

**8.0 TECHNOLOGY  
MANAGEMENT AND USE**

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## **8.0 TECHNOLOGY MANAGEMENT AND USE**

This chapter presents findings, commendations, and recommendations relating to administrative and instructional technology use in Bath County Public Schools (BCPS). The six sections are:

- 8.1 Technology Planning
- 8.2 Organization and Staffing
- 8.3 Infrastructure
- 8.4 Hardware and Software
- 8.5 Professional Development
- 8.6 Technical Support

When reviewing the administrative technology resources of a school division, MGT examines the computing environment within which the administrative applications operate; the applications themselves and the degree to which they satisfy user needs; the manner in which the infrastructure supports the overall operations of the school division; and the organizational structure within which the administrative technology support personnel operate.

In reviewing instructional technology, MGT analyzes all areas that contribute (or should contribute) to the effective use of technology in the classroom. This ranges from broad areas, such as the technology plan, the organizational structure, and the infrastructure, to more specific resources available in the classroom, such as the type of hardware employed, the method of selecting software, and access to outside resources. Other critical factors assessed include staff development for teachers, school-level technology support and maintenance, and the equitable distribution of technology among schools.

### **CHAPTER SUMMARY**

Technology support for Bath County Public Schools is provided by a director of technology, who is housed in the central office; three individuals who devote a percentage of their day serving as technology resource teachers in their schools; and three individuals who serve both as lab managers and technology technicians for their schools.

Judging from interviews with school personnel and the responses to MGT's survey, there is a fairly high level of satisfaction with the technology support received by the schools. In fact, administrators and teachers in BCPS had a much more favorable reaction to the technical support they receive than their counterparts in other school systems across the country.

There are a number of things going well in the technology area; as a result, the division received commendations for:

- establishing a permanent technology advisory committee;
- providing good technology support to the schools;
- implementing and maintaining an effective infrastructure;
- purchasing five-year warranties on computer equipment; and
- creating the Technology Assistant program.

## **8.1 Technology Planning**

Ten to 12 years ago, technology was seen as an add-on in school divisions, indeed in many organizations, including many private businesses. Today, technology is a foundational aspect of almost every organization.

Planning is the key to success in using technology. This applies to a school system overall as well as to each of its schools. Schools should have a technology plan that is closely aligned with their curricula. Technology is, after all, a tool—though a very powerful one—that can greatly enhance the teaching and learning process. Accordingly, a school system’s technology plan should be designed to help the school system achieve its educational goals.

The value of planning cannot be overstated. It is the only way that educational enterprises can adequately address five of the most critical factors related to the use of technology, as discussed briefly below.

- **Training.** Professional development is critical for all staff. It is especially important for teachers, however, since it is essential to creating an effective learning environment for students. Unless serious attention is given to what training will be provided, how it will be delivered, when and how frequently it can be made available, and to whom it is directed, effective training will not occur. The price of inadequate training is a considerable loss in the “payoff” on investment in educational technology resources.
- **Equity.** Despite the best intentions, too frequently imbalances occur in the level of technology resources available at each school. Unfortunately, technology can widen the gap between the “haves” and “have-nots” if it is allowed to do so. Without careful planning at the school division level, there is a risk of inadequately supporting some schools. Similarly, at the school level, there is a risk of leaving out some students.
- **Rapid Change.** Few things change more rapidly than technology. If the implementation and ongoing operation of technology resources are not carefully monitored, the school system or school will not handle this rapid change effectively.
- **Funding.** Many people identify funding as the greatest barrier to the effective use of technology in the classroom. School systems often do not recognize that funds that have historically been used for other purposes can be redirected to support technology. For example, textbook funds are now frequently used to purchase instructional software. Unless planning addresses how things will be funded, this barrier will have a considerably greater impact than it should.
- **Credibility.** A plan that outlines how technology resources will be acquired, deployed, and used will help to develop credibility with the community. Both the board and the public are rightfully anxious to see that tax dollars are spent in an effective manner. Only through

planning is it possible to demonstrate that proposed strategies have been well conceived, that acquisitions of technology resources have been carefully considered, and that every aspect of the implementation is cost effective.

A technology plan must address the specific requirements and preferences of the organization it is designed to serve. Although multiple plans may contain very similar elements, no two plans should be alike. Likewise, while there are guidelines that can help a school division develop a plan suitable for the environment within which it operates, there is no right way to develop a technology plan.

