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*Metropolitan universities can play a key role in the integration of technology into K-12 education.*

*Indeed, technology efforts will fail without higher education involvement. The University of Tennessee at Chattanooga has programs to train in-service teachers in technology, a space flight simulator for hands-on education, and connections to schools that will assure new teachers' familiarity with technology.*

# Realizing the Potential of Educational Technologies: *A Challenge to Metropolitan Universities*

Ernest Boyer, in *Scholarship Reconsidered*, calls the professoriate to an examination of higher education as we approach the 21st century. In summoning us to sharpen our purposes and identities, he describes the comprehensive university as the type of campus most prone to an identity crisis. The comprehensive university has difficulty, Boyer says, in sorting priorities and giving direction to faculty efforts so that the institution might develop a distinct mission. Boyer suggests that the special niche of these campuses could be the combination of quality and innovation in the application of knowledge. Such institutions would "give priority to programs which build bridges to institutions beyond the campus, relate the intellectual life to contemporary problems, and, in the land-grant tradition, become centers of service to the communities that surround them" (p. 63).

The University of Tennessee at Chattanooga is perhaps the sort of institution that Boyer has in mind. UTC is a comprehensive university of about 8,500 students within a metropolitan setting. The City of Chattanooga has 150,000 residents, while the population of the metropolitan area numbers 450,000.

Like several other metropolitan universities, UTC, now public, was once private. In 1969 the University of Chattanooga became a campus of the University of Tennessee, with a special mission of regional service. Also in common with many metropolitan universities, UTC serves a diverse, nontraditional student body. The average age of

students is 27, and many are first-generation college enrollees. Commuting students are in the majority, and part-time students constitute a sizable portion of the enrollment.

Our students are connected to the metropolitan area by bonds of family, career, and residence, and it is incumbent upon the university to build upon these bonds. UTC seeks to be an economic, educational, and cultural engine for the Chattanooga area. A particular emphasis for UTC has been involvement in K-12 education. Long the primary educator of teachers in area schools through the College of Education and Applied Professional Studies, and home of the nationally acclaimed Southeast Center for Education in the Arts, a center for the advancement of discipline-based arts education, the university most recently has expanded its involvement in primary and secondary education through an emphasis on technology for the 21st century classroom.

### Technology in the Schools

Technology can play a critical role in the systemic reform of schools. It can increase the effectiveness of instruction, open opportunities for student-directed learning, and enhance critical thinking for a greater variety of students. It can become the social equalizer that the introduction of the printing press was centuries ago. A host of new instructional technologies is rapidly evolving: interactive video, networked science, hypermedia, multimedia, microcomputer-based laboratory applications, and many others. Public school classrooms are exploring implementation strategies, and these strategies are as varied as the technologies themselves.

Technologies promise to change the basic nature of education, to change the relationship of teacher and student. Ours is fairly called "the information age." The exponentially expanding information base, and its immediate availability through technologies, alters the roles of teacher and student. Rather than the primary font of information, the teacher becomes facilitator and coach in a classroom where students have access to the most current information available on almost any subject — instantly and over great distances.

For the student, the measure of school success shifts from the amount of information memorized to the ability to access information and use it to solve problems. This focus on problem solution brings with it an emphasis on teamwork, critical thinking, cooperative learning, and oral and written communication skills. Thus, the teacher is a coach in a classroom of active learners; the student increasingly learns by doing. This new emphasis closely matches the type of skills the workplace will require in future employees, and our conversations with business leaders confirm their desire to see such skills in today's graduates.

Coinciding with this revolution in how the teacher will use technology to direct the learning experiences of students in the classroom, however, is the development of circumstances in college and university teacher preparation programs that are a source of considerable alarm. Many factors have contributed to a "disconnection" between programs that train teachers and the classrooms in which they work. Funding patterns, ivory-tower attitudes on the part of college and university faculty, social and demographic issues which affect public schools, nationalization of education goals and strategies, and school reform are among the disparate factors which have combined to create considerable distance between what and how teachers learn, and what and how they are expected to teach.

As in-service teachers take on the daunting task of incorporating these new technologies into their classrooms, they often do so with scarce support of the teacher

education programs in colleges and universities. Effective integration of these technologies into the classroom requires skills and time that most busy classroom teachers do not have.

### **The Role of Higher Education**

Higher education can play an important and pivotal role in assisting the current teacher corps with the knowledge and hands-on experience necessary for effective utilization of technologies. But the ideal point at which teachers can best be prepared to use technology is during their pre-service education. Their teaching styles have not “solidified” at this point, and they are able to integrate the use of instructional technologies into their instructional approaches without disrupting existing methodologies. Teachers in the future should become as comfortable using a computer projection system as today’s teachers are with the use of the overhead projector. University teacher preparation programs and curricula are beginning to be revised to incorporate these new instructional technologies.

