

Distance Learning Forum
Sponsored by the State Council of Higher Education for Virginia
June 1st and 2nd, 1998

Luncheon Presentation: Distanceless Learning

Executive Summary

Dr. Moore described the application of distance learning technology at Virginia Tech and its impact to date in an effort to show all higher education institutions attending the Forum that the technology is both coming and effective. Dr. Blythe discussed the potential of new advanced networking—represented in its current form by Net.Work.Virginia—that will have an enormous effect on information transmittal. His presentation indicated that ten years hence customers of all types (home, business, and higher education) will have the ability to receive the full spectrum of high quality audio, visual, and telecommunication services at reasonable costs.

Dr. Anne Moore
Director of Information Technology Initiatives
Virginia Polytechnic Institute and State University

Dr. Moore began by discussing the process by which technology is adopted into society. There is first a “research and development” phase that leads to “large scale prototypes.” This is closely followed by a “commercialization” phase that in the end evolves to a “commodity” phase. Each phase has subcategories of “people and places,” “the technology,” and “policy.”

Her presentation, she continued, would concentrate on the people and places aspect of the research and development phase of distance learning. Earving Blythe’s presentation would discuss the technology. Dr. Moore then discussed Virginia Tech’s efforts to understand and incorporate the latest distance learning and pedagogical technology into its programs.

In 1993 Tech reallocated 1.5% of its budget to fund the Instructional Development Initiative. The purpose of the Initiative was to outfit classrooms and other pertinent sites with the appropriate hardware to facilitate the use of technological advances. Most importantly under this Initiative, a Faculty Development Institute was begun. This Institute began a four-year program to equip all of Tech’s faculty with hardware, software, a network connection, and the ability to use all of this. As of today 96 percent of Tech faculty have gone through the program.

The results of the investment are beginning to pay off, according to Dr. Moore. There are now 500 courses that are completely or partly taught “on-line.” There is also Tech’s

“Endless Summer” program, whereby a pilot group of students is involved in taking 27 courses on-line.

Dr. Moore then showed Quicktime movies of faculty at Tech who have been “early adopters” of technology in the courses they offer. These faculty included Valerie Hardcastle, a professor of philosophy; Lucinda Roy, a professor of poetry; and Tim Mack, a professor of entomology.

Dr. Moore also discussed the Virtual Reality Cave that had been developed at Tech to showcase the use of 3-dimensional technology and its application to instruction. She specifically described a 3-dimensional tour of the inside of a grasshopper as a way technology can assist a difficult instructional subject.

Dr. Moore said that students feel that learning has dramatically increased by using the new technologies, that distance learning forces a higher rate of reading of background materials, and lets people participate in discussions who otherwise might sit silently in a traditional class.

Dr. Moore summarized what Tech has found out about the application of technology, and specifically new distance learning approaches, to instruction at Virginia Tech. The findings include:

- Students find they actually have a greater access to class materials and the opinions of other students;
- With the lecture material posted, there has been a much higher level of participation in subject discussions than is the case in traditional classroom settings;
- The overall performance of students taking virtually-based classes is at the same level as or better than that of those taking the same classes in the traditional classroom/pedagogical approach;
- Students become active learners rather than passive learners in the virtually-based classes.

Switching from a discussion of the “people” element of the research and development phase of technological innovation, Dr. Moore next discussed the “places” element. She described the Math Emporium at Tech, a space developed to provide technologically-based assistance and support for specific math classes, classes that utilize mathematics extensively (e.g., an engineering course), and for students needing work in mathematical skills. The advantage of this physical facility is that it is very inexpensive to set up and operate.

She then described a new physical facility under construction at Tech, the Advanced Communication and Technology Center. This independent element of Tech’s academic life is not owned by any specific department or school within the University. Its designed purpose is to combine the major technological services and research groups in the university, giving them one location in which to interact and exchange ideas and knowledge. The computing and communication research group will co-inhabit the facility

with the instructional technology group, both of which will have direct access to the University's new digital library effort.

In closing, Dr. Moore stated that the Advanced Communication and Technology Center allows a synergistic effort to incorporate advanced computing and communication technology into the instructional and academic life at Virginia Tech. She next introduced Dr. Blythe to discuss the technology in more detail.

Dr. Earving Blythe
Vice President for Information Systems
Virginia Polytechnic Institute and State University

Dr. Blythe said that the changes that will be seen over the next ten years in the application of advanced communication and networking technology, and in the cost of services, will make the last ten years seem tame. He then provided a short history of networking and communication technology advances.

Prior to 1970 the only efforts at networking were taking place at Bell Telephone, with the goal of cutting their marginal costs. However, around 1970 the Department of Defense got involved with dual goals of improving the ability of computers to communicate with one another, and of creating a communication network capable of surviving nuclear war.

With this short history as a background, Dr. Blythe said that there will be tremendous increases in investment by both the government and private sector in communications and networking in the next decade. The Department of Defense is interested in creating a communications network that is able to transmit visual and virtual reality in any type of environment, and is mobile and survivable in battle. The Space Warfare Group and DOE are interested in developing the technology to simulate weapons testing and weapons' environmental impact, which will require at least an order of magnitude improvement in computing and networking technology.

The private sector legacy companies (AT&T, etc.) are also primed to invest heavily in communications and networking technology to preserve their market share. Entrepreneurial companies see more opportunity in this area, so are also investing heavily in research and development.

Dr. Blythe next discussed the actual technological advances that can be expected to impact higher education over the next decade. He said that higher education will see advanced networking with the following characteristics:

- The ability to transmit high bandwidth (1.5 to 155 million bits per second);
- The availability of a "universal connection" (a connection to a network that will enable simultaneous voice, video, and data transmission);

- A high degree of customer control, wherein the customer determines how to allocate the advantages of the universal connection; and
- A great downward pressure on pricing.

Citing Net.Work.Virginia as an example of the first pass at Advanced Communication Networks (the “next generation” Internet), he noted that the network was able to cut costs to subscribers who only used the low bandwidth capacity (1.5 million bits per second) by 50 percent. For those able to use the high bandwidth (155 million bits per second), the costs of the network have been cut by over 90 percent.

Dr. Blythe closed his presentation by discussing the advent of wireless technology, saying that Virginia Tech had recently won licenses for four areas in Southwest Virginia. This new technology will allow Tech to transmit over 2.5 times the information into these areas than had heretofore been available from all sources (television, radio, telephone, cable, etc.). With the availability of high band connections discussed above, current technological capabilities will allow an immediate 1 gigabyte of information transmission into the small operational subdivisions of each of these areas, and technology on the boards will increase that amount to 10 gigabytes. The bottom line is that customers will be able to get the full spectrum of audio/visual computing and communication with no practical limit in the amount of information they can be presented. The monthly cost for such service—estimated 5-10 years from implementation—will be about \$30-\$100 in today’s dollars, depending upon the set of services a customer selects.

Dr. Anne Moore quickly followed Dr. Blythe’s presentation to say that the “policy” element of research and development was well discussed in the paper provided by Dr. Dewayne Matthews of WICHE for the background papers segment of the Forum. This paper can be found on SCHEV’s web-site (www.schev.edu) under the heading of “Distance Learning.”