## **FINDING**

The Bath County Technology Plan is dated June 2004 and was developed by the technology advisory committee under the leadership of the Director of Technology and Administrative Services. However, since the Virginia Department of Education mandates a format and largely influences the content, rather than authoring it, the committee more or less coordinated the development of the plan. The Mission Statement reads as follows:

*With the use and establishment of school-wide technology infrastructure and networks, instructional multimedia, telecommunications, online access to libraries and schools, teacher training, integration of Virginia's Computer/Technology Standards into content areas, and well-equipped and maintained hardware and software, the Bath County Public School Division will enhance teaching and learning to prepare students for the 21<sup>st</sup> century.*

The plan establishes goals that focus on the five primary areas identified by the Virginia Department of Education in the *Educational Technology Plan for Virginia: 2003-2009*, namely:

1. Integration
2. Professional development and support programs
3. Connectivity
4. Educational applications
5. Accountability

The plan specifies goals and provides targets and action plans for achieving each one. Some of the more noteworthy goals, targets, and action plans are listed below.

Integration Goal 1: Improve teaching and learning through the appropriate use of technology.

- School leaders will attend the annual Technology Leadership Conference sponsored by the Virginia Department of Education and/or other technology conferences and training events.
- Teachers and staff will receive tuition/workshop reimbursement for participating in technology inservice.

- School leaders will receive inservice to evaluate instructional uses of educational technology.
- School principals will observe/evaluate instructional uses of educational technology in classrooms.
- School leaders will initiate, sponsor, or provide inservice to teachers and other staff during the year to support technology integration activities.

Professional Development Goal 1: Establish partnerships for identifying and delivering effective technology training to assist educators as they help students achieve high academic standards.

- A variety of classes, training, and resources pertaining to integrating technology effectively will be available for staff development.
- Technology-related staff development offered by various entities will be provided in a variety of topics and delivery methods.

Professional Development Goal 3: Establish and maintain instructional technologists (including site-based technology resource teachers) in the division.

Connectivity Goal 1: Ensure that all schools have access to integrated instructional and administrative services across interoperable high-speed networks.

- Every instructional and administrative area in all three schools will have a sufficient number of network connections to support the high bandwidth requirements of current and future instructional and administrative applications.
  - All future wiring upgrades will provide at least three network drops per classroom.
  - Computer workstations will be replaced as necessary to ensure appropriate function for required tasks.
- The division will connect all school facilities through a wide area network with sufficient bandwidth to accommodate instructional and administrative needs.
  - BCPS will monitor the bandwidth needs of facilities to ensure that they are being met.
- Each school local area network will have reliable high-speed access to the Internet capable of supporting instructional and administrative applications and initiatives.
  - BCPS will monitor the bandwidth needs of facilities to ensure that they are being met.

Connectivity Goal 2: Ensure sufficient support for ongoing, reliable network operations.

- Adequate support personnel will be in place to operate and support the school technology infrastructure.
- Support personnel for the infrastructure will have appropriate technical skills.
- Customer support systems will be in place to address technical problems in a timely and efficient manner.

Educational Applications Goal 1: Improve teaching and learning through the appropriate use of network-accessible educational applications.

- Teaching and learning resources that effectively support the Virginia Standards of Learning will be identified, communicated, and developed.

Educational Applications Goal 2: Promote and develop Web-based applications, services, and resources.

- Every school will have an efficient, automated library media center connected to the Internet and networked to appropriate learning areas.

The plan contains a number of other important goals and targets that, if followed completely, would greatly facilitate BCPS's efforts to achieve its overall educational goals. Some of these will be further addressed in the remaining sections of this chapter.

## **COMMENDATION**

**Bath County Public Schools is commended for developing a technology plan that effectively addresses technology use by students and teachers.**

## **FINDING**

Technology can be a very powerful resource for many instructional endeavors and is essential to ensuring effective management operations. However, if it is to achieve its potential divisionwide, effective methods for involving all stakeholders, addressing equity, establishing technology-related standards, and coordinating initiatives must be adopted. The best way to accomplish these objectives is to establish a committee composed of members knowledgeable in technology and representative of all stakeholders.

BCPS has a technology advisory committee that is composed of technology resource teachers, principals, parents, and members of the board, business community, and public. The director of technology is an active participant and provides leadership to the group. The purpose of the committee is to offer advice and feedback regarding the school division's technology services and plans.

**COMMENDATION**

**Bath County Public Schools is commended for establishing a permanent divisionwide technology advisory committee.**

Involving stakeholders in decisions about technology use is vitally important, and the BCPS technology advisory committee certainly does that. However, the committee meets only about twice a year, and has not been very active.

**RECOMMENDATION**

**Recommendation 8-1:**

**Expand the responsibilities of the technology advisory committee.**

The technology advisory committee should meet on at least a bi-monthly basis and should assume the following responsibilities:

- reviewing and updating the technology plan annually;
- providing advice on and helping set priorities for administrative technology initiatives;
- establishing recommended lists of technology-based instructional materials and software;
- monitoring the level of division staffing available to support administrative and instructional technology and recommending increases as necessary;
- assisting in the development of technology budgets;
- providing advice on the distribution of local, state, and federal funds that can be used to support technology (as applicable);
- providing advice and guidance on the types and amount of technology-related professional development that should be made available;
- assisting in the development of hardware, software, and network standards;
- monitoring the equitable distribution of technology among the schools;
- offering advice on technology grant applications/proposals; and
- recommending revisions in policies and procedures that impact technology use.

