

Educating the Net Generation

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Diana G. Oblinger and James L. Oblinger, Editors



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Through Information Technologies

Educating the Net Generation

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Faculty Development for the Net Generation

Anne H. Moore, John F. Moore, and Shelli B. Fowler

Virginia Polytechnic Institute and State University

Introduction

In the past 10 years, many colleges and universities have actively engaged in integrating technology in teaching and learning. Approaches to this integration are as varied as the institutions' missions and the clarity of their aims for technology-assisted instruction. Regardless of the approach, institutions must make the necessary human and financial investments. Faculty development for existing and future faculty is a pivotal investment for integrating technology in higher education; it can catalyze innovations in learning across generations.

Today's students are described as busy instant messaging, blogging, downloading music and videos, and playing video games with an international network of friends and acquaintances. The technological engagement and interaction related to students' formal learning activities are not so widespread, however. Surveys of Net Generation students suggest that their learning experiences reflect mixed technology usage at best, and at worst they may experience ineffective or inappropriate uses of technology in their academic programs.¹ Faculty report that students are asking for more online activities.² A growing range of pilot programs and emerging practices document improvements in learning.³ But, when will such models be systematically adopted by institutions, resulting in widespread gains in student learning? That answer may be closely tied to faculty development.

Defining what constitutes faculty development is an important first step. Expertise should be developed, not just in how to use technology or in pedagogical practice but also in how to understand learners and how they perceive technology.

Jason Frand⁴ reinforced the need for faculty to work thoughtfully and creatively with Net Generation students' changing mindsets. Today's multitasking, Nintendo-born-and-bred students do not view computers as technology. They

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have a range of attributes that distinguish them from older generations. Baby Boomers and Gen-Xers populate higher education's existing faculty ranks; they have different mindsets. In order for higher education to ensure that productive teaching and learning exchanges occur across generations of learners, these different mindsets may need to be reconciled. As we've designed faculty development at Virginia Tech, the following characteristics of the Net Generation have influenced our programs.

- ▶ **Life online.** For several decades, a growing body of research points to the ways in which computers and related technologies influence the ways we live and work—indeed, the way we think.⁵ Sherry Turkle⁶ has also studied the effects of computers on children and adolescents, describing the manner in which online environments offer spaces for identity, play, and expressing multiple aspects of the self. The so-called loner or silent student who might have never spoken in a face-to-face learning environment today may have online companions and also may interact more readily in online learning activities.
- ▶ **Rapid communication.** Turkle's research suggests that word processing has made thinking with our hands commonplace, for it allows people to quickly display their thoughts—good and bad, organized or chaotic—on a page. The resulting communications, public and private, often demonstrate wide variations in quality of thought and writing style; current experience in online education bears this out as well.
- ▶ **Social networking.** The Net Generation uses technology to enliven and extend their social networks. Reports of Weblog use in higher education indicate that blogs are “helping students across the country meet their dorm mates, form study groups, and make friends before they set foot on ... campus.”^{7a,b}
- ▶ **Games and simulations.** Net Generation students cut their teeth on computer games and simulations. This may have profound effects for learning. Fortunately for educators, games and simulations can be used to provide beneficial insights on simple or complex phenomena. Yet, life tends not to play out solely through the logic or binary rules of games and simulations; students' learning today needs to be more than simulacra.
- ▶ **Digital literacy.** Just as word processing makes it physically easier for students to express themselves, computers make it possible to use many applications, from spreadsheets to databases, without knowing how the hardware or software works. Turkle claimed that today's college students are so used to thinking about things at “interface” value, clicking on icons to ac-

compish their work and play, that all they require is *seeing* how something works rather than *knowing* how it works. Although the Net Generation is considered digitally literate, they might not possess the full complement of the knowledge and skills they need to use technology wisely and well. The same may be true for faculty.

Fluency in Information Technology

The National Research Council concluded that fluency with information technology is imperative today. This state of mind is called FIT, for fluency in information technology.^{8a,b} FITness requires three kinds of knowledge:

- ▶ **Contemporary skills**—the ability to use today’s computer applications, enabling people to apply information technology immediately. Skills are an essential component of job readiness. Most importantly, skills provide a store of practical experience on which to build new competence.
- ▶ **Foundational concepts**—the basic principles and ideas of computers, networks, and information that underpin the technology. Concepts explain the how and why of information technology, and they give insight into its opportunities and limitations. Concepts are the raw material for understanding IT as it evolves.
- ▶ **Intellectual capabilities**—the ability to apply information technology in complex situations, encapsulating higher-level thinking in the context of IT. These capabilities empower people to manipulate the medium to their advantage and to handle unintended and unexpected problems when they arise. Intellectual capabilities foster more abstract thinking about information and its manipulation.