The success of incorporation of new technologies is problematic, however, unless university faculty, university students, classroom teachers and classroom students all have ample opportunity to work with them in actual classroom settings. Some of the best ideas regarding the use of instructional technology come when this broad community of learners works together.

It is at this critical juncture that the disconnection between university teacher preparation programs and public school programs becomes most obvious and tragic. Many states have infused classrooms with technology dollars, developed in-house training programs, and forced (or strongly influenced) classroom teachers to get training in order to get technology grants for the schools. Most typically these state efforts proceed without the involvement of college and university teacher preparation program personnel. The results of attempting to implement technology into public school classrooms without utilizing a cooperative, collaborative strategy encouraging inclusion of in-service teachers, pre-service teachers, teacher preparation faculty, and public school students is threefold:

- 1) When technology is widely introduced throughout a district or state system, there is enormous risk that the inevitable flaws and glitches will come to dominate the experience, and the culture will become anti-technology. It is better to start with a subset of volunteers who work out the gremlins and can serve as trainers for those who follow. This is an ideal opportunity for university/school partnerships.

- 2) Without the learning resource that the university has traditionally been to school systems, the temptation is for such systems to spend virtually all available technology funds on equipment without adequate provision for training and support. School systems should provide technical assistance, but instructional support — i.e. how to use the equipment to enhance learning — requires a broader context from which the teacher can benefit. The person who can help you hook up the equipment will not be able to help you teach third grade science.

- 3) When states introduce technologies without including college and university faculty in the training programs for in-service teachers, and fail to provide funding for technology for the college/university classroom that is at least a reasonable facsimile of what the public school classroom will have available, the result is a continuing supply of new teachers who do not know how to use technology to teach.

Technology can be the education reform initiative that provides the bridge

between schools and teacher preparation programs. Both institutions have learners in the equation. Superintendents and state departments of education should not attempt to infuse technology into their schools without the partnering with college and university faculty. College and university teacher preparation program faculty must work with public schools to learn how to use the technology to support instruction and how to pass this emerging knowledge on to pre-service teachers.

The pre-service teacher, interestingly enough, is probably the one participant who is uniquely prepared to teach as well as learn. Unlike previous generations, today's teachers-in-training bring to college basic technical skills. Fresh from the public school classroom, they have insights into how they, as learners, would have used technology if given an opportunity. Once again, technology turns the teacher-learner relationship around.

The necessity of a connection between K-12 classrooms and teacher preparation programs, particularly with regard to emerging technologies and their utilization, is one which makes good sense to those among us engaged in teacher preparation. The underlying concepts and practices find support in the the U.S. Department of Education's "Mission Statement and Principles of Professional Development," at the time of this writing in draft form and distributed for public comment. The statement focuses on "high-quality professional development" in the teaching profession, to "ensure the career-long development of teachers and other educators whose competence, expectations, and actions influence the teaching and learning environment." Further, the statement asserts, these "strategies should be collaboratively designed, implemented, coordinated, and evaluated by schools, higher education institutions, and other appropriate entities and should focus on improving teaching and learning."

### Activities at UTC

The University of Tennessee at Chattanooga has undertaken university/school partnerships aggressively, and has sought involvement even at the level of input into state legislation regarding education reform and technological advancement. Some of the initiatives noted below, and portions of all them, are funded through normal operating budgets. Others have attracted substantial grant support, from the federal government, the state government, or private entities. But those who would discount the applicability of specially funded programs to other campuses should consider two particular points. First, several of these efforts are largely pilot programs, and the costs of replication and adaptation are likely to be lower than origination. Second, current political and economic realities suggest that it is unlikely that higher education will see expanding general investment in our institutions in the near-term. Dollars-per-student are more likely to remain stable or decline. Therefore, sources of funding for innovation and growth are most likely to be targeted for those programs tied to specific governmental and private initiatives and priorities. The improvement of K-12 education is among society's highest priorities. Initiatives demonstrating strong interest and results in this area, particularly technologically based initiatives, are likely to be strong competitors for increasingly scarce resources. It is, clearly, a situation not only of altruistic good, but one where we will best help ourselves by helping others.

The 21st Century Classroom is the name of the Tennessee-funded program which has provided on our campus the first state department of education training facility on a university campus. The program provides training for public school teachers in the application of instructional technology. Those who complete the

program can qualify for state-funded technology equipment for their classrooms. The same technology used for in-service teacher training is used to teach university courses in a technology-aided format. The state initiative which made the technologies available to public schools also established the concept of training centers based at colleges and universities.

The Southeast Tennessee Professional Development Consortium is a related program, funded by a federal "Goals 2000: Educate America Act" grant. UTC has formed a partnership with eight school systems in our service area to provide professional development for teachers in active learning and technology.