The technology advisory committee should address most, if not all, of these areas through subcommittees. For example, if the committee were addressing the issue of instructional software acquisition, it would form a subcommittee composed of two or three of its members and other individuals who have expertise in that area. Following its deliberations, the subcommittee would present its recommendations to the full committee, which would in turn seek approval from the superintendent and the School Board. Through this mode of operation, the technology advisory committee would become a key resource for the superintendent and the School Board. Although the committee should continue to be an advisory body, this approach would enable it to become very influential with respect to technology use in the division.

Given the number of responsibilities cited above for the technology advisory committee and the suggested approach of creating subcommittees to address each issue, it might appear that those who serve on the technology advisory committee will be spending most of their time on committee work. In fact, the subcommittee approach is designed to accomplish two things: 1) reduce the amount of time each technology advisory committee member must devote to the functions of that committee; and 2) spread the responsibility for contributing to the division's technology strategies among a large number of people throughout BCPS and beyond.

Unless it is necessary to address some urgent issue, the full technology advisory committee would meet only once every other month. Interactions between the members would, of course, continue during the intervening time via telephone and electronic mail. Most of the work of the committee would be performed by subcommittees. By using this strategy, technology advisory committee members would normally be able to discharge their responsibilities in two hours or less per month.

At its first meeting, the committee should formalize its operating rules. It should elect from its membership a chair and vice-chair. The technology advisory committee should determine how it will record its actions and decisions, how long its members will serve, and how it will conduct its business. Although the particular manner in which it chooses to do business is not too important, it is essential that it formalize its operations. Such action will contribute to its becoming an effective and influential group.

BCPS should begin immediately to implement this recommendation so that a fully operational technology advisory committee will be functioning no later than September 2006.

### **FISCAL IMPACT**

This recommendation can be implemented with existing resources.

## **8.2 Organization and Staffing**

Ideally, technology is one area of a school division that supports all administrative and instructional personnel in a constructive way. Organizing technology resources to effectively achieve this outcome can be challenging, at least for some school divisions.

The International Society for Technology in Education (ISTE), an internationally recognized non-profit organization dedicated to advancing the effective use of



technology in PK-12 education, has developed a Technology Support Index rubric to assist school divisions in determining their needs in a variety of technology support areas. In the index, school divisions are divided into one of the following four categories for various areas of technology usage and support:

- Deficient (beginning support capability)
- Limited (isolated areas of effective support)
- Satisfactory (very good support provided in most areas)
- Outstanding (excellent support in most areas)

With respect to organizational structure, the Technology Support Index classifies school divisions as *satisfactory* when they have a structure where the “technical support functions and instructional technology functions report differently, but each unit is cohesively organized and there is communication between units.” Higher-functioning divisions, those functioning at an *outstanding* level, instead have an organizational structure where all of “the technology functions report through the same unit in the organization, providing for a logical chain of command and communication structures....”

