Distance Learning in Colorado:

A Grassroots Initiative

Eric Feder, Director
Educational Telecommunications Unit
Colorado Department of Education
feder_e@cde.state.co.us
303-866-6859

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Just as we and our parents grew up in the industrial age, today's learners are growing up and will spend the rest of their lives living and working in the information and post-information ages where they must be able to analyze, evaluate, and synthesize rapidly changing information. No longer will the ability to merely repeat memorized facts be sufficient. Today's learners must be able to think critically, work cooperatively and interact with peers from differing cultures. Geographic and socio-economic isolation have restricted access to these skills for many Colorodans. To succeed in the future, all Colorado residents, regardless of where they live, need the opportunity to access the same quality educational programs and resources and to interact with people from diverse backgrounds. Affordable telecommunications services can bridge this gap. As the Colorado Telecommunications Advisory Commission put it, "Zip codes should not dictate the quality of your education." (1989)

Through the use of a myriad of distance learning technologies, students, faculty members, administrators and other learners in nearly all Colorado institutions of higher education, most school districts and Boards of Cooperative Educational Services (BOCES/BOCS), many public libraries, and numerous businesses are participating in, or investigating, distance learning projects to improve curricular offerings and instructional, staff development and community education programs to give learners access to quality interactive programs and resources. Higher education, school district, and library personnel and business employees are choosing from numerous programs delivered via advanced telecommunications networks to select programs which best meet their individual professional development and educational needs. Not only is access to programming and resources increased, but the skills necessary to use these resources effectively are also taught.

Colorado learners of all ages participate in courses and special programs delivered via interactive technologies. Students and teachers learn via satellite and from many locally designed and developed distance learning projects that provide enhanced educational opportunities via regional, interactive networks using such technologies as: Instructional Television Fixed Service (ITFS), T1 -- compressed digital video, cable television, fiber optics networks and the Internet. Regardless of the technology used, distance learning is providing Colorado learners access to quality educational opportunities in areas of limited resources.

Therein lies the seed for success *and* confusion which has historically been distance learning in Colorado. Because of many factors, including a long-held belief in district and institutional autonomy and the use of local funds to finance projects, many institutions have developed and utilize seemingly non-compatible systems. While there currently are several efforts under way to interconnect these disparate systems, most efforts throughout the years to accomplish this have ended in frustration. As a result, the Colorado General Assembly formed the *Telecommunications Advisory Commission* (TAC) during the 1989 legislative session. While not the first effort to coordinate distance learning and other telecommunications efforts in Colorado, TAC was charged with developing a statewide telecommunications plan for delivering educational programming and

information resources. After public hearings and consultation with education and telecommunications specialists, the commission designed a plan calling for the establishment of voluntary, regional telecommunications clusters which, when complete, would be interconnected by a statewide telecommunications backbone. This plan was designed to take advantage of existing networks and initiatives.

Until sunsetting in June 1995, the Telecommunications Advisory Commission successfully brought together representatives from many educational institutions, distance learning projects, the telecommunications industry, state government and other segments of the Colorado community to discuss various issues including: technology selection, interconnectivity, and control. Several current initiatives are the result of this effort to plan for Colorado's educational telecommunications needs.

- The State telecommunications compressed digital video network, *CIVICS*, which interconnects regional and institutional interactive video networks via the state's microwave network;
- The *Higher Education Telecommunications Alliance* (HETA), which coordinates the interactive video projects of the five Colorado higher education governing boards and the community college system overseeing their interconnection with the CIVICS network;
- *Connect Colorado*, a regional video and data network in southeastern Colorado which was developed in response to the Telecommunications Adivsory Commission's plan for regionalization of telecommunications infrastructure. This network is an partnership of the school districts, BOCES, hospitals and libraries in southeastern Colorado (from Fowler east); the Colorado community college system; Otero and Lamar community colleges; and Southeastern Communications, a subsidary of Southeastern Power.
- The *Multi-use Network Taskforce* (MNT), which has worked since 1997 to develop a workable design for a high speed statewide telecommunications network interconnecting each Colorado county seat, prison and institution of higher education – other government offices, schools, libraries and public hospitals will connect to aggregated network access points (ANAPs) in each community; and
- The *Beanpole Bill Taskforce* (HB 99-1102) (C.R.S. 24-32-3001) has worked to implement the MNT's second recommendation– to provide capital construction funds to local communities so these agencies can complete the "last mile" loop.

