

# As the Use of Videoconferencing Technology Booms, so Does the Need for Creative Technical Support

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## INTRODUCTION

Videoconferencing provides for the instantaneous, interactive, and collaborative sharing of information through face-to-face conferencing technology. The information is transmitted and received through multiple high-speed phone lines via the PBX. The conferencing equipment provides educational opportunities that

would not otherwise be available because of cost, time, and/or distance. The purpose of using videoconferencing is to provide greater availability of learning opportunities to students over a broad geographical area. Another application for this technology is to provide a collaborative forum for discussions between many departments.

Videoconferencing encourages the transfer of information between participants locally, nationally, and internationally. The customers that use distance-learning delivery methodologies in the Broward County (Florida) School District include, but are not limited to: the superintendent, department heads, area offices, principals, students, teachers, media specialists, the magnet program, senior management, staff trainers, human resource department, budget department, Broward Education Communications Network (BECON), and collaborative colleges and universities. BECON is the main content developer and user of K-12 curriculum applications for distance learning classes that incorporate videoconferencing.

The Broward County School District is the fifth largest public independent school district in the

country. Its 280,000 children from over 164 countries communicate in 54 languages. The district's operating budget is approximately \$3.5 billion with individual student expenditures around \$4,750 per student. The district employs 28,000 teachers, administrators, and support staff in more than 235 schools, centers, and adult vocational facilities. Broward County is 1,196 square miles and approximately 25 miles north to south and 50 miles east to west, with the bulk of the population living within a 410 square mile area in the east. The western two-thirds, approximately 621 square miles, is comprised of the Florida Everglades. The county has 29 municipalities that account for 88.4% of the population, with the balance of the population residing in unincorporated areas. Between 1988 and 1997, the K-12 student population exploded, increasing 57% in just 9 years.

Videoconferencing technology in Broward County Schools has been expanding dramatically. The school district's distance learning department (BECON) continues to grow and develop state-of-the-art distance learning programs that require high-end technical support. While



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distance education programs are very much in demand in Broward County, there are still many who have not yet discovered these important educational or administrative benefits of videoconferencing. One of many such benefits includes minimizing travel for meetings, which optimizes the workday's productivity time and money. However, adoption of videoconferencing has been slowed by a number of issues such as scheduling conflicts, time conflicts, technology awareness, or are intimidated with technology.

In the future, this application could also be used for disasters and other unforeseen emergencies. The Department of Homeland Security has been rumored to be exploring and funding applications for possible disaster scenarios. Broward County Schools possibly has one of the most extensive videoconferencing networks in the state and with some creative research could yield many unexpected benefits.

## **TECHNICAL SUPPORT**

The most important thing to know about videoconferencing is that it is a "system" that requires all of its components to work seamlessly for a successful presentation. If there are problems in network connectivity, software, hardware, wiring, or even operator error, the technology will fail. Therefore, it is essential to deliver fast, efficient technical support to our customers. This is why the equipment requires continuous and ongoing service via a preventive maintenance program that incorporates routine testing, proactive reformatting where applicable, software upgrades, color-coding of interconnections, labeling of equipment and patch panels to minimize service interruption, continuity tests, and remote diagnostic applications.

Since its inception, the responsibility of managing the network has included the provision of depend-

able, reliable technical support to the district's customers. I have been the sole district employee performing this function for Educational Technology Support (ETS) for the past six years. As little as four years ago, the district's distance education program (BECON) had only 26 videoconferencing systems, primarily used to provide advanced placement (AP) classes for schools with low AP enrollment, as well as special distance learning programs. The use of videoconferencing as both an educational and administrative tool has grown significantly. Many curriculum programs have incorporated videoconferencing into their weekly classes.

During the 2002-2003 school year, videoconferencing was used in more than 1,700 delivered programs, affecting more than 60,000 students. The district's videoconferencing/ distance learning network has exploded to include approximately 150 systems located at school, administrative, and special purpose locations, and a 32-port Lucent/Avaya videoconferencing bridge housed at ETS and scheduled through BECON. The bridge connects multiple sites for student classes, administrative meetings, and staff training. It is important to note here that the popularity and use of this technology is expanding, and close to 90 additional schools are in the midst of acquiring videoconferencing systems. In addition to managing the videoconferencing network, I design the installations, schedule repairs, supervise BellSouth video and network technicians, and provide assistance to principals and district administrators. BECON and ETS work in a close partnership providing their customers top-level services in the distance education arena.

Starting in 1997 and continuing through to the present, I developed the program currently used for SBBC's Videoconferencing Techni-

cal Support Network. The school district began by purchasing distance education videoconferencing systems consisting of 26 units that cost approximately \$30,000 each. Once installed, the videoconferencing systems came with a one-year warranty. A simple installation required the scheduling of equipment installers and phone company services. Phone services were also required to install high-speed ISDN line connections in order to connect videoconferencing sites. Sometimes installations would require inordinate amounts of time to complete. It became obvious early on that there was a more efficient way of handling the support and installation process. The reason for some inefficiency was that sometimes the equipment needed to be tweaked by the equipment manufacturer and at other times the phone lines and/or PBX software required work by our service provider, BellSouth. In either case, it was not unusual for an equipment vendor/installer to point to the phone company as the cause of a problem, and the phone company would sometimes point to the equipment installer as the cause for system failure. While the finger-pointing continued, it increased completion time of the work order. Another problem that surfaced early on was that, once the videoconferencing system was working, equipment failures occurred, and this took considerable time to diagnose and correct due to the involvement of more than one vendor.