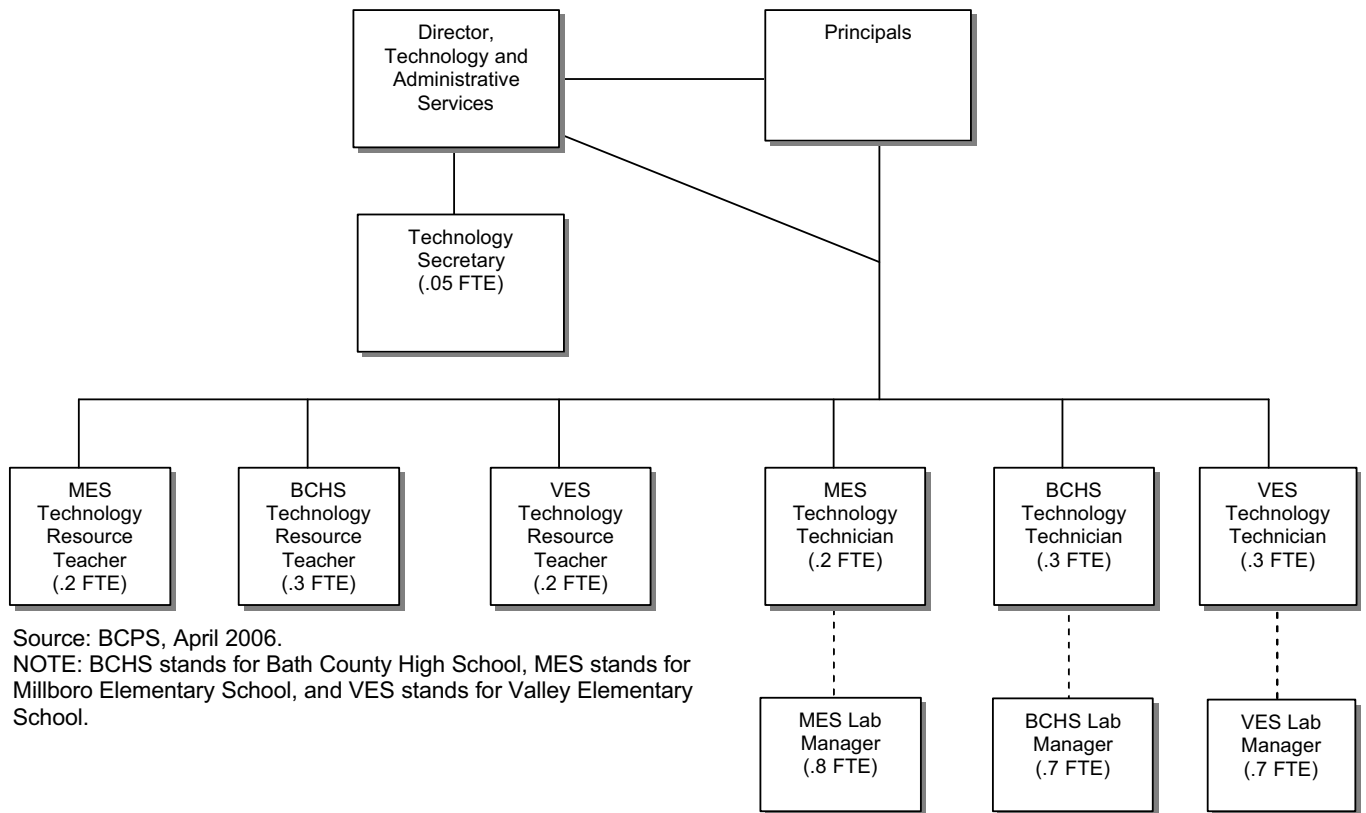
Currently, BCPS technology support personnel report differently. The technology resource teachers and the lab managers/technology technicians report to their principals, whereas the Director of Technology and Administrative Services reports to the superintendent. Given the size of BCPS, this is probably a good arrangement. The division is small enough for the Director to work closely with the school-based technology support personnel, and that appears to be working well. Thus, even though the BCPS support structure ranks in ISTE’s *satisfactory* category, it is probably the best structure for such a small division. The organizational structure of the technology support staff is shown in Exhibit 8-1.

## **FINDING**

For 24 years, BCPS schools were served by school technology coordinators who assisted school staff with technology issues. These individuals were typically full-time staff in other capacities who were paid extra to work with technology projects during their planning or duty periods, and to assist with projects after school. For the 2005-06 school year, six staff members were identified as technology technicians or resource teachers, and were assigned these part-time duties within their work day. The result has been that significantly more assistance is available for building staff to ensure that their hardware and software work properly, and that they have additional assistance for technology integration activities.

Effective July 1, 2004, the Commonwealth of Virginia started providing funds to school divisions to facilitate the use of technology in schools. In a superintendent’s memorandum, the Superintendent of Public Instruction identified the purposes for which those funds were to be used: “Local School Boards shall employ two positions per 1,000 students in grades kindergarten through 12, one to provide technology support and one to serve as an instructional technology resource teacher.”

**EXHIBIT 8-1  
BATH COUNTY PUBLIC SCHOOLS  
TECHNOLOGY SUPPORT STAFF  
ORGANIZATIONAL CHART**



Source: BCPS, April 2006.

NOTE: BCHS stands for Bath County High School, MES stands for Millboro Elementary School, and VES stands for Valley Elementary School.

Because BCPS has a total student population of less than 1,000, the division determined that the most effective way to support all schools and teachers was to divide each of these positions three ways so that each school would have the benefit of a technology resource teacher for some portion of every school day. Accordingly, the technology resource teacher at the high school spends 30 percent of his time on this function, with the remainder being allocated to his regular teaching assignments. Similarly, the technology resource teachers at Millboro and Valley elementary schools devote 20 percent of their time to this function and the balance on regular teaching assignments.

For years, BCPS had lab managers who were supplied at division expense. Prior to the current school year, these lab managers devoted 100 percent of their time to assisting teachers and students in the computer lab(s). As of this year, these individuals have been assigned a new responsibility: to serve as the technology technician for their entire school, in addition to continuing as the lab manager. At Millboro Elementary School, the lab manager spends .8 percent of her time carrying out the traditional lab manager role, and .2 percent of her time serving as the technology technician for the school. At Bath County High School and Valley Elementary School, the lab managers spend .7 percent

of their time fulfilling the lab manager responsibilities and .3 percent of their time as technology technicians.