To help students gain the knowledge necessary for FITness, an institution’s strategic plan and teaching and learning activities should contain appropriate goals for becoming FIT. Faculty and staff who do not have the requisite knowledge and skills to work toward fluency in information technology may need professional development programs that help them achieve FITness in their teaching and research. To bridge the gap between faculty expertise and student needs, institutions must address awareness, enablement, and integration:

- ▶ Awareness of students’ approaches to meeting their learning needs and of what technologies are available to them
- ▶ Enablement through professional development so they have the skills needed to implement systemic change

- ▶ Integration, or the ability to bring together the disparate pieces needed—pedagogy, learning space design, technology, support, policies—to enable successful learning

Because technology, pedagogy, and practice change so rapidly, faculty professional development may need to be ongoing. When IT is involved, institutions also need to provide easy and convenient support for technology-integrated learning. To leverage the creativity of faculty and staff—to turn their intellectual and social imaginations to the task—institutions need to provide systematic encouragement and assistance through comprehensive faculty development programs.

The remainder of this chapter will describe two programs at Virginia Polytechnic Institute and State University that focus on professional development: for faculty, the Faculty Development Institute (FDI); and for graduate students, the Graduate Education Development Institute (GEDI). Both programs are grappling with ways to engage Net Generation students to benefit their learning.

The Faculty Development Institute

Virginia Tech's Faculty Development Institute helps faculty acquire teaching strategies that leverage instructional technologies to improve student learning (<http://www.fdi.vt.edu/>). FDI is the cornerstone of a large-scale, continuing strategy to systematically promote innovative, informed uses of technology in daily practice for faculty and students. FDI also represents one institution's attempt to focus on the knowledge and skills development required for a FIT faculty in order to meet today's students' needs for fluency in using information technology, or FITness. Begun in 1993, FDI

- ▶ offers a recurring four-year cycle of faculty development workshops,
- ▶ links professional development to replacing faculty computers every four years,
- ▶ supports course development initiatives,
- ▶ promotes student digital literacy, and
- ▶ outfits classrooms with appropriate technology.

As a result, Net Generation students today are likely to find that a majority of their courses involve blended face-to-face and online learning activities, online discussions, archived learning materials, and discipline-specific software and Web-accessed resources—aspects of learning they claim to fully appreciate. And as these Net Gen students clamor for more, faculty report that their repeated FDI participation has made them likely to use technology more effectively across the spectrum of their professional lives, including teaching, research, and service roles.

Early FDI programs focused more on lowering faculty anxieties related to using new technologies in teaching. In the early 1990s, students were not always comfortable with changes in teaching or learning practices that technology introduced. Some students and faculty questioned whether the new technologies were just passing fads. But after the successes of the first full FDI cycle and with growing technology use plainly evident across a spectrum of institutional life, the university's 1996 strategic plan established the faculty development process as a strategic objective. Acknowledging that institutional leadership at the highest levels was necessary to sustain widespread technology integration, the 1996 plan and one in 2002 outlined aims for FITness. With strategic objectives and the requisite support structures in place, the university sought not only to provide for grassroots experimentation and innovation but also to nurture the seeds of change for faculty and students, regardless of generational affiliation.

Repeated participation of virtually all faculty (96 percent) and all department heads over more than a decade of FDI programs has helped build a wider familiarity and understanding of the complex issues involved in adopting and successfully integrating technology in traditional and hybrid courses. Awareness of the challenges raised in fully online distance-learning programs has increased as well. In addition, the evolving expectations of successive generations of students (of which Net Generation students are the latest and perhaps most vocal about technology's place in their lives) surface in faculty narratives shared in FDI workshops about successful strategies and practices. In turn, informal peer-mentoring activities have proven particularly productive in helping faculty address specific concerns. An especially effective feature of FDI is the series of presentations by faculty demonstrating how and why they have changed their approaches to teaching. These presentations provide credible responses to questions about the effects of technology use on student learning and attitude, productivity, student-faculty communication, instructional development time, and more.

