Technology, Learning, and Change:

Community Development Revisited

Virginia Tech's partnership with an economically distressed region works toward productive network-economy–based enterprises

By **Anne H. Moore**

The rapid technological innovation of the past 20 years has spawned numerous opportunities for improving the quality of life and work globally. But to take advantage of technology-driven opportunities, people and the communities in which they live must have affordable access to the tools—including advanced telecommunications, computers, and software—and they must learn how to use these tools and to create new uses that benefit their lives and work. In short, a citizen's ability to take advantage of these opportunities depends on how well that individual and the surrounding community weaves standard and innovative uses of new technologies into the fabric of community life.

Virginia Polytechnic Institute and State University's vision for itself and for the communities it serves involves working toward such technology integration with its complex of interwoven processes. When a group of local leaders from Southside Virginia asked the university to assist in their community revitalization efforts, Virginia Tech viewed as a logical next step a proposal to extend its own technology integration and implementation processes to the distressed region.

Whereas original planning and implementation strategies emanated from the university's information technology organization, in many respects the project has evolved into a partnership in learning with the region. The project involves a growing complex of relationships among local governments, private businesses, K–12 and higher education institutions, and a local foundation in Southside's Dan River region.

Early descriptions of the effort depicted an economic development project where Virginia Tech would serve as a catalytic agent in the community's transformation of its economy from one based on textiles and tobacco to one based on network economy initiatives. In practice, the project's success hinges upon the

extent to which a regional ethos develops that encourages and engages the community's imagination on its own behalf, in part by using powerful technological tools as interventions and other knowledge-based resources as levers for change.

Context and Challenge

Bordering on North Carolina, the Dan River region of Southside Virginia is a largely rural area south of the state capitol, Richmond, and 135 miles east of Virginia Tech's main residential campus in Blacksburg. The structural problems evident today in this expanse of wooded areas, fields, small cities, and towns were born, in large measure, of the region's economic dependence on textiles, tobacco, and furniture for many decades. Over the past 25 years at least, severe economic downturns in these industries and the associated migration of jobs offshore have directly contributed to the inability of rural communities like those in Southside to compete on a statewide, much less a national or international, basis. This, coupled with a dearth of interstate roads and airports in the region has helped isolate its citizens from modernization and innovative enterprise on many fronts—social, economic, educational, and political.

Modern communities need to attract and retain bright, innovative people—the kinds of citizens that contribute new ideas and practices on many fronts to a region.

Because advanced education has not been necessary for employment in the region's traditional industries, many regional citizens have not valued education in general and higher education in particular. As a result, nearly half of the adult population has only a high school diploma, and a fifth has no more than an eighth-grade education. Those children who complete high school tend to leave for postsecondary education or work in another place, never to return.

After at least a decade or more of attempts at using traditional development strategies to overcome such structural problems, the region remained mired in decline, with unemployment figures continuing to climb. Dire circumstances made worse by recession prompted a local group to think that traditional strategies were insufficient to return the region to prosperity. This core leadership group formed a nonprofit organization called the Future of the Piedmont Foundation with aims to turn the region's fortunes around. The foundation members understood that the effort they were launching would involve systemic social, political, economic, and educational activities designed to encourage cultural change over many years.

One foundation member, an active alumnus of Virginia Tech, approached the university about serving as a key partner and change agent in the revitalization of the Dan River region. In accepting his invitation, the university agreed to develop a plan that the foundation leadership supported and in which they could invest their influence and other such resources as might be required over time.

Assumptions

Several assumptions informed the university's vision for working with the citizens of the Dan River region:

- Much good work involving familiar, time-honored approaches to economic development and citizen engagement had already been accomplished. The university would not compete with local initiatives and would attempt to partner with these efforts where appropriate, but in the main would propose strategic interventions focused on life and work in a new economy.
- Education is a vital element of any community's well being. An educated citizenry with its skilled labor pool remains an important ingredient in attracting new businesses to a region. Focusing on traditional educational practice alone is an insufficient strategy for regional revitalization, however, since students who graduate and matriculate successfully in the nation's colleges and universities tend to move to other places where they can find productive work. Also, it seemed probable that traditional educational practice, particularly in a distressed region, should be revisited in light of contemporary learning requirements for life in global societies.
- Numerous reports recognize the value of research universities to economic growth, providing evidence that investments in research have an impact on economic growth within commuting distance of the investments. Consequently, revitalization must include strategic investments in basic and applied research and the experts associated with such enterprises. Modern communities need to attract and retain bright, innovative people—the kinds of citizens that contribute new ideas and practices on many fronts to a region.
- Contemporary communities must have an affordable, advanced telecommunications infrastructure to compete in today's global economic arena. Without such an infrastructure, neither the education and research nor business and civic applications of a new economy might emerge and grow. Hence, a focus of Virginia Tech's proposal would be the integration of advanced communications infrastructure in strategic aspects of life and work across the Dan River region.