Continued support for a statewide telecommunications network for the delivery of instructional, professional development and educational programming to, from, and among Colorado's communities has come from several sources including Colorado's Department of General Support Services (GSS), Commission on Information Management (IMC); Commission on Higher Education (CACHE); Department of Education (CDE) and, more recently, the office of Governor Bill Owens.

Colorado Interactive Distance Learning Projects

School District and BOCES Distance Learning Projects using terrestrial telecommunications networks (elementary and secondary students are primary audience): (in alphabetical order)

- The **Aurora Public Schools** Continuing Education Department delivers self-paced learning opportunities for discouraged and traditional learners through the use of telecourses delivered via Rocky Mountain PBS, Channel 6 and via the Internet. *Operational*
- The **Colorado Information Infrastructure** (CII) interconnects eleven school districts, two community colleges and the Centennial BOCES via the state's CIVICS network. This was funded, in part, through a grant from the Colorado Public Utilities Commission ($540,000) and US Department of Commerce through a National Telecommunications Infrastructure Administration grant ($350,000). Sites include the high schools in: Briggsdale, Gilcrest, St. Vrain SD, Prairie, Grover, Johnstown, Eaton, Estes Park, Ault, Berthoud and Longmont. *Operational*
- The **Colorado Department of Education** has a videoconferencing facility capable of connecting to like sites throughout the state, nation and world. It will be used for professional development and meetings. *Operational*
- The **Colorado Online School Consortium**, a statewide consortium of fourteen urban and rural school districts, is working with teachers in each district to develop web-based courses for delivery. A Colorado Technology Literacy Grant ($344,000) provided funding. *Operational*
- The **Colorado School for the Deaf and Blind**, a residential program operated by the Colorado Department of Education, has a video conferencing facility capable of connecting to like sites throughout the state, nation and world. It will be used for training professionals and others in Colorado and for meetings. *Operational*
- **Delta County School District** operates an interactive video network interconnecting its high schools to share instructional resources.
- **Denver Public Schools** provides two-way, interactive foreign language classes to elementary schools over their educational access cable television channels. This network also delivers staff development programming to teachers throughout the district. *Operational* Future availability of eight ITFS (Instruction Television Fixed Service) channels will expand program delivery to include gifted and talented programs and elementary science classes. *Planned* Denver Public Schools also uses the Internet and World Wide Web to provide instruction to its students. *Operational*
- The **East Central BOCES' Interactive Learning Network, Phase I** uses a digital fiber optic network to interconnect four BOCES' school districts (Bennett, Strasburg, Byers and Deer Trail) offering high school and Morgan Community College courses to high school and adult learners. The BOCES received grants from the Colorado Department of Education through Schools of Choice, Educational Telecommunications and Project LEAD programs to partially fund this network. *Operational* House Bill 95-1316 (C.R.S. 40-3-106(1)(c)) was enacted specifically to allow this network and Phase II (below) to

operate. It allowed telecommunications carriers to enter into private contracts (at less than normal rates) for distance learning, remote arraignment and telemedicine over interactive video networks.