The role of the technology resource teachers is to work with fellow teachers in workshop settings, small groups, and one-on-one sessions to help them learn to use technology effectively and to incorporate it into their teaching. It is not their responsibility to provide technical support; that falls to the technology technician. When teachers encounter network-, hardware-, or software-related technical problems, they are to call the technology technician for assistance. That individual is to work with them to resolve such problems. When the technician is unable to resolve a problem, she escalates it to the Director of Technology and Administrative Services.

A few weeks prior to the on-site visit to Bath County, MGT surveyed BCPS employees on all facets of division operations. The responses to the technology-related questions were quite positive, as shown in Exhibit 8-2. For example, 88 percent of administrators and principals rated the division's support of instructional technology as *good* or *excellent*, and none rated it *fair* or *poor*. Fifty-eight percent of teachers rated the division's support of instructional technology as *good* or *excellent*, while 40 percent rated it *fair* or *poor*.

When asked how strongly they agreed or disagreed that BCPS provided adequate technology-related staff development, 76 percent of administrators and principals agreed or strongly agreed, and none disagreed. Sixty-nine percent of teachers agreed or strongly agreed, while 18 percent either disagreed or strongly disagreed. In regard to whether or not the division provided adequate technical support, 63 percent of administrators and principals and 56 percent of teachers agreed or strongly agreed. Only 13 percent of administrators and principals and 20 percent of teachers disagreed or strongly disagreed.

Finally, when asked about the division's support for instructional technology, 75 percent of administrators and principals and 54 percent of teachers rated it as *adequate* or *outstanding*. Twenty-five percent of administrators and principals and 39 percent of teachers indicated that the division's support of instructional technology *needs improvement* or *needs major improvement*.

It is significant that these last responses from Bath County were considerably better than the average responses that MGT has received from administrators and teachers in over 30 school systems around the country. To illustrate that contrast, 56 percent of administrators in other school systems indicated their instructional technology support *needs improvement* or *needs major improvement*, while only 39 percent indicated their support was *adequate* or *outstanding*. Similarly, 53 percent of teachers in other school systems stated that their instructional technology support *needs improvement* or *needs major improvement*, while 40 percent rated their support as *adequate* or *outstanding*.

Thus, the survey results support the assertion of the Director of Technology and Administrative Services that technical support improved this year over past years. During interviews, most school-based personnel agreed that support had improved. Moreover, it is likely to continue to improve, as the technology resource teachers all said that this was more or less a "learning year" during which acclimating to their new role. After a year's experience in this position, they are likely to be more effective resources for the teachers in their respective schools.

**EXHIBIT 8-2  
COMPARISON SURVEY RESPONSES  
WITHIN BATH COUNTY PUBLIC SCHOOLS**

SURVEY STATEMENT OR FUNCTIONAL AREA	ADMINISTRATORS/ PRINCIPALS	TEACHERS
	(% Good + Excellent) / (% Fair + Poor) <sup>1</sup>	
The school division's job of providing adequate instructional technology.	88/0	58/40
The school division's use of technology for administrative purposes.	75/13	45/20
	(% Agree + Strongly Agree) / % Disagree + Strongly Disagree) <sup>2</sup>	
I have adequate equipment and computer support to conduct my work.	88/0	70/20
The school division provides adequate technology-related staff development.	76/0	69/18
The school division requests input on the long-range technology plan.	75/13	37/28
The school division provides adequate technical support.	63/13	56/20
	(% Needs Improvement + Needs Major Improvement) / (% Adequate + Outstanding) <sup>3</sup>	
Data Processing	13/50	26/34
Administrative Technology	13/76	29/36
Instructional Technology	25/76	39/54
Instructional Support	38/50	43/51
Staff Development	38/63	44/49

Source: MGT Survey results for Bath County Public Schools, 2006.

<sup>1</sup> Percent responding *Good* or *Excellent* / Percent responding *Fair* or *Poor*.

<sup>2</sup> Percent responding *Agree* or *Strongly Agree* / Percent responding *Disagree* or *Strongly Disagree*.

<sup>3</sup> Percent responding *Needs Improvement* or *Needs Major Improvement* / Percent responding *Adequate* or *Outstanding*.

**COMMENDATION**

**Bath County Public Schools is commended for providing good technology support to its schools.**

**FINDING**

Bath County has been working during the last year to develop a countywide master plan for technology and telecommunications. A final draft of the plan has been received by the Board of Supervisors, though the recent departure of the county administrator has delayed further development and implementation of the plan.

The county administrator and representatives from the Board of Supervisors, the hospital, The Homestead, the BARC Electric Cooperative, the community hospital, the telephone company, The Homestead Preserve, local and regional technology services consultants, local businesses, and school division staff all participated in the development of the plan through monthly meetings. The Director of Technology and Administrative Services was active in the process throughout.

The technology and telecommunications plan addresses technology access, child and adult technology literacy, infrastructure, community development, public school programs, and other important issues.

