	Summer 2002
Basic Computing Skills	New Faculty Orientation
Computer-Based Classroom Presentations	Basic Computing Skills
Developing a Network Interactive Course	Developing a Web Course Using Dreamweaver and Blackboard
	Developing Web Course Interaction
	Creating Instructional Web/Media Content
	Using AutoCAD
	Using MatLab
	Creating Learner-Centered Instruction
	Developing and Delivering Online Instruction at a Distance
	Instructional Media Production
	Research Tools and Presentation

burg, the FDI began to supplement the traditional summer program with fall and spring workshops. About 100 faculty members currently take their training outside the traditional summer period. The FDI uses the nonsummer sessions for planning purposes, too. Fall sessions enable refinement of summer workshops; spring sessions provide a dress rehearsal for new summer sessions. One serendipitous benefit of nonsummer attendance is that faculty members can apply their skills immediately in their current classes.

Effective Program Practices

Throughout the years, the FDI has developed several effective practices based on their experiences.

Group participants by technical skills, not department area. Initially the FDI grouped classes primarily by departmental area. However, people evolve at different rates, making it difficult to create a program relevant to all attendees. The FDI staff members decided to aggregate attendees on the basis of their needs or technical skills and noticed that this new approach created two program benefits:

- ◆ cross-pollination, owing to the mix of faculty members from different areas, which encourages the exchange of new ideas and fosters institution-wide activities; and
- ◆ greater faculty participation because faculty members are more inclined to ask questions or request clarifications when their department colleagues are not present in class.

A single facilitator steers the workshop. Employing a series of presenters who discuss various topics creates a disjointed learning experience. To provide continuity, a single FDI staff member facilitates the entire track.

He frames the presenters' talks around the workshop topic, offers pedagogical insights, and leads question-and-answer sessions.

Minisessions allow participants to brush up on basic skills. The workshops build in free time that lets faculty members work on individual projects or attend minisessions on basic technical skills. For example, a Web design workshop might offer a quick refresher on scanning.

The FDI teaches pedagogy by example. After the initial program cycle, FDI staff members noticed that attendees began to emulate the presenters' teaching styles and even their presentation formats. Staff members realized that each workshop may address a technical topic, but it also teaches pedagogy by example. In the second four-year cycle, the FDI started to work pedagogy into the workshops.

Online evaluations facilitate on-the-fly workshop changes. After each 90-minute session, faculty members fill out an online survey that helps the FDI staff evaluate presenters and topics and restructure the workshop immediately.

Faculty testimonials provide credible, real-world e-learning examples. In luncheon presentations, previous FDI attendees discuss how they altered their courses on the basis of their training. This has proved very popular because it frames the FDI instruction with authentic examples of effective practices—and pitfalls to be avoided. Attendees also feel that a faculty colleague provides a more credible source.

A Decade-Long Progression of Change

At the fundamental level, the FDI provides a consistent technology environment at Virginia Tech. Through participation, all faculty members have access to the same computing equipment and networking re-

sources; the consistent technical platform ensures that basic, everyday tasks can be accomplished across the entire university.

More significant is the cultural change that occurs from the continual refreshment of technology and training the FDI provides, as John Moore described: “We are in the third FDI cycle. All the faculty members are exposed to e-learning; 20 to 25 percent have attended the FDI three times. Whether they adopt it or not, faculty members have seen the e-learning environment and understand its context. Everyone on a faculty member’s tenure and promotion committee is exposed to it. Faculty members understand the impact and value that e-learning has for student learning as well as faculty productivity. A sustained program builds a gradual awareness and appreciation of technology, and fosters cultural change. A handful of workshops once or twice a year cannot achieve the same result.”

The FDI fosters grassroots activities to incorporate technology into teaching—and to promote institutional change. One example is the Cyberschool, founded by the arts and science faculty in the mid-1990s to collaborate on e-learning development. “People could see how to use a computer in math or physics, but it was less obvious in a philosophy or English class,” recalled Valerie Hardcastle, professor of philosophy. “There were no books about teaching on the Web, so we invented our own method by sharing information.” Cyberschool courses share common characteristics such as computer conferencing systems, e-mail, bulletin board services, and Web use. For example, one activity, the literature initiative in technology, experimented with asynchronous discussions as a means to study literature in a team environment.

E-learning course development, however, represented just the tip of Cyberschool activities. As faculty gained e-learning expe-

rience, Cyberschool became an active faculty coalition to foster institutional change about e-learning—for example, advocating a student computer ownership requirement. “None of this institutional change happened by magic,” stated John Moore. “It was a group of faculty that we worked with extensively to drive the evolution of teaching with technology.”

Lessons Learned in Virginia Tech’s E-Learning Experience

Through trial and error, Virginia Tech has learned numerous lessons from its e-learning and training activities. These findings and effective practices fall mainly into training and instruction categories.

Training Lessons Learned

Position training in a practical context. From the very beginning, Virginia Tech’s training initiative focused not on technology but on how it can improve teaching.

Incentives encourage participation. While attendance is not mandated, the incentive to replace their computer, software, and network access presents a compelling reason for faculty members to attend the FDI.

Faculty selection locally encourages departmental buy-in. The FDI structured the training program to ensure the participation of all college deans, who select the sequence in which faculty attend, to coordinate with their department plans.

Adding different departments to the participant mix stirs up new ideas. The mixing of workshop participants from different departments encourages cross-pollination of ideas, interdisciplinary thinking, and potential institution-wide projects. It eliminated any self-consciousness about taking courses with other departmental colleagues.

Position training as a peer activity—to gain faculty buy-in.