- The **East Central BOCES' Network Phase II Network** uses an analog fiber optic network to interconnect seven rural school districts (Arickaree, Arriba-Flagler, Genoa-Hugo, Hi-Plains, Limon, Woodlin and Kit Carson). It has received funding from the federal Rural Electrification Administration ($291,000) and the Colorado Department of Local Affairs ($149,000). *Operational* **Phase III** will interconnect phases I and II and provide connectivity among the remaining BOCES districts. *Planned*
- **Jefferson County School District** uses the Internet and World Wide Web to provide instruction to the students in Colorado's largest school district. This district is the lead agency in the Colorado Online School Consortium (above). *Operational*
- **Mesa County School District 51**, the UTEC vocational education center and other educational institutions in the Grand Junction area are investigating the development of a compressed digital video network to interconnect schools in the Grand Valley. It would link with the WestCEL project (below). *Planned*
- **Monte Vista School District C-8** is providing Colorado high school students with the opportunity to participate in classes via the Internet. Students interact with their teachers and other students through the Internet. Upon successful completion of these standards-based courses, students receive a high school diploma from Monte Vista School District. *Operational*
- The **Mountain BOCES**, through a cooperative agreement with Colorado Mountain College (CMC), will interconnect six communities (Avon, Glenwood Springs, Parachute, Rifle, Steamboat Springs, and Frisco) via an expansion of CMC's compressed digital video network for instructional and administrative applications. This was funded, in part, through a grant from the Colorado Public Utilities Commission ($350,000). *Operational*
- The **Mountain BOCES** data network connects each BOCES district to each other and the Internet via a T-1 network. This project was funded by a TLC grant ($1,000,000). *Operational*
- The **Northeast Colorado Telecommunications Consortium** will interconnect schools in the Peetz, Julesburg, Revere, Holyoke, Haxtun, Fleming and Lone Star School Districts PLUS Northeast Colorado BOCES (Haxtun) and Northeastern Jr. College (Sterling) via an 11-megabit wireless network for distance learning and the Internet. *Planned, Fall 2000*
- **Net-TLC+** is an interactive web site providing migrant education teachers, parents, community members and administrators in twelve northern Colorado school districts with a collaborative workspace for sharing ideas, meeting with mentors, having online discussions and participating in professional development opportunities. This project has been funded by a Colorado Goals 2000 grant ($600,000) and a Colorado TLCF grant ($364,000). *Operational*
- **Northern Front Range school districts** and institutions of higher education have jointly received Federal Communications Commission approval for twenty ITFS channels for the Fort Collins, Loveland and Greeley area. They are being used to provide instructional programming to learners in schools, businesses and homes within a thirty-mile radius of each community. *Operational*

- The **Pikes Peak Schools of Excellence Cluster** uses Pikes Peak Community College's Instructional Television Fixed Service (ITFS) network to deliver courses to high school and adult learners north, east and south of their campus in Colorado Springs (below). *Operational*
- **Poudre School District R-1** operates an interactive cable TV network for the delivery of instructional and professional development programming. The network interconnects three high schools, the district media center and the administration building. Nearly all district schools and subscribers on the community's two cable television systems can receive their signal. *Operational*
- **Roaring Fork School District** is designing an interactive video network connecting its high schools in Glenwood Springs and Basalt. Courses will be delivered between the two schools, enabling students in both schools to participate in a comprehensive high school program. *Planned, Fall 2000*
- The **Southeastern BOCES** is a partner in the Connect Colorado (above) network. The BOCES is investigating the use of their fiber optic network to provide interactive instruction and professional development. *Operational*
- The **San Luis Valley BOCES Regional Distance Communications** (ReDiCo) Network interconnected five rural school districts (Alamosa, Del Norte, Moffat, Rio Blanco and San Luis) and Adams State College for delivery of college, vocational and high school courses via a compressed digital video network. This network received funding from the Colorado Department of Local Affairs ($199,000). *Operation suspended* This project led to the Trinidad State Junior College/San Luis Valley Education Center Network video project (below). *Operational*
- Phase I of the **South Platte BOCES** interactive video network (Brush, Fort Morgan and Wiggins high schools and Morgan Community College) provides instructional, educational and administrative opportunities to students, teachers, administrators and community members via a hybrid fiber optic and microwave network. This network received support from a Colorado Department of Local Affairs grant ($243,000) and TCI of Colorado for the use of a fiber optic strand as part of its cable franchise agreement with the cities of Brush and Fort Morgan. *Operational*
- The **Trinidad State Junior College/San Luis Valley Education Center Network** will provide instruction and other resources to high school and adult learners through a compressed digital video and data network interconnecting four San Luis Valley high schools (Center, San Luis, Sierra Grande, and Monte Vista) with Trinidad State Junior College and the San Luis Valley Education Center in Alamosa. This was funded, in part, through a grant from the Colorado Public Utilities Commission ($405,000). *Operational*
- **Trinidad State Junior College/Community Care Network** project interconnects schools and health care facilities in La Veta, Branson and Primero with health centers in Trinidad and Trinidad State Junior College. This was funded, in part, through a grant from the Colorado Public Utilities Commission ($350,000). *Operational* The two Trinidad State Junior College networks are interconnected.