By adding strategically targeted research and technology infrastructure development to advanced education access, the university proposed to help the community create places that creative and innovative people and companies would want to be. Technology infrastructure and research labs are vested in place and attract entrepreneurs and innovators. With technology, research, and education as an integrated set of strategies, Virginia Tech proposed that the region might have the right ingredients to draw its own children back to the area, attract new creative talent to the region, and develop and extend its own innovative initiatives to the community and beyond.

Virginia Tech's Office of Information Technology spearheaded the development of a revitalization plan, and its networking and learning technologies staff continue to coordinate or facilitate selected technology-integration activities. Consequently, many elements of the partnership that Virginia Tech forged with leaders in the Dan River region build on lessons the university learned from technology-enabled community development efforts in Blacksburg and Montgomery County, as well as in nearby Roanoke, the largest city in Western Virginia. Because Virginia Tech has been involved for more than 10 years with the Blacksburg Electronic Village project,[1] a myriad of successful experiences informs current and emerging initiatives on campus and beyond.

Note that the founders of the Blacksburg Electronic Village, also members of the university's information technology unit, made similar assumptions to those in the university's proposal for the Dan River region. Still, the Southside community development process would focus on a region so severely disadvantaged as to involve high risks for all participants. Further, the complexity of a process physically removed by 135 miles from Virginia Tech's main campus suggested the need for a region-based center to sustain progress and transformational change.

Virginia Tech's Partnership with the Dan River Region

The university proposed revitalization projects for the Dan River region in two comprehensive activity areas:

- developing an advanced telecommunications and computing infrastructure, and
- developing the related knowledge and skill base required for a human infrastructure that could drive renewal.

Under these two umbrella activities, several projects were designed and implemented.

Taking Stock of Community Assets

University experts from the information technology organization and from community-development disciplines conducted preliminary environmental scans of businesses, schools, governmental entities, and other community organizations to determine the extent to which technology was a factor in daily operations. Once a picture of existing conditions became clearer, lists of potential technology-assisted interventions were developed with aims to introduce technological opportunities to business, education, and civic organizations as appropriate.

Early tactics that surfaced on the interventions list involved obvious next steps to working in technology-enabled environments rather than rad-

ical interventions. For example, encouraging the use of geographic information systems in regional planning efforts was a logical first step.

Installing an Advanced Telecommunications Network

Because Virginia Tech is involved in developing successive iterations of the Internet to enable its own access to cutting-edge teaching and research activities, the university proposed extending advanced Internet capabilities to the Dan River region. Such access allows the community to leapfrog into a highly technology-enabled working environment—and perhaps into a competitive economic development arena. Incremental approaches to acquiring advanced telecommunications would doom the region to competitive disadvantage, since no business case exists for major telecommunications providers to extend advanced communications access (optical fiber providing high-bandwidth capabilities) to the region at affordable rates.

The university also proposed teaching interested citizens to install the network themselves, in hopes of beginning to develop a sustainable economy in this arena. Virginia Tech's Office of Information Technology drew up regional blueprints for deploying advanced communications infrastructure in Southside and other rural regions of the commonwealth, working with local leaders to operationalize the plan (see <http://www.ecorridors.vt.edu/>).

Helping Teachers Learn to Use and Integrate Technology

In partnership with the Future of the Piedmont Foundation and the region's congressman, Virginia Tech secured a federal grant that provided the seed funding for a three-year teacher development program in the Danville Public Schools and Pittsylvania County Schools. The university's learning technologies staff coordinated planning using their expertise in instructional development. Virginia Tech faculty specializing in instructional technology and in content-specific educational domains offered workshops to scores of teachers in the region.