The equipment repair tech person would be dispatched. This required time and coordination with the vendor company and the possibility of a different vendor dispatch if the problem was traced to the phone lines. Additionally, waiting for parts to be shipped, received, and installed meant more down time for the system. Meanwhile, the school would not have access to instruction, and students and staff would be short-

changed as well as having to make schedule adjustments. To make matters even worse, after the first year, the warranties expired and each system required a costly service contract/warranty amounting to hundreds of thousands of dollars. Therefore, besides the support services being inefficient, the cost of repair was high.

Understanding the technical support problems, I worked with the equipment vendors to develop more efficient methods to handle support issues. In the end, I was sent for intensive technical training, attaining the necessary expertise and certifications from the various manufacturers. Classes were held in Austin Texas, Philadelphia, Denver, San Jose California, and Reston, Virginia. After acquiring the necessary certifications and expertise, I was able to provide immediate service for district videoconferencing equipment, thereby closing the service time gap from equipment system failure to repair. The most valuable skills were developed over a six-year period of on-the-job training consisting of installation and diagnosis of multiple systems and platforms. By gaining intimate knowledge of each system, location, contacts, and history, repair and support became extremely efficient. Remote diagnostics implementation while in the start-up stages has already demonstrated that it is a valuable technical support resource. It is important to note that, even though the district uses numerous videoconferencing platforms, all of the systems are compatible and comply with industry-based standards. The district uses H.320 ISDN telephony via the PBX for connectivity for videoconferencing services. While many of the district videoconferencing systems are capable of using H.323 ("video over IP"), most district locations currently do not have sufficient bandwidth to support one 384 connection, let alone

multiple connections over IP. When the initial infrastructure was designed, nobody had envisioned the use of videoconferencing on such a large district-wide level via shared network bandwidth. The concept of shared network access using a convergence of technologies is a current and future mission-critical project. Additionally, the district owns 49 V-Tel videoconferencing systems that use the Windows 95 operating system and do not support the H.323/IP standard. Early plans to refresh some of the older, outdated systems are underway.

## BRIDGING

Videoconferencing can be used between two locations, which is commonly called a point-to-point call. However, when three or more locations are in the same videoconference, a special piece of hardware is required to connect all the locations simultaneously. This piece of equipment is called a bridge. A key component of the bridge is the scheduling software known as CRCS. With this scheduling software, the operator can pre-schedule one or multiple events, edit those events even while they are active, allow 3 to 24 locations to confer simultaneously, and provide real-time conferencing monitoring. This application is a key component of distance education because multiple classrooms are provided with simultaneous live interactive instruction. The CRCS scheduling component has been run from ETS, while BECON's distance learning center in Davie schedules all programming and bridge scheduling with technical support from its partner, ETS.

In the beginning, I was directed to produce an analysis of distance learning in Broward County Schools as well as an implementation plan. This report included an in-depth analysis of the bridging technology available on the market at that time.

As a result, the bridge was acquired and later expanded. Additionally, a Lucent/Avaya Technologies bridge was acquired--at approximately \$200,000 off the list price. A scheduling system for the bridge housed at ETS was implemented, and my responsibilities include supervision and maintenance of warranty and support services for the bridge. It must also be noted that, with expansion of videoconferencing locations, capacity of the bridge will soon be maximized. Lucent/Avaya will no longer provide support for the bridge within the next two years. The current bridge is also limited to H.320 technology. At the time of purchase, we knew the bridge would have to be replaced due to expansion and possible use of IP videoconferencing in the future. Plans are already in the works to replace and expand the current bridging capacity as well as incorporate the IP and ISDN bridging capabilities.

In addition, the district implemented a program to convert the phone lines from costly ISDN service to a more efficient technology. Working with our phone service provider, BellSouth, we were shown how to provide even greater dependability while providing the district huge cost savings. If the district maintained dedicated ISDN service to all of the more than 140 videoconferencing systems, the cost for ISDN service would have easily exceeded \$500,000 per year for dedicated ISDN line connectivity. By using resources already available on school sites via PRI/PBX digital phone switches, the use of ISDN line-connected sites shrunk to a mere dozen locations. Because of the huge workload, compounded with the use of BellSouth supported school phone switches, the district requested and provided a BellSouth technician to provide additional support services, thereby producing a team approach with the phone company on a district-wide level.

While installing the more than 150 videoconferencing systems, unique challenges surfaced and creative solutions were developed. One such challenge pertained to connectivity between the videoconferencing system and the PBX. When connectivity is attempted beyond the 1,000 linear foot range, degradation of the video signal makes communication impossible. In addition, many campuses have limited capability of their intra-building wiring. The solution was to incorporate fiber optic multiplexers, which convert typical signals traveling over copper lines to light pulses. These signals are translated back onto copper at the termination point, thereby providing service to areas on district campuses that would not otherwise be practical. It must be noted that these devices are not inexpensive, and their use must be justified.

This year the district is using e-rate monies in a bid to acquire additional videoconferencing systems. If the district is successful, approximately 82 more Tandberg Scholar videoconferencing systems will be added and supported. Additional per-system savings of \$3,000 (Tandberg 880) to \$9,000 (Tandberg Scholar System) are realized because I perform the warranty work and installations myself.

## **FUTURE VISION**

While it has taken the better part of six years for numerous distance education models to finally take hold in the district, the next few years should be amazing. Videoconferencing to the desktop is already being tested through a variety of products. Wired or wireless videoconferenc-

ing products will provide instantaneous live videoconferencing for room systems, wall mounted flat screens, desktop systems, laptops, and cell phones. Communication infrastructures will be enhanced with a greater spectrum of wireless, wire, and fiber backbones to support these key applications.

Integration of video, voice, and data will provide the district and its customers with a greater variety of delivery methods, instruction, and communications, both synchronously and asynchronously. While all of these wonderful technology enhancements are just a few steps from our front door, none of this can be brought to fruition unless the state's Department of Education provides the school district with appropriate funding.