Affordable and Efficient:
The Cody Model of Technology Deployment
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Schools across the United States share the twin challenges of needing to purchase up to date computer resources within limited budgets, and also provide timely technical support for teachers, students, and administrative staff. As the number of computers owned by school districts spirals upward and the network infrastructure connecting those computers grows in complexity, these challenges become even more formidable. Everyone is familiar with the phrase "do more with less," but for technical support personnel, the task of maintaining, updating, and supplementing a district's computer resources can seem like "mission impossible" as the list of requested computer work grows and the number of staff available to respond rarely proves adequate.

The Cody Public Schools, located in northwest Wyoming just east of Yellowstone Park, provide an outstanding example of how schools with limited resources can deploy technology across a district in both an affordable and efficient manner. The Cody model of technology acquisition and support is perhaps most remarkable because of the small number of staff who are able to efficiently keep networks and computers humming along with minimal downtime. From 1990 to 1998, one individual maintained all of the computers, servers, and network elements within the district. Starting in 1999, one additional support technician was added. Administrators and teachers in both large and small school districts in the United States can glean important lessons from the experiences of technologists in Cody.

District Profile

The Cody school district is modest in size, serving approximately 2,700 students in 3 elementary schools, 1 middle school, 1 high school, and two rural schools located respectively twenty and forty miles outside of town. The district's move to hire a technology coordinator in 1990 started the process of strategic planning and implementation which led to their present network of over 500 computers and 20 servers, connected in a wide-area network (WAN) via fiber optic cabling supporting data transfer rates throughout the district of one gigabit per second. To put that speed in perspective, it is necessary to realize that most school networks today

operate at a maximum speed of 10 megabits per second (mbps) or 100 mbps. Compared to a dialup modem that theoretically (but never actually) connects to the internet over a phone line at 56 kilobits per second (kps), a one gigabit per second transfer rate equates to 1000 mbps or 1,000,000 kps. This level of speed in a school network is, at present, quite remarkable. Cody schools' cutting edge network technology is one of several factors which led Cody High School to be designated the TCI Model School for the State of Wyoming in 1994.

In addition to installing 3 network drops (connections) in each campus classroom throughout the district, the Cody technology plan provided for installation of a separate phone line in each classroom and cable TV access. The district has the capability to broadcast on three local television channels, and negotiated for free compressed video services delivered to each campus. This is accomplished by demarcing the compressed video signal at Cody High School (where the studio is located), and then rebroadcasting over local TCI education channel #64. This negotiated service, as well several other free or discounted telecommunications services, were obtained when the city of Cody renegotiated its cable contract with the local television content provider. Savvy district administrators in other cities in the United States have negotiated similar deals for school districts, and the financial savings from these efforts can be significant.

One of the first priorities of the Cody technology plan was to provide each teacher with a computer on his/her desk and a comprehensive training program to introduce them to the basics of computer use. Attendance and grades are maintained by teachers via their own classroom computer, and the district is migrating to software (PowerSchool: www.powerschool.com) which will provide students and parents with password access to their own records and transcripts through any web browser on the internet, at school or at home.

In addition to those utilized personally by teachers, computers have been aggregated into 12 different labs on the Cody campuses. At the secondary level, students learn literacy skills primarily within a lab pullout model, under the guidance of certified computer literacy teachers. In addition to learning Microsoft Office productivity software, multimedia design (PowerPoint) and webpage design (Frontpage), students can prepare for and obtain Microsoft certification at a variety of levels. One secondary lab is specifically dedicated to students preparing for these rigorous examinations. At the elementary level, teachers are scheduled to bring

their classes into the computer labs to teach lessons or extend classroom lessons even further with technology resources.

Two Platforms for the Price of One

The decision of the Cody School Board to provide students and teachers with two platforms for the price of one is one of the most innovative and cost-saving ingredients in the district's technology plan. Although many Cody students' computer literacy courses revolve around Microsoft software applications for Windows 95/98 (Word, Excel, PowerPoint, Access, Frontpage), 95 percent of all computers in the Cody district are Macintoshes. Using Connectix's Virtual PC software, Macintosh G3 computers emulate the Windows environment to permit any Win95/98 software to run just as it would on an Intel based computer.

By choosing to purchase Apple Macintosh G3 computers almost exclusively, the Cody technology department has simplified and streamlined its technical support roles in several ways. First, the district has less of a menagerie of computer brands and types to troubleshoot and support. Technicians are thoroughly familiar with the limited number of computer types possessed by the district, making diagnosis and repair of problems much more efficient. In contrast to this situation, many schools in the United States have purchased a variety of different Windows-based computers which usually require different parts, are put together differently, and generally require technicians to have a more extensive skill set. Particularly smaller school districts may not be able to afford to keep personnel on staff who can maintain such a diverse set of computer platforms. As a result, expensive outside consultants must often be called in, and technical support needs may remain unmet for an unreasonably long time.