In addition, a youth development program was launched, also directed by learning technologies staff. It was designed to bring disadvantaged high school students to three-week summer workshops at Virginia Tech to develop science, technology, engineering, and math abilities and to encourage college-going behaviors and preparation.

Both of these development programs are now seeking funding to sustain longer-term activities, propelled by positive formative assessments of these endeavors. In addition, the university's learning technologies staff and instructional technology faculty joined with the Danville Public Schools to compete successfully in the federally funded magnet school program. With the aid of an $8 million grant and the partnership of the National Aeronautics and Space Administration, Danville's Galileo Magnet School offers an International Baccalaureate high school curriculum with specializations in aerospace technology, biotechnology, and advanced communications technology. In its second year of operation, Galileo's students are performing above average on state-mandated Standards of Learning tests. Having developed its own technology-enriched curriculum, Galileo can serve as a resource to other schools in the region and beyond.

Partnering to Develop Faculty in Technology-Assisted Teaching

Virginia Tech's Faculty Development Institute has successfully engaged more than 96 percent of the university's faculty in integrating technology in teaching (see <http://www.fdi.vt.edu/>). The university's learning technologies division extended this training opportunity to faculty at Danville Community College and Averett University, a private liberal arts institution in Danville, assisting Averett especially in creating its own faculty-development and technology-integration plans. Regional education leaders are currently discussing ways in which complementary and joint technology-enriched program opportunities might occur. For example, Virginia Tech's Math Emporium, a technology-assisted, advanced learning community in mathematics, could serve Dan River region students who want to take linear algebra or precalculus courses in an online environment.

Research Benefiting the Local Economy

Virginia Tech invited selected members of its own research faculty to visit the region and proposed basic and applied research activities that would build upon university strengths and the region's assets. Research projects that have emerged to date include advanced polymer research, which complements a number of local industries; robotic vehicular research and development, which takes advantage of an excellent local test track; niche biotechnology projects aimed at creating high-value horticultural crops; and e-textile development in concert with regional textile mills. Transferring these technologies into the commercial sector remains a central focus.

Developing Local Leadership

Virginia Tech joined with other regional institutions, in particular the University of Virginia, to offer leadership development programs to local citizens. Facilitated by university experts in technology integration and in community development, the programs acquaint participants with

- the challenges facing contemporary communities,
- modern solutions that productive communities around the world are developing and using effectively,
- a network of regional colleagues who will assist in revitalization, and
- resources that might aid their own community development efforts.

Activities will use newly deployed advanced communications networks to forge relationships and to link people, projects, and resources. If successful, the networks will create a new regional identification among participants.

Establishing the Institute for Advanced Learning and Research

Virginia Tech joined with the Future of the Piedmont Foundation, Danville Community College, and Averett University to create the Institute for Advanced Learning and Research (IALR), a visible symbol of and fulcrum for revitalization activities. This institute serves as a demonstration site and as a catalytic and collaborative agent in bringing technology-enriched programs and research to the region from Virginia Tech, other colleges and universities, and business and industry.

The IALR will host advanced learning programs focused on preparing people for innovation-economy jobs. Indeed, institute plans call for it to be an "engine of innovation" by having a small cadre of resident faculty, research scientists, and graduate students focused on strategic regional projects, with connections to Virginia Tech and other major research universities. It will also join with regional schools, governments, chambers of commerce, and other entities to create conditions that support economic transformation.

The institute will have a high-tech conference center with the goal of making Southside a destination for business meetings, educational programs, and other technology-focused gatherings, and building strategically upon the region's attractions. One of the first orders of business in launching the institute was to hire two dynamic young leaders to coordinate the endeavor, one reporting to Virginia Tech's Vice President for Information Technology and the other to the Vice Provost for Outreach and International Affairs (see Acknowledgments). They direct institute activities and drive planning and implementation processes in the community while remaining linked to resources that the university can bring to bear on revitalization efforts. With community, state, and federal support, other faculty and staff members are joining the institute's innovation team.

Funding for the $20 million facility was provided from the Tobacco Master Settlement Agreement ($15 million) and the federal Economic Development Administration ($5 million). Seed operating funds came through private support and the Tobacco Indemnification and Community Revitalization Commission. (For more information see <http://www.ialr.vt.edu/>.)

Many of the university's strategies in the Dan River region could function as proof-of-concept initiatives for models useful in other communities.