Since its inception FDI has sought to involve faculty as workshop presenters on as many topics as feasible. Not surprisingly, the credibility and practicality evaluations of these presenters are high. Faculty selected to present to their peers are able to clearly describe successes and failures of early adoption strategies with emerging technologies in the context of their personal interaction with students. For example, presenters might illuminate how the use of instant messaging within a course fits with current expectations, habits, and practices of Net Generation students, as well as how it might benefit learning. FDI extends this approach to

helping faculty understand changing norms and expectations in their use of course management systems, collaboration and conferencing tools, e-portfolios, digital library resources, and similar learning assets.

Further, faculty indicate that they find equal or greater value in systematic assistance from their peers. Such assistance includes sorting out ways in which new techniques or procedures relate to possible changes in course goals and outcomes, the incorporation of interdisciplinary agendas, and the introduction of gaming and simulation strategies to stretch and deepen learning. Faculty presentations, case studies, and Webcasts provide examples and personal narratives about successful (and problematic) implementations of emerging strategies to interested workshop participants.

FDI encourages interaction among presenters and other faculty. Resources and contact information are provided for each program track on its Web site.⁹ Modeled much like an online course, these faculty-to-faculty queries and conversations can be extended after workshops through online forums or e-mail with presenters. If developing course materials outside scheduled workshops is necessary, FDI provides production resources for digitizing content (for example, slides, audio, video) or limited quantities of graphic or animation developed through its partnership with the university's New Media Center (<http://www.nmc.vt.edu>).

As mentioned earlier, evaluation of the workshops by faculty attendees is positive. During a workshop, evaluations are conducted every 90 minutes using a Web-based form, providing rapid reports to workshop facilitators who, in turn, make changes expeditiously. Faculty clearly value the opportunity to explore instructional issues with their colleagues and to discover the potential of technology for enhancing their teaching; and they have indicated that FDI resources are critical if they are to adapt to the needs of their students. Indeed, faculty cite increased pressure from Net Generation students for more sophisticated uses of current and emerging technologies; these students say there is more to innovative teaching than PowerPoint and Excel.

Over a dozen years, FDI programs have evolved in several important ways. The content of FDI workshops changes each year as new technologies emerge and faculty demonstrate improved approaches to using technology in instruction. Early programs focused more on the basics of using technology and software. Current programming places more emphasis on

- ▶ Shifts in faculty perceptions of students' expectations
- ▶ Students' use of technologies such as instant messaging and blogs

- ▶ Teaching strategies that can successfully address such behavioral shifts
- ▶ Ways to design for active learning
- ▶ The appropriate means for dealing with a range of privacy and security issues

Many workshops have also featured strategic, discipline-specific software with which faculty have requested assistance, such as MATLAB (math software used in engineering, science, and business), AutoCAD (design software used in architecture and engineering), ESRI Geographic Information Systems (GIS software used in agriculture, engineering, science, and social science), LabVIEW (instrumentation software used in agriculture, engineering, and science), and others. All workshops include open lab time designed to give faculty opportunities to apply what they learn to their courses. FDI staff also encourage faculty to bring their graduate assistants to workshops to facilitate the incorporation of new methodologies and technologies into the future professoriate's teaching practices.

Other changes in programming include immersing faculty in more online activities that might lead to creating learning environments similar to their students' personal communication environments. A workshop might include an online tutorial, a short streaming video segment, and an online chat or discussion. The overall context emphasizes how technology-based resources may be useful to students in the learning; in the background, the hands-on use of software and Web-based tools such as course management systems or e-portfolios provides opportunities to practice.

A third shift has involved recognizing that FDI, while beginning as a teaching/learning enhancement program, should enlarge its scope to directly address how information technologies can be useful in all aspects of faculty life. Indeed, FDI staff work hard to maintain programming relevance and value. The identification of new topics and issues often comes directly from faculty through program evaluations, internal grant proposals, consultations, and direct suggestions. In addition, staff hold periodic program-planning briefings with each college to gather feedback on current offerings and to gain faculty input on topics that should be addressed in the future. Examples of new topics introduced based on faculty suggestions include Creating Learning-Centered Instruction, Parallel Programming for Supercomputing, and Using LabVIEW to Enhance Laboratory Learning. Other workshops and support for technology-assisted or enhanced research collaboration, grant writing, and presentation of research findings also resulted directly from faculty requests.

Another aspect of maintaining FDI relevance and value involves providing just-in-time, need-to-know access to information. FDI provides several Web-based information resources. An instructional design portal provides in-depth information, examples, and Web references covering instructional design models, pedagogy and learning theories, teaching strategies, media selection methodologies, and guidance on evaluation and assessment.¹⁰ For those with immediate questions concerning software functions and operations, FDI licenses online tutorials from Element K and Atomic Learning.^{11a,b} Because the tutorial is well indexed, it is also easy to search when looking for specific information, such as how to insert graphs into documents. Thus the tutorial can also serve as an on-demand reference or help tool.