- **WestCEL** is a cooperative digital network connecting thirty-three mountain communities from Walden to Rangely to Ouray for data and video transmission. Its video sites provide instruction and professional development. Sites include Grand Junction, Palisade, Meeker, Walden, Steamboat Springs, Hayden, DeBeque, Plateau Valley, Delta, Paonia, Montrose, Ouray, UTEC vocational education center, Colorado Northwestern Community College, Mesa State College and Western State College. WestCEL can connect to the CIVICS network through Western State. *Operational*

- **Post Secondary Education** Distance Learning Projects using terrestrial telecommunications networks (elementary and secondary students are secondary audience): (in alphabetical order)
  - **Adams State College** is a leader in many compressed digital video projects. It participated in the San Luis Valley ReDiCo network during its two years of operation and, with other members of the Higher Education Telecommunications Alliance, is a major force in the development of this cooperative agreement. Adams State's Alamosa campus is connected to Colorado State University and other Colorado government and higher education sites via the CIVICS network. *Operational*
  - **Colorado's community colleges and four-year schools**, working in cooperation with Colorado's public broadcasting stations, are national leaders in the use of *Telecourses* to provide learners of all ages, including high school students, with college credit courses. Telecourses have more learners participating than any other telecommunications-based delivery system. *Operational*
  - The **Community Colleges of Colorado** (CC of C) operates a compressed digital video network in conjunction with the CIVICS network, interconnecting all community colleges. *Operational*
  - **Colorado Mountain College** operates a compressed digital video network interconnecting their campuses for instruction and administrative purposes. *Operational* Six high schools in the region connect to this network for college and high school credit courses, staff development and other training. *Operational*
  - **Front Range Community College** offers courses to students throughout Colorado, the country and the world via the World Wide Web. Over eight hundred students participate in these courses each semester. *Operational*
  - The **Higher Education Telecommunications Alliance** (HETA) is a cooperative effort of Colorado's five higher education governing boards and the community college system. Its members worked with the Department of General Support Services to design CIVICS, the compressed digital videoconferencing network portion of the state's digital network, and helped plan its use. Through this network post-secondary institutions and school districts are able to share courses and other programs. Network and user equipment is currently in state office buildings in Grand Junction and Denver, Adams State College, Colorado State University, the University of Northern Colorado, the University of Colorado Health Sciences Center, Fort Lewis College, Mesa State College, area health education centers and nearly all community colleges. Additional institutions of higher education and school districts are being connected through state and national grants. *Operational* The network continues to grow as additional school districts seek to connect.
  - **Pikes Peak Community College** delivers high school and community college courses to learners throughout Colorado and in other states via the Internet and their Instructional Television Fixed Service (ITFS) broadcast system. This ITFS system delivers live two-way audio/one-way video programs to high school and community learners in high schools, homes and businesses in the PPCC service area. While ITFS programming originates from PPCC, school districts have a key role in determining programming and schedules. *Operational*

- **Red Rocks Community College** delivers courses to high school and community learners in three mountain communities (Bailey, Black Hawk, and Idaho Springs) via a compressed digital video network. Faculty at RRCC and each high school design and deliver instructional programs to students in the other sites. *Operational*
- The **University of Colorado** has operated a digital fiber optic network since 1987 to link CU's four campuses. This network interconnects with ITFS systems in Boulder and Colorado Springs to provide programming to schools and industry along the Front Range and with a satellite uplink to provide programming nationally. *Operational*
- The **University of Colorado Health Sciences Center** (CUHSC) is connected to Area Health Education Centers (AHECs) in Clifton, Alamosa and Greeley via CIVICS, the state's compressed digital video network, to provide remote diagnosis and training. *Operational* The CUHSC is expanding this network to other AHECs through their own videoconferencing bridge.
- The **University of Northern Colorado** was the first Colorado institution of higher education to utilize a compressed digital video network to provide instruction, counseling and other student support services on the Western Slope and in the Denver metropolitan area. UNC's Greeley campus is connected to many Colorado colleges, universities and government offices via the Colorado Division of Telecommunications CIVICS compressed digital video network. *Operational*