A third program, the Tennessee Valley Project is a program funded by an Annenberg/CPB grant. The TVP has been developed as a pilot program with expectations for regional and national implementation. The project connects rural school systems with advanced technology and information sources for the improvement of math and science education in primary and middle school grades. Based at UTC and utilizing its computer systems, the TVP connects the rural school systems, all adjacent to UTC's home county, to statewide and national sources of science information. The Tennessee Valley Project, the Oak Ridge Laboratories, the Tennessee Aquarium, and other partners have joined to develop specific information bases and to provide technological assistance both to the project and directly to students in their classrooms. A particular strength of the TVP is its emphasis on training; most of the first year of the three-year pilot period has been devoted to teacher education and systems planning. As with other technology-based education programs, the College of Education and Applied Professional Studies at UTC has partnered internally with our Center for Excellence in Computer Applications at all levels, from conception to implementation.

The UTC Challenger Learning Center is not a program which began at UTC, but which has been taken to a new level of educational collaboration at our campus. The national Challenger Center program is the legacy of the Challenger Space Shuttle astronauts who perished in the tragedy of Flight 51-L on January 28, 1986. The families of the seven astronauts, including that of the first teacher-in-space, Christa McAuliffe, sought to continue the educational mission of the shuttle through the establishment of the Challenger Centers. At these centers, students learn math and science along with team-building and leadership skills through simulated space missions. The mission itself is the culmination of several weeks of preparatory study, and is reinforced by follow-up units.

The Challenger Center on our campus combines several features making it unique in the utilization of the space-mission concept to advance technology in the classroom. The UTC center, the 25th in North America, is among the first on a college or university campus and the first to be housed in a specially designed and constructed facility. The center will bring together students (particularly from the targeted middle-school age group), in-service teachers, pre-service teachers, and professors of education in what promises to be a learning experience for all. The Challenger Center is an embodiment of the learner-directed-education concept. UTC, which opened the center earlier this year on the ninth anniversary of the shuttle disaster, will sponsor and encourage research into and improvement of the educational models pioneered and implemented through the center. The Chattanooga City and the Hamilton County School Systems have been full partners in the establishment of the center and have devoted both funds and personnel to its operation.

In the fall of 1995, UTC will establish a "school laboratory" program with the city schools. Two schools will become centers for university/school direct col-

laboration. UTC students and faculty will work in the schools; university students will work in the classrooms and university faculty will teach courses on site. A K-12 teacher in each school will serve as coordinator for the interface, which will incorporate educational technologies as a key component.

Other partnerships, less technologically based but important parts of a seamless relationship, include the annual Governor's School for Prospective Teachers, which each summer brings to campus 40 high school juniors who have expressed an interest in teaching; and the new museum education partnerships, in which sophomore education students will design and deliver educational programs to local schools using content and lesson plans developed jointly with the Tennessee Aquarium and the new Creative Discovery Museum.

Instructional technologies can lead to genuine reform in education. But poorly conceived, poorly coordinated, and poorly implemented, the introduction of technology into classrooms can be an expensive deadend, which neither exploits the potential of the technologies themselves nor modifies educational practice for the 21st century.

Colleges and universities, particularly metropolitan universities with their dedication to regional service and applied research, can play an important if not indispensable role in assuring that technologies are introduced into classrooms and curricula with cost effectiveness, with the realization of their full potential, and in concert with fundamental educational goals.

### *Suggested Reading*

Boyer, Ernest L. *Scholarship Reconsidered: Priorities for the Professoriate*. Princeton, NJ, The Carnegie Foundation for the Advancement of Teaching, 1990.

Bull, G., and J. Cooper, "New Technologies in Teacher Education," *American Association of Colleges for Teacher Education Briefs*, March 1989, pp. 7 - 8.

Bull, G., J. Cooper, J. English, and M.E. King, "Successful School-University Partnerships," Paper presented at the IBM Superintendents Conference, Orlando, FL, February 11 - 15, 1991.

Ihmig, D., "Memorandum: Contextual Statement/Environmental Scan," New Deans' Institute, American Association of Colleges for Teacher Education, Washington, DC, July 30, 1994.

*Professional Development: Mission Statement and Principles*. Comment Request. Federal Register, December 9, 1994, pp. 63773 - 63774.

Tanner, Mary P. "The Effect of the Inservice/Preservice "Disconnect" on the Implementation of Technology in Public School Classrooms," in *The Dynamic Interaction of Higher Education, Teacher Education, and School Reform*. A TECSU Dialogue. Monograph Series, Vol. 1, No. 1. Teacher Education Council of State Colleges and Universities and Institute for Educational Leadership at the University of Northern Iowa, Cedar Falls, IA, 1995.