While faculty may refer to these resources for their own use, they also frequently treat the tutorials as supplements or references for students. Some faculty assign tutorials to be used outside class, saving valuable face-to-face time for other topics. Hundreds of tutorials are available and marketed alongside face-to-face workshops to emphasize continual availability. Faculty and students expect such immediate access—a characteristic of the Net Generation.

Carefully coordinated faculty development programs are a critical component of teaching and learning improvement. But these efforts are not stand-alone initiatives; they must be linked to infrastructure and services. For example, holistic planning is a necessity when curricular changes occur that require long-term planning for upgrades of discipline-specific computer classrooms and development of new courseware by faculty. Likewise, planning for workshops related to effective uses of wireless Internet access in classrooms should be coordinated with campus network planning efforts so that faculty are ready to leverage such an asset as soon as it is operational.

Virginia Tech, like many institutions, offers an array of services on behalf of technology-assisted learning that are closely aligned with the supporting infrastructure. Presenting a comprehensive, cohesive view of the breadth and depth of development services and programs is useful; old-fashioned marketing helps. Strategies aimed at better cohesion and communication include coordinating institutional offerings, cosponsoring and cobranding presentations, workshops, and lecture series, as well as internal grant programs and course development assets. Because different development programs and agencies within an institution often attract different segments of university faculty and staff, joint marketing and sponsorship can broaden the awareness and impact of each unit's work

while simultaneously amplifying communication of institutional aims. In addition, Virginia Tech constructed Torgersen Hall, a building designed to showcase university activities for integrating technology in teaching and research as well as to provide spaces where such efforts might come together more spontaneously. Torgersen Hall also provides a home for FDI, the New Media Center, the digital library research, and more.

In summary, the FDI aims to help faculty construct a personal linkage between their professional needs in teaching and research as well as with the Net Generation and emerging technologies. Such development programs should emphasize teaching, learning, curriculum, discovery, and the needs of faculty and students; they should not focus on technology for its own sake. This focus underlies FDI's long-term, strategic value to the faculty and the university, which faculty and students have confirmed in surveys. Survey respondents indicate that active learning is integrated into instruction; greater student collaboration is taking place; and communication between faculty and students is enhanced. More important, perhaps, the surveys suggest that students feel they have a better understanding of course materials. Plus, they believe that they are provided opportunities to develop skills—such as problem-solving and critical thinking—that transcend individual subjects.

The Graduate Education Development Institute

Building on the success of the Faculty Development Institute, Virginia Tech launched a pilot project in 2003. Working in collaboration with the Graduate School, Learning Technologies (the division of Information Technology at Virginia Tech that also houses FDI) created the Graduate Education Development Institute (GEDI) to engage future faculty in teaching, learning, and technology issues as an integral part of their graduate student professional development. According to the EDUCAUSE Current Issues Committee, the “rapid introduction of new technologies and the constant enhancements and upgrades to existing technologies” indicates that faculty development models that focus on continuous learning and that take a systemic approach are increasingly necessary.¹² With the creation of GEDI, Virginia Tech is moving toward a systemic approach that addresses current faculty (in FDI) and that engages our future faculty (in GEDI). While we encourage faculty-to-graduate-student mentoring, GEDI also recognizes the importance of peer mentoring in the process of learning to teach effectively. To that end, GEDI serves as a multidisciplinary site where graduate students can explore the integra-

tion of teaching, learning, and technology that meets the needs of Net Generation learners and their own professional needs for FITness.

GEDI invites future faculty, at the beginning of their teaching careers, to begin thinking about how they can best communicate with Net Generation students. In doing so, GEDI staff hope to facilitate the development of a reflective teaching practice that better enables 21st-century faculty to recognize the importance of continuous learning for themselves as well as their students.

In many ways, professional development issues are as old as academe itself. Yet the future professoriate is facing a new academy, one which asks them to envision “new structures and funding models, new professionals, new relationships, new accountability, and new leadership roles.”^{13a,b} For graduate students who plan to remain in academe, the 21st-century university is an exciting place. Even as novice teachers and scholars, many are eager to critically analyze the kinds of teaching and mentoring practices that have—and have not—worked well. The majority of graduate students in GEDI are a mix of late Baby Boomers and Generation Xers; almost all of these young professionals are technologically savvy in ways that their senior professors are not. As such, GEDI participants are curious about how the Net Generation’s learning processes may differ from their own; they are intent on becoming teachers with skills that engage Net Generation learners.