This community technology advisory/planning committee has fulfilled an important role for the school division this year to offer feedback on school division initiatives, and to provide other possibilities for consideration.

### **COMMENDATION**

**The Director of Technology and Administrative Services is commended for working with other community representatives to develop a countywide master plan for technology and telecommunications.**

### **8.3 Infrastructure**

Infrastructure is the underlying system of cabling, communications lines, switches, and routers that connects the various parts of a wide area network (WAN). It is similar in nature to a human skeleton or a country's road network—it accomplishes no work on its own, but rather enables other systems to perform their functions.

Of all technology resources, infrastructure is probably the most important. If a sound infrastructure is in place, most users will have a means of accessing people and information throughout their organization and beyond, greatly facilitating their ability to accomplish the responsibilities of their job. Increased efficiency and effectiveness will be the result. Without an effective infrastructure, such capabilities are very limited.

Given the capabilities and benefits that will accrue, most organizations, both public and private, have learned that to achieve their desired level of success, they must invest adequately in an infrastructure. This is particularly true of school divisions, which typically have a central office and multiple school sites spread over a wide area.

The most fundamental requirement of a sound infrastructure is a WAN that serves all users in the enterprise. A key function of a WAN is to connect the local area networks (LANs) that are located throughout the enterprise. A LAN is typically found within a building and serves to connect all the users within that building to one local network. Connecting the LAN to a WAN allows all LAN users access to others in the enterprise, as well as to the electronic world beyond. An enterprise in which every user is connected through a LAN to a WAN has the infrastructure necessary to take full advantage of the telecommunications capabilities that exist today and those that will be available tomorrow.

A WAN gives all users the capability of communicating with all other personnel in the organization through an electronic mail system. Typically, it also provides a bridge to the Internet and World Wide Web, which enables anyone connected to the WAN to access information and people outside the organization. WANs also allow authorized individuals in one office to access files of information in another office. WANs are often "closed," meaning that security measures prevent persons outside the confines of the WAN from accessing information housed within the WAN without a password and/or personal identification number.

## **FINDING**

BCPS has about 450 networked computers in classrooms, computer labs, and offices utilizing the Windows XP operation system and Microsoft Office (2000, XP, 2003) application software. These workstations are networked via Cisco switches and routers within buildings to comprise local area networks. Building switches utilize either copper or fiber connections, depending upon load and distance between network closets. Each school has a primary server utilizing the Windows Server 2003 operating system. The School Administration Building server continues to operate with Windows Server 2000. Only a few pre-XP workstations are in use in the schools, and most of them are not connected to network resources. There is only one Macintosh computer in the division, and it will soon be gone.

Valley Elementary School, Millboro Elementary School, and the School Administration Building are connected to the division wide area network core router (centered at Bath County High School) via T-1 lines.

The school division uses two T-1 Internet lines for instructional and administrative use, including several compressed video classes at the high school. The Internet lines are met by a Cisco edge router and Pix Firewall.

The division contracts with Sycom Technologies for network support, though it does not have to call often. The Director of Technology and Administrative Services provides most of the network support.

During school interviews, all school-based personnel were unanimous in their praise for the network. Comments included the following:

- "The network is great."
- "The network is very reliable."
- "The only problems we ever have with the network are caused by the telephone company."

## **COMMENDATION**

**Bath County Public Schools is commended for establishing an infrastructure that provides good service to the entire division.**

## **FINDING**

BCPS has a very informative Web site that provides a lot of information about the school division and its activities for parents and other community members. The types of information that have appeared recently include frequent updates on division activities such as:

- SOL testing;
- the arts in BCPS (Elementary School Dinner Theatre programs, Band Concert and Art Show, the Valley Elementary Talent Show, etc.);

- Mertz Career and Technology Center Students who excelled in a recent regional culinary arts competition; and
- 4-H Share the Fun Show.

Parents have expressed particular interest in and appreciation for the following items that appear on the Web site:

- the headline news features on school home pages;
- links to faculty and staff email addresses;
- faculty Web sites—especially those that provide homework assignments;
- school and division calendar information that is continuously updated, including academic, extracurricular, and athletic events;
- photos on student activities;
- school menus; and
- school closing information.

While the Web site provides a wealth of information on school and division activities, it does not provide information to parents regarding student grades, test scores, attendance. This information is very valuable to parents, and in divisions where such an approach has been implemented, parents have reacted very favorably. Moreover, this is the sort of thing that school divisions need to do in order to better serve parents and the community.

## **RECOMMENDATION**

### **Recommendation 8-2:**

**Acquire and maintain a software package that allows parents to see information on their children's progress in a secure manner.**

Various software products enable school divisions to draw on SASI data and make it available to parents. This can include grades, test scores, attendance data, and other information of interest to parents. BCPS should acquire such a package and implement it as soon as budget and staff resources allow. In another small Virginia division, the entire support of such a product is managed by the SASI coordinator.