Seeking Linkages with Research Triangle in North Carolina

Danville and Pittsylvania County lie on the border between Virginia and North Carolina. Traditionally, this Southside region of Virginia has looked north for development opportunities, but its close proximity to North Carolina's Research Triangle and access to advanced telecommunications ideally suit the Dan River region to serve as a bedroom community and economic partner for its neighbors to the south. Whether for living spaces or for telecommuting locations, the area between the Research Triangle and Danville offers reasonable land prices along with well-preserved Victorian mansions. This setting provides a good test of the proposition that neither distance nor borders matter in new-economy enterprises.

Learning Lessons, Creating Models

Land-grant and other higher education institutions have long histories of community outreach activities. In recent years, the Kellogg Commission and concerned leaders have called for institutions to migrate their activities from one-way outreach to two-way engagement partnerships with their surrounding communities. As Virginia Tech works toward an engagement model for the 21st century, many of the university's strategies in the Dan River region could function as proof-of-concept initiatives for models useful in other communities.

In proving concepts and designing new models for potential replication, the learning curves are steep for all participants, within higher education and without. Innovative community-building or capacity-development activities are, by definition, risk-taking ventures and not for the faint-hearted. Anxiety levels can rise precipitously and without warning in any quarter of the enterprise—from university to community—because of the magnitude of work involved, the unfamiliarity of aspects of the work, the need for inclusive approaches to community development work, the politics of getting work done, the resources required, and more. With this in mind, the following discussion outlines a few salient observations about community development and learning in Virginia Tech's engagement with the Dan River region's development process to this point.

Learning Anxiety

Transformational learning at an individual, organizational, or community level is difficult and—without coercion—rarely occurs unless desired, indeed invited, by the learner(s). Edgar Schein's research on transformational learning suggests that, despite much press to the contrary, very few institutions are truly learning organizations. He warned,

> Learning and the change that inevitably accompanies it is a complex process, often more a source of frustration than achievement for groups and for individuals.[2]

Schein said that radical re-learning induces anxiety and guilt in most people. If re-learning is desired, it is necessary to find ways to provide safe environments in which to experiment with change, without people and the organizations they cherish losing face. He also said that it is important to distinguish between forcing people to learn some-

thing they see practical reasons to accept—like learning new computer skills—and learning something that is questionable to them or beyond their comprehension at a particular moment.

If people accept the need to learn, tactics such as training, coaching, community support, communication strategies that provide feedback on progress, and incentive programs will usually assist the change process.[3] In this case, the practical, though difficult, intervention of integrating technology—which Virginia Tech's information technology office planned and led in its early stages—offered the community recognizable reasons for change. In turn, as catalytic agents—whether universities or other entities (evidence exists suggesting that regional corporations can serve this role as well[4])—fully engage a community in the give and take of change, after which partners can develop training, support, and communication programs across community sectors and organizational boundaries.

Impetus for Change

Transformational community change may be motivated by external factors but rarely occurs unless enough citizens inside of the community want change, are willing to work for it, and know how to secure or leverage the resources required for change. Much of the literature on substantive change suggests that external factors may either inspire or force people to think about the need for change, perhaps even moving them to the point of proposing directions. But unless a critical mass of community members coalesce behind an idea to exert internal pressure for substantive change, a transformational learning process is not likely to get off the ground.

Internal advocates need to be willing to work with neighbors, friends, and colleagues to bring about change and must themselves demonstrate change in various aspects of community life. Couple such internal efforts with appropriate resources, and transformational change is more likely to take root.

Without these three components—external forces, internal pressures for change, and resources for change—piecemeal, incremental adjustments to the status quo will be the order of the day.[5] In the Dan River region's case, the Future of the Piedmont Foundation served as the first critical internal force for change. They have since been joined by numerous others as the effort gains momentum, breadth, and depth. The foundation has also maintained vital links to Virginia Tech's information technology and outreach organizations and to related research programs and faculty.