The FDI staff has worked hard to position themselves as colleagues to the faculty. They solicit faculty input and advice on curriculum and workshop structure to meet faculty members' needs, which creates faculty ownership for the program.

Instruction Lessons Learned

One is a lonely number in e-learning. It is important to create a core group of e-learning supporters within a department and not rely on a single proponent. Otherwise, if the early adopter leaves, the program is dead unless others can continue in his place.

Don't rebuild the wheel. Use off-the-shelf applications whenever possible. It is very costly and time-consuming to develop individual applications.

Don't relive another's past mistakes. Assign a faculty member who is experienced in e-learning to mentor an interested colleague informally. Online distance learning, especially, is a risk-taking activity with specific right and wrong ways of teaching. An experienced mentor can help a novice avoid mistakes.

E-learning course adaptation is a long and winding road. It is very labor intensive to get started. Teaching ratings may decline until the instructor becomes comfortable using the technology. It is a difficult process overall.

The Future of E-Learning at Virginia Tech

The magnitude and direction of e-learning growth at Virginia Tech will hinge on two primary considerations: funding and new uses.

Funding Will Impact Future Activities

Ironically, a budget crisis in the early 1990s facilitated the FDI's initial fund-

ing. Former Virginia Tech Provost E. Fred Carlisle wanted to use the situation to make a positive statement. He deducted an additional one-and-a-half percent above planned budget cuts to fund initiatives to help the university strategically. The FDI benefited financially from this idea. He also reallocated equipment trust funds to provide equipment for faculty, which ensured the program's long-term viability.

During subsequent budget cuts, Virginia Tech's e-learning support activities received lower cuts overall because of their perceived strategic value to the university. The FDI especially "was absolutely sacred," said Anne Moore. "It generated grassroots support from the faculty, department heads, and the deans, right up to the top of the university. Everyone understood that the FDI was absolutely essential and critical."

However, the future will continue to be difficult financially. State revenue shortfalls continue to make funding a challenging proposition. As a result, Virginia's higher education institutions—public and private—have come together to explore ways to save money cooperatively. Joint purchases and development initiatives as well as service provider models are under consideration. According to Anne Moore, Virginia Tech is preparing itself to provide hosting services in its areas of strength if requested—for example, data warehousing or CMS hosting. Another alternative is open-source development of a CMS to eliminate vendor fees.

Leveraging the FDI Model in New Ways

The FDI program enabled Virginia Tech to leverage its faculty's technical self-sufficiency to incorporate teaching through technology. As the university looks to the future, Virginia Tech plans to leverage the FDI model to advance the institution in two new ways: by extending the training

model to develop potential faculty, and by introducing and developing a new technical initiative—e-portfolios.

Using the FDI to Cultivate Prospective Faculty

As Virginia Tech strives to become a top-30 U.S. research institution, Karen DePauw, vice provost for graduate studies and dean of the graduate school, believes it is important to enhance the university's future faculty by integrating technology into the graduate student program. Some graduate students accompany their faculty mentors to the FDI workshops currently, but the university plans to create a formal training program aimed specifically at graduate students. "We realized that if it is important to engage current faculty in the FDI process, it is even more important longer term for the university to develop the skills of its prospective faculty members," stated Anne Moore. "We anticipate less resistance from graduate students on technical skills; the harder task will be pedagogy." Program details are forthcoming; Learning Technologies hired a full-time staff person in March 2003 to head this initiative.

Using the FDI to Seed New Technologies: Developing E-Portfolios

Another area of interest is the e-portfolio—a means to electronically record students' academic goals and progress while attending Virginia Tech, and possibly throughout their lives. Currently students in selected courses are required to track their work by posting coursework and research on institutionally managed personal Web sites. However, it is not feasible to create and manage individual Web sites for each student across the university due to an inability to pull information out of each Web site for collective analysis.

Virginia Tech is interested in applying the e-portfolio concept across the university. "The Web site approach is easy, but you lose all systematic analysis," John Moore said. "You need a database with multiple templates to record writing samples, coursework, and other information. Otherwise you have thousands of individual e-portfolios—a nice promotional tool, but not a very effective one." Moore described a vision whereby e-portfolios are not only a student advisory tool but also an institutional planning tool. "When a freshman creates an individual e-portfolio, it can be an advisory tool by displaying potential courses of study for different majors," he explained. "As the student progresses, he can post and review coursework and show relevant content to prospective employers. However, a lot of cross-connects occur institutionally when analyzing e-portfolios in the aggregate. It becomes a planning tool, enabling institutions to forecast potential course demand. Additionally, a faculty member could include examples of student work in an e-portfolio presented to a promotion and tenure committee."

This is a complex technical and institutional vision, but Anne Moore foresees using the FDI to assist with its actualization. "We have a significant channel to educate faculty members about e-portfolios during an FDI workshop," she explained. "We can seed the concept and demonstrate it. Faculty members' feedback and user experiences will mold it. This will facilitate grassroots development and faculty buy-in."

The FDI will continue to play an important role in Virginia Tech's e-learning and institutional activities by providing a common forum to seed, actualize, and improve ideas and initiatives. Just as important, the FDI fosters faculty buy-in because of their direct involvement in the process. "I really think the most important thing we did was

to create the FDI program, because it drives so many of our activities,” Blythe said. “It is very hard—and I am not even sure it is desirable—to use a top-down approach in the development of teaching with technology and other ideas. It really needs to be grass roots, and it truly is here.”

Endnotes

1. *Instructional Development Initiative Annual Report 2002*, Virginia Polytechnic Institute and State University, p. 5.
2. *Ibid*, p. 5.
3. *Ibid*, p. 6.