## **FISCAL IMPACT**

A software product similar to the one BCPS needs to acquire is operating effectively in another small Virginia school division. That purchase price was approximately \$3.50 per student, which included the cost of training division staff to use the software. Using this per student fee to project the cost of implementing such a product in BCPS, we estimate that the division would incur first-year costs of approximately \$2,730. The annual

maintenance cost would likely be \$1,000 to \$1,200 per year. These costs, of course, would be subject to negotiations that the division would conduct with the company.

<b>Recommendation</b>	<b>2006-07</b>	<b>2007-08</b>	<b>2008-09</b>	<b>2009-10</b>	<b>2010-11</b>
Acquire and Maintain a Software Product to Facilitate Reporting of Student Progress Information	(\$2,730)	(\$1,100)	(\$1,100)	(\$1,100)	(\$1,100)

#### **8.4 Hardware and Software**

MGT's review of equipment involves an analysis of the type of hardware resources available for staff, teacher, and student use. While computers are the predominant resource in the classroom, other relevant technologies include, but are not limited to, digital cameras, projectors, and networking equipment. It is important that computers used for instruction have sufficient power and speed to support the use of recently developed multimedia courseware and effective access to the Internet/World Wide Web. All such computers should be networked. Similarly, computers that are used for administrative purposes need sufficient power and speed if they are to effectively use the more advanced software tools available for data storage, manipulation, and analysis. Administrative computers, too, should be networked.

While the price of hardware is generally declining, the cost of software is increasing. This is primarily because software actually translates into personnel costs; that is, software development is usually a labor-intensive activity that requires skilled technicians who earn relatively high salaries. As a result, the task of selecting software for use in any organization is becoming more difficult. This is particularly true of educational entities because they require more diverse types of software than do governmental agencies or private corporations.

#### **FINDING**

One area where BCPS has stepped out ahead of many school systems is in the purchase of extended warranties for the computers that they acquire. Purchasing a warranty essentially means that the manufacturer (or dealer) of the equipment will provide the repair support required during the coverage period. The standard for the division is to purchase five-year warranties. Such an approach has a significant impact upon the amount of repair work that in-house staff must do, one result of which is improved technical support.

ISTE's Technology Support Index classifies school divisions where warranties "are purchased to cover the life of the equipment (five or more years)" as *outstanding*.

#### **COMMENDATION**

**Bath County Public Schools is commended for purchasing five-year extended warranties on all computer acquisitions.**



Extended warranties provide a way to reduce the total cost of ownership (TCO) for equipment owned by the school division. MGT must often recommend that school systems purchase warranties; thus, BCPS is ahead of many other divisions in this regard.

## **FINDING**

Another place where BCPS leads other school systems is in its equipment replacement policy. The “current minimum standard for classroom and office workstations is a Pentium III microcomputer with 256+ MB of RAM,” with the Windows XP operating system. Workstations are replaced “at least every seven years, though often every six years (or more frequently for certain mission-critical settings).” Most division computers are Pentium IV machines. There are some older systems in use, but those are no longer connected to the division’s network.

## **COMMENDATION**

**Bath County Public Schools is commended for establishing an equipment replacement policy.**

MGT often recommends the implementation of an equipment replacement policy, so Bath County Public Schools is ahead of other divisions in this area as well.

It is important to add that, a technology support project conducted by ISTE, confirmed that establishing a computer life cycle allowed school divisions to avoid obsolescence and provided for better support, thereby reducing TCO.

## **8.5 Professional Development**

Training is the most critical factor in determining whether technology is used effectively. Teachers and administrators must be comfortable using technology, and they must know much more than merely how to operate the equipment. In fact, teachers must know how to integrate technology effectively into their teaching, and administrators must know how to use it to better manage their schools and their division as a whole. Studies indicate that it may take three, four, or even five years for a teacher to acquire the level of expertise desired. Consequently, it should be recognized that mastering technology is not something that can be achieved quickly. Planning and support for technology-related professional development must take this into account.

Training must also be ongoing. Teachers and administrators need continuous opportunities to improve their technology skills and to share new strategies and techniques with peers. While face-to-face interaction is essential, technology can also facilitate communication through email and interactive Web sites.

Technology integration involves more than learning to replicate common tasks such as lecturing and record keeping using computers. Teacher roles, instructional strategies, the organization of curriculum, and classroom management often have to change in order to take advantage of technology. Professional development should support teachers as they make these transitions.

School and division administrators are the key to integrating technology into the curriculum. Although teachers are on the front lines, administrators are often the driving force behind increasing levels of technology use in the schools. Administrators who make technology a priority in their schools will have teachers who make technology a priority in their classrooms.