Multiple Approaches to Learning

Transformational change implies that much teaching and learning will occur before change takes place. Using approaches to teaching that accommodate a community's learning styles is critical. The literature on constructivist, experiential, and organizational learning suggests viable options for engaging in community-based activities. Harry Boyte explained that successful civic learning organizations stress learning as productive work aimed at community problem-solving and capacity-building. He further suggested that an empowering, people-oriented process will build public relationships across rigid boundaries of old.[6]

While accounting for the histories and cultures of places, citizen-learners must also consider larger public environments. Every community is unique, but modern advances in transportation and communications have created an environment that requires change agents and civic activists alike to pay special attention to multiple contexts. These political, social, and economic contexts extend far beyond a particular community yet must figure in visible ways in meeting immediate and long-term goals for change.[7] For example, developing communities today usually understand the need for a robust telecommunications infrastructure and may be willing to build it themselves, but they do not always see the need to link their infrastructure with others across a region or the world, apparently fearing some loss of competitive advantage. Communities might benefit from exposure to notions of globalization as an elemental ingredient of 21st century community endeavors. The Southside leadership development programs seek to foster this awareness.

Furthermore, creating valuable local services—in business, education, and government—that might be provided electronically to other places might help combat isolationist tendencies or other defensive tactics that limit opportunities for learning and exchange. Establishing such viable projects and programs is one goal of leadership development efforts in the region.

Technology as Catalyst

Modern technologies are just tools, however powerful, pervasive, or necessary they may be for modern commerce. At the heart of community change lies the development of human relationships focused on change, human capital that responds to new challenges, new and sustained alliances that cross traditional community boundaries, and other kinds of relationship-building activities. The technology, if thoughtfully employed, can serve as intervention implements and motivational objects on behalf of social, economic, and political change.

Many people seem to accept the need to learn about new computing and telecommunications technologies. Once they consider what the technology allows them to do differently, it can inspire them to re-think an activity or enterprise, whether social, economic, or educational. From the perspective of profit-making and nonprofit entities, modern technologies—beyond being a useful tool for change—can also be disruptive, changing the ways people work, interact, and more.[8] As such, disruptive technologies might be dismissed as unfamiliar, threatening, or seemingly unproductive according to traditional measures. Again, change agents must attend to aligning human and financial resources with community pro-

cesses for disruptive technologies to gain a foothold.

Community capacity-building efforts in Southside seem to have passed the point of having participants dismiss unfamiliar technologies, ideas, and practices out of hand, and re-thinking of activities is occurring in selective places. But much work remains. As a community's familiarity with and ease in using technology increases, broader and deeper conversations about technology's influences on life are in order. Sherry Turkle suggested that "[c]omputer software changes how architects think about buildings, surgeons about bodies, and CEOs about business. It also changes how teachers think about teaching and how their students think about learning."[9] In all cases, Turkle said, it is important to understand at a deep level the personal effects of technology in order to make it serve people and their communities well. Much of the community leadership development in Southside aims to bring such an awareness of choices and consequences in using new technologies.

Campaigns for Change

A vision of the change desired is essential, as is the constant communication of it. In the past, literature on change talked of unfreezing old structures, reconfiguring them to desired forms, and then refreezing them for some period. This model posited a static quality to institutional change—not particularly descriptive of the dynamic environment in which many think transformational learning occurs today.

Recent descriptions of substantive change suggest that a campaign metaphor or model is more appropriate to contemporary change processes. In this model, change agents employ three different but well-connected campaigns, with all of the liabilities and assets inherent in campaign models:

- They use the tactical elements of political campaigns, creating coalitions to guide and support initiatives.
- They use elements of marketing or promotional campaigns to explain the vision in understandable terms, to stay in touch with and provide feedback to stakeholders and constituents, and to avoid being pegged as out of touch or social engineers.
- They employ various tactics reminiscent of military campaigns, securing lines of supply and capturing important beachheads to keep pilot efforts from stalling.

Change agents must attend to aligning human and financial resources with community processes for disruptive technologies to gain a foothold.

Most important, modern change agents keep these campaign elements in constant motion, dynamically reengaging appropriate tactical or strategic elements as needed.[10] This approach is exhausting for all involved, from university to local news organizations. Still, it is absolutely necessary to keep a new narrative growing, to keep unfounded and defeatist rumors at bay, and to explain frequently to citizens the benefits of the changes before them.

Community Development Revisited

Developing communities for a new age is fairly common today. But the scale and scope of learning required by all who participate in such development activities suggest that much more is at stake than adding a few new smokestacks to the existing horizon. In contrast, a new horizon may be coming into view, with contemporary community developers serving as designers, architects, and builders of its unfolding landscape. In this view, today's vanguard of change has enthusiastic innovators and anxious survivors alike learning to create new structures and processes that will benefit their re-envisioned vistas of life and work.