By using Virtual PC software on Mac G3s to emulate the Windows environment, fixing a software problem on a Cody school computer is, at worst, a 15 minute process. If a student or teacher has created a software or Windows operating system error, the service technician can simply throw away the old "image" of the Windows environment (usually about 1.5 gigabytes in size), and copy a pristine image back onto the computer with a hot swappable, external hard drive. No restart is necessary, and in 15 minutes that workstation is back in business running Office, Frontpage, or other Windows based software needed by the user.

Contrast this situation to those found in many other school districts. If the district is small, outside consultants are frequently utilized to solve

troubleshooting problems. This can prove costly in both financial terms and downtime. If the district is large, support personnel are often separated into different arenas of expertise: those who work on servers, those who work on a particular type of student workstation, those who work on administrative workstations, etc. This type of specialization can help streamline the technical support process, but it cannot entirely compensate for the diverse complexity of troubleshooting issues which are natural for a network of differing computer types. Even when a technician is reasonably certain of the problem on a particular Windows computer, it rarely can be fixed in the fifteen minutes required to recopy a software image back onto a Macintosh G3.

The only student workstations in Cody schools which are not Macintosh G3s are those used for Microsoft Certification preparation. Students in these classes work on Dell towers, and are able to take apart and reconstruct the computer's internal components as required for the different certification levels.

In elementary settings and for teacher productivity, the Cody technology department finds that most users prefer to use AppleWorks (ClarisWorks) rather than work in the Windows environment with Microsoft applications via Virtual PC. The option is available for teachers and students who want it, however. Given that many website designers and commercial printing companies still prefer to work on Macintoshes rather than Windows computers, there are significant advantages in providing students with multiple platform experiences at school. The diverse computer skills Cody students possess by graduation will serve them well in the future, regardless of their chosen profession or the operating system in which they are required to work.

Technical Support without Windshield Time

As more computers are acquired by districts for teacher and student use, the number of technical support requests naturally increases. The technology tools employed by the Cody schools to meet these demands permit two technical support personnel to perform the functions of many more, and vastly reduce the amount of "windshield time" (spent driving in the car to campuses) required to fix problems.

By using several software tools, Cody technicians can diagnose and fix most software related problems or questions on computers located anywhere in the district from the comfort of their own office. This includes the computers located in rural schools twenty and fifty miles away. Timbuktu

(www.netopia.com/software/tb2/) software allows techs to monitor network performance and assess where bottlenecks or other problems are occurring. It also allows techs to remotely control any server on the network, as well as monitor network performance. With Apple Network Administrator software, new computers can be "cloned" with all needed software in batches of thirty at a time, in approximately thirty minutes. Computer literacy teachers can "freeze" the desktops of students during direct instruction periods, to insure they are focused and not off-task.

Apple Administrator software also allows technicians to see and take control of the computer of any user on the network, to answer a question or fix a problem. Unlike Windows based disk imaging solutions like Ghost or Lab Expert, Apple Administrator software does NOT require that an entire hard drive be re-imaged for new applications to be installed. Individual "template" files or entire applications can be remotely installed or removed from one or all client computers on the network with a few mouse clicks. The ability to remotely control and monitor computer resources in this fashion, prepare new computers for use in the classroom, and keep students on task makes technical support in Cody schools both more efficient for users and more affordable for taxpayers. The ultimate beneficiaries are the students and the teachers in the classrooms.

Financing: Planning for Upgrades and Partnerships

The implementation of the technology plan in Cody schools has not been a solo effort, although the technology coordinator, Biff Beck, does deserve a large amount of credit for having both the vision and expertise to carry out this laudable effort. Mr. Beck and others in the Cody district have carefully arranged partnerships with a wide variety of commercial vendors to make purchases of hardware, software, and telecommunications services as affordable as possible.

It is a fact that schools, and many businesses, cannot afford to literally stay on the "cutting edge of technology." The rate of change in technology is too rapid, and educational budgets are too limited. In this environment, it makes sense to invest in technologies which are easily upgradable and maintainable, and have a long, useable life expectancy. Cody schools have made this type of investment in technology for the long term benefit of their customers: the students. While personnel in other school districts may become increasingly frustrated as the response time of their technical support staff lags, Cody educators will continue to benefit from an educational technology philosophy that allows minimal staff to serve a large client base affordably and efficiently. More importantly, Cody

students will continue to graduate with a high level of computer literacy on two platforms. These skills equate to a comparative advantage for Cody students over most of their peers entering the workforce.

The ongoing challenge for Cody schools, as well as other schools across the United States, is to provide a robust staff development program which facilitates the integration of technology use into the regular classroom. The network infrastructure which Cody schools have at their disposal is robust and should be the envy of many other districts. As Mr. Beck states, "I have built the highway, now it is up to them (teachers and administrators) to use it." Hopefully educators from other parts of the United States can benefit from the insightful experiences of Cody technologists, who are daily demonstrating that the ability to "think different" can equate to greater efficiency, financial savings, and wider instructional opportunities for students in the classroom.

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