Still in a pilot phase, the primary focus of GEDI is a semester-long, for-credit, multidisciplinary seminar, “Pedagogical Practices in Contemporary Contexts.” This course asks participants to explore (and begin to develop) the kinds of reflective pedagogical practices that stimulate 21st-century lifelong learning and engagement within the Net Generation. (The course is also part of a recently approved Future Professoriate graduate certificate that students may choose to earn.) The intent of the GEDI pilot project is to move beyond the unavoidable limitations of short-term, workshop-based training. GEDI staff work to create an interactive community over the span of a semester. This community crosses disciplinary lines, offering the potential for multidisciplinary collaboration and opportunities to “think outside the box” of discipline-specific perspectives. This process begins by discussing the importance of having pedagogical practices informed by pedagogical theory. In many disciplines there is little organized discussion of teaching methods, and rarely is there assigned reading in any pedagogical theory that might inform practice. (Colleges and schools of education, as well as some disciplines within the humanities, are notable exceptions.)

In the first part of the GEDI course, students look at the potential usefulness of a critical pedagogical praxis. In particular, participants examine ways in which critical pedagogy may inform teaching practices with the goal of helping students think about their own learning processes. For example, seminar participants read selected works and discuss ways in which theory and practice might be reinvented and reframed for their own discipline. GEDI participants are encouraged to read other pedagogical theory as well. Emphasis is placed on thinking about pedagogical practices in terms of the learning objectives each instructor is trying to achieve, not on a specific theoretical approach. This process is increasingly important as participants learn to recognize the ways in which Net Generation students differ from their predecessors and the ways in which learning to be FIT might successfully occur.

Regardless of the domain knowledge being taught, traditional teaching methods are often viewed as less effective with Net Generation students. With attention to what Jason Frand called the attributes of the “information-age mindset,”¹⁴ GEDI participants discuss ways to use technologies that the Net Generation views as normative (rather than as technology) to challenge these learners to think creatively and critically. As Frand suggested, moving from “interacting on the Net” to “critical thinking” is not necessarily a simple or easy leap. Yet it is a necessary one. Helping students understand that finding information via Google is not synonymous with the critical evaluation of information is one of the tasks of contemporary higher education. As Net Generation students leave college and enter the broader society, “the ability to deal with complex and often ambiguous information will be more important than simply knowing a lot of facts or having an accumulation of knowledge.”¹⁵

For some faculty, many of whom have been teaching for several decades, the learning processes of Net Generation students are viewed within a negative framework. Differences in learning processes are perceived as shortcomings—the desire for ubiquitous connectivity, the preference for multitasking and “channel-surfing attention spans,” and less tolerance for delays, for example—when compared with previous generations of learners. In GEDI, participants avoid judgmental evaluations of different learning processes and focus instead on creating problem-based, active-learning environments that prepare Net Generation students for the complex 21st-century context in which they live and work.

GEDI participants, across a wide range of disciplines, are interested in discovering how current technologies might further students’ intellectual movement

from simplistic “absolute knowers” to more sophisticated “contextual knowers.”¹⁶ The GEDI seminar conversations also focus on issues of diversity: recognizing diverse curricular goals, diverse learning styles, and the increasingly diverse demographics that exist both inside and outside 21st-century classrooms. GEDI’s primary emphasis, though, is on developing curricular approaches and pedagogical practices that facilitate Net Generation learners’ abilities to problem solve in complex contexts—a process that requires the contemporary skills, foundational concepts, and intellectual capabilities that go with a FIT mindset.

Within the GEDI seminar, participants from fields as diverse as engineering, political science, chemistry, and English examine various problem-based learning case studies. Participants decide how and why a particular case study does (or does not) work and how to improve it. They explore whether the case study involves problem-based learning that encourages students to problem solve while simultaneously using domain knowledge, skill sets, and tools particular to that discipline. Participants assess whether a strategy inadvertently has a closed-ended answer, or whether it provides opportunities for students to suggest alternative solutions. They focus on how Net Gen students’ technology skills and learning processes are engaged. In addition, emphasis is placed on case studies requiring students to address complex domestic and/or global contexts in finding possible solutions. These conversations take place with attention to different teaching and learning environments—from small labs and discussion-based classrooms to large lecture halls, hybrid/blended situations, and fully online courses. Following the collective cross-disciplinary discussions about what makes a successful case study, participants work individually or in teams to develop a sample problem-based learning module or case study for use in a course. Part of the task includes providing audience- and site-specific learning objectives for the case study and rationales for how and why various technologies are integrated.