In modern times, educational institutions have often acted as important vehicles for social, political, and economic progress. Yet today, some argue that the social conditions in which education has traditionally occurred are changing beyond recognition. In their examination of the forces of change in society today, Jarvis, Holford, and Griffin suggested that the risks, illusions, and ambiguities of a postmodern world call for replacing traditional notions about education, a vestige of modern societies where stability, confidence, and progress were the social order of the day, with a new concept of learning over a lifetime.[11] This argument parallels and reflects provocatively on discourse in other research and practice and on the community development activities mentioned here: Businesses, governments, universities, and communities have publicly stated that they are setting their sights on difficult, complex, and sometimes illusory aims. Furthermore, the forces of change influencing these efforts are unprecedented in modern times.

Jarvis, Holford, and Griffin listed several forces of change confronting societies today, noting such influences as globalization processes that are social and cultural, not just economic; shifts in work toward providing services and away from manufacturing mass-produced goods, with a concurrent disappearance of the job-for-life; and the commoditization of style, culture, and knowledge, with various forms of media replacing production as a basis of social life. They see these influences, in which new technologies figure significantly, and others as harbingers of the lifelong learning required to realize transformational shifts that adjust to such influences.

It remains to be seen how a comprehensive view of any emerging landscape might look if mainstay institutions in communities across the nation and beyond fully engage these contemporary forces. Histories are better suited to capturing the warp and woof of such shifts, whether sweeping or limited.

It is too soon in what is effectively a cultural change process to declare a definitive proof of concept; still, early signs of progress are present. The for-

mative assessments of technology deployment and of faculty and community development activities that have occurred to date in Southside Virginia are positive and suggest staying the course. Further, nearby communities are now looking at ways to link to Southside's revitalization efforts or to create their own initiatives employing key elements of the Dan River region's plan. While flattering, imitation of a concept is not the same as proof of concept; at the same time, successive iterations of concept components offer opportunities for broad-based refinement of ideas and practices.

For the present, these communities are seeking or engaged in revitalization efforts in order to remain part of a landscape of social, cultural, and economic activity. Many of the institutions that have traditionally constituted and supported such communities are either under fire or on the cusp of change themselves. For community development partners—universities, corporations, chambers of commerce, local governments, schools, nonprofit foundations—it seems that the time for two-way engagement processes has indeed arrived, as many good learners are required for the tasks at hand. *e*

Acknowledgments

My sincere appreciation to Tim Franklin, Director of the Institute for Advanced Learning and Research, and Nancy Franklin, Southside Regional Director of Information Technology at the institute, for their continuing contributions to creating this community development narrative.

Endnotes

1. The Blacksburg Electronic Village project officially launched in 1993, when the university extended its network to the neighboring township. It lists many firsts among successful efforts to provide advanced communications access to citizens. See <http://www.bev.net>.
2. D. L. Coutu, "Edgar Schein: The Anxiety of Learning," *Harvard Business Review*, Vol. 80, No. 2, March 2002, p. 100.
3. Ibid, pp. 100–106.
4. H. Mayer, *Taking Root in the Silicon Forest: High Technology Firms as Surrogate Universities in Portland, OR*, unpublished dissertation (Portland, Ore.: Portland State University, 2003).
5. A. Toffler, *The Adaptive Corporation* (New York: McGraw-Hill, 1985).
6. H. C. Boyte, "Information-Age Populism: Higher Education as a Civic Learning Organization," monograph of the Council on Public Policy Education, 2002.
7. Ibid.
8. C. M. Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail* (Cambridge, Mass.: Harvard Business School Press, 1997).
9. D. L. Coutu, "Technology and Human Vulnerability: A Conversation with MIT's Sherry Turkle," *Harvard Business Review*, Vol. 81, No. 9, September 2003, p. 44.
10. L. Hirshhorn, "Campaigning for Change," *Harvard Business Review*, Vol. 80, No. 7, July 2002, pp. 98–104.
11. P. Jarvis, J. Holford, and C. Griffin, *The Theory and Practice of Learning*, 2nd Ed. (London: Kogan Page Limited, 2003).

Anne H. Moore (ahmoore@vt.edu) is Associate Vice President, Learning Technologies, at Virginia Polytechnic Institute and State University in Blacksburg, Virginia.