Colorado State Government interactive video projects using telecommunications networks:

- The **CIVICS Network** is a compressed digital video operating over the state's digital microwave network. Government sites are in the State Office Building (Grand Junction) and the State Services Building (Denver). These are interconnected to HETA (above) and CC of C (above) higher education sites. *Operational*
- The **Department of Corrections** interactive video network will operate over the CIVICS network. It will connect state correctional institutions with county court facilities for remote arraignment. *Planned*

Colorado school districts' distance learning projects are resources for their entire communities. An excellent example is the East Central BOCES *Interactive Learning Network*. Community members are encouraged to participate in college classes alongside high school students. Many do, taking college courses without leaving their local communities. Other community members benefit from special programs for such groups as fire fighters and lawyers. This is of major value, as this region of the Eastern Plains has no local institution of higher education. Additionally, the network has been used by the *I-70 Chamber of Commerce* which replaced the competing chambers of commerce in the four participating communities. Other school districts make their satellite receive sites available to community members for a multitude of community and economic development programs.

In the past five years several major legislative and regulatory events made it possible for school districts, BOCES and institutions of higher education to implement regional, interactive video networks for instruction, professional development and economic development programs.

- During the 1995 legislative session the Colorado General Assembly passed **HB 95-1316** (C.R.S. 40-3-106 (1)c), allowing local exchange carriers to enter into private, noncost-based contracts for interactive video applications for distance learning, telemedicine (diagnosis and treatment of patients) and remote arraignment. This allows local telephone companies to give school districts, BOCES and others discounted rates for these applications. The East Central BOCES took advantage of this law to develop contracts with the telephone companies in its area for two fiber optic distance learning networks.
- During the spring of 1995, the **Colorado Public Utilities Commission** reached an agreement for U S WEST to pay reparations for poor service and installation problems. The initial payment was for $4,000,0000, with U S WEST agreeing to set aside up to $8,000 per day as long as significant problems continued. Through a grant application process, grants totaling nearly $5.4 million were awarded to nearly thirty educational institutions, libraries and non-profit organizations for community based projects.
- During the 1996 legislative session the Colorado General Assembly passed **SB 96-197** (C.R.S. 23-11.5) providing twenty million dollars to public and private schools and institutions of higher education and public libraries to provide distance learning, technology-assisted learning and enhanced information access to communities throughout Colorado. This legislation also tasked the Colorado Commission on Higher Education (CCHE), with the assistance of the Department of Education (CDE) and the Commission on Information Management (IMC), with designing a statewide telecommunications network for education. Funds were awarded through a competitive grant process overseen by the Technology Learning Committee.
- Also during the 1996 legislative session, the Colorado General Assembly passed **SB 96-102** (C.R.S. 24-37.5-203) tasking the IMC, with the assistance of CCHE and CDE, with designing a statewide telecommunications infrastructure for government and education. This bill led to the establishment of the Multi-use Network Task Force in 1997.
- The federal **Telecommunications Act of 1996** provided for the establishment of a discount program for schools, libraries and public health facilities. Based upon the degree of poverty in their service areas, schools and libraries are eligible for discounts ranging from twenty to ninety percent off their telecommunications and Internet costs and the costs of installing local area networks. After long delay, funds for the first cycle have begun to flow to schools and libraries in Colorado and across the nation.
- The state's **Multi-use Network** (MNT) (1999) will connect state, county and municipal offices, schools, libraries and public health facilities to improve the delivery of service to and for Colorado residents. The MNT is scheduled for a three-year build-out ending in June 2003 with all 64 county seats and six other communities having an MNT aggregated network access point (ANAP), or point-of-presence, with at least 20 mbps of digital service. These agencies, schools and libraries will be elligible to apply for **Bean Pole Initiative** (HB 99-1102) (C.R.S. 24-32-3001) funding to cover initial local connectivity costs.

While many school districts take the lead in the development and implementation of distance learning programs, they involve their communities in the planning, development and utilization of these educational and economic development tools.

Colorado Distance Learning Sites
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