In seminar dialogues, participants talk about active learning that recognizes and develops undergraduate students’ sense of agency as FIT critical thinkers; they are also fostering their own sense of agency—as future faculty—about their teaching. For example, GEDI facilitators prefer not to overemphasize “how to” prescriptions about various teaching and learning technologies; instead, they encourage graduate students to explore how they might shape the technology to fit their pedagogy rather than vice versa. Likewise, since a critically engaged, self-reflective teaching praxis is what GEDI participants are encouraged to develop, the seminar and assignments are designed to foster a reflective practice. As part of this process,

GEDI participants explore the use of Virginia Tech’s e-portfolio software as both a teaching tool and a professional development tool. To understand some of the ways they might incorporate the use of an e-portfolio into their teaching and how they might engage Net Generation learners in critical reflection via the tool, they simulate and use the e-portfolio with each other in much the same way that they might ask their own students to use it. GEDI participants also use the e-portfolio to begin the process of building a teaching portfolio. The creation of a teaching philosophy, syllabi, and digital video clips of their teaching can be “housed” in the e-portfolio along with reflections about their teaching and learning praxis.

It is important that we develop teaching and learning practices that encourage the Net Generation to develop critically engaged lifelong learning skills—with the emphasis on critically engaged. Technology should not be used to allow students to become passive recipients of information, as some traditional teaching methods do. Integrative approaches to teaching, learning, and technology should not render our students passive learners, however unintentional. Tony Bates has argued that students should be provided opportunities to interact with their instructors and with other learners, whether minutes, miles, or continents apart and, most important, that Net Generation learners “need to be able to challenge and question what they are being taught.”¹⁷ Higher education needs to foster active learners with the complex critical thinking and problem-solving skills required for this new century. At Virginia Tech, the GEDI project engages future faculty—those who will be responsible for teaching the Net Generation—in developing “best practices” in technology-enriched teaching and learning.

Conclusion

Current and future faculty are expanding their understanding of the Net Generation, technology, and pedagogy in an effort to improve teaching and learning. For this to occur, Baby Boomer and Gen-X faculty, as well as graduate students, need systematic support to develop and maintain their own fluency in information technology—to be FIT. Net Generation students assume a technology-enabled context in much of their lives and work; they exhibit a degree of digital literacy not necessarily shared by faculty; and they too need the full complement of knowledge and skills to be FIT. A first step is to focus on what students should know and be able to do. A next step is to understand what technology means to students. Programs such as FDI and GEDI illustrate how to support faculty in their efforts to engage the Net Generation.

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9. Browse Virginia Tech's Faculty Development Institute Web site <<http://www.fdi.vt.edu/summer/2004/TrackC.html>> for more information about faculty training programs.
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About the Authors

Anne H. Moore is associate vice president for learning technologies at Virginia Tech, where she coordinates such programs as the Faculty Development Institute and the Graduate Education Development Institute. In addition to teaching in urban affairs and planning, she assists underserved rural and urban communities with integrating technology in learning activities. Moore is founding chair of the Electronic Campus of Virginia. She has served as staff director for two reports on the future of Virginia higher education and sits on several advisory boards. Moore holds three degrees from the College of William and Mary and has authored numerous articles, book chapters, and policy papers.

John F. Moore is director of educational technologies at Virginia Tech's Faculty Development Institute, recognized for its best practices in a national benchmarking study sponsored by the State Higher Education Executive Officers Association. Moore leads initiatives in e-portfolios, online learning systems, and faculty development. He also heads Virginia Tech's planning and implementation of e-portfolios. Moore codirected the Sloan Foundation-funded ACCESS project to study the effects of asynchronous learning courses on students and faculty, as well as several National Cancer Insti-

tute-funded consumer health intervention projects using interactive kiosks. Moore holds bachelor's and master's degrees from Ohio University and a doctorate in instructional systems from Virginia Tech.

Shelli B. Fowler is director of the Graduate Education Development Institute in Learning Technologies at Virginia Tech and associate professor of English. Her research areas include critical pedagogy and the integration of teaching and technologies, and she is the coeditor of *Included in English Studies: Learning Climates That Cultivate Racial and Ethnic Diversity*. She is the recipient of several department, college, and university teaching awards. Fowler earned her doctorate from The University of Texas at Austin.