Just as it is critical that teachers and administrators receive extensive staff development, it is also important for technical staff to participate regularly in training programs that enable them to stay current. No industry changes as rapidly as the technology industry. In order for technical and instructional support staff to continue to provide the level of support that a school division requires, they should participate in effective training programs at least annually.

## **FINDING**

The BCPS Technology Plan repeatedly states that “school leaders will attend the annual Technology Leadership Conference sponsored by the Virginia Department of Education and/or other technology conferences and training events.” It is appropriate that this action step be cited as a means of achieving several different goals that the division has set because there are many types of learning opportunities available at most technology conferences. Typically there are numerous sessions on a variety of educational technology topics that are often very informative. Usually there is also an exhibit hall that allows attendees to see the latest hardware and software developments on the market. However, the most beneficial part of attending conferences is the opportunity to network with colleagues from other parts of the state or nation to learn about educational technology approaches that have worked and others that have not.

Without exception, the technology support staff interviewed indicated that they had attended at least one conference in the past year. Most had plans to attend training institutes or academies this summer. Clearly, in this area at least, BCPS is taking the actions prescribed in its technology plan.

## **COMMENDATION**

**Bath County Public Schools is commended for allocating funds to enable technology support staff members to attend technology conferences and academies to strengthen their personal technical capabilities.**

ISTE’s Technology Support Index classifies school divisions that have comprehensive staff development programs in place as *outstanding*. Although conference attendance alone does not equate to a “comprehensive staff development program,” attending conferences would certainly be one component of such a program.

## **FINDING**

An approach to professional development that is becoming very popular today is online or Web-based training. Teachers with computers at home, or with computers they check out from school for home use, sign on to the Internet to take courses. These courses are offered by both public and private entities. Some are very primitive, with little more than

lecture notes placed on-line. Others, however, are very sophisticated, with on-line mentors to help students, interactive activities, chat rooms, and other features that build a sense of community among the participants. Because the courses are on-line, teachers can access the material whenever it is convenient for them, whether that is on a Sunday afternoon or at 1:00 in the morning. For teachers who are already comfortable with the technology, this is a low-cost, high-impact approach to professional development.

Although BCPS teachers have taken advantage of on-line professional development provided by other school divisions in the past, there is little or no involvement in on-line course work this year.

ISTE's Technology Support Index classifies as *outstanding* those school divisions where "online training opportunities are provided for staff both onsite and remotely..."

## **RECOMMENDATION**

### **Recommendation 8-3:**

**Review all of the options for offering Web-based professional development and strongly encourage teachers to take advantage of these opportunities.**

To facilitate a review and assessment of Web-based professional development programs, we have provided the following partial list of organizations that offer such courses, along with their Web addresses. The director of technology, working with a subcommittee of the technology advisory committee, should review all of these as well as any others that they identify on the World Wide Web.

- ASCD (Association for Supervision and Development) Professional Development Online – [www.ascd.org/framepdonline.html](http://www.ascd.org/framepdonline.html)
- Atomic Learning – [www.atomiclearning.com](http://www.atomiclearning.com)
- Classroom Connect – [cu.classroom.com/logon.asp](http://cu.classroom.com/logon.asp)
- iEARN (International Education and Resource Network) – [www.iearn.org/professional/online.html](http://www.iearn.org/professional/online.html)
- Marco Polo – [www.marcopolo-education.org/](http://www.marcopolo-education.org/)
- OnlineLearning.net – [www.onlinelearning.net](http://www.onlinelearning.net)
- Pearson Learning's Skylight Professional Development – [www.skylightedu.com/courses/](http://www.skylightedu.com/courses/)
- T.H.E. (Technological Horizons in Education) Institute – [www.thejournal.com/institute](http://www.thejournal.com/institute).

This approach will provide teachers with more professional development options, as well as flexibility to take advantage of training activities at times that fit best into their busy schedules. It is also important to note that promoting this new approach to staff

development is a way of providing guidance and direction to the division's instructional staff.

It should be recognized that these courses are not free of charge. There will be some costs associated with using them. For example, Classroom Connect's Connected University has four departments offering courses in the following areas of study:

- Technology Integration
- Mathematics
- Educational Leadership
- Curriculum and Instruction

A full list of these courses can be viewed at the:  
<http://cu.classroom.com/pdfs/ResourceCatalog.pdf>.

A subscription to Connected University courses costs \$399. Special pricing options for building and division purchases are also available; hence, the actual cost is unknown but negotiable.

Another example comes from a second provider listed above: T.H.E. Institute. This organization offers four courses on integrating technology into the curriculum—one each in social studies, science, mathematics, and English/language arts. These courses cost \$149 each. Course moderation (\$50) and graduate credit (\$90-110) are additional options. Volume discounts are available. T.H.E. Institute also offers two courses on using technology in education, also at \$149, and a course in internet literacy at \$79.

Although they vary somewhat, the rates charged by the other providers are similar to those identified for Classroom Connect and T.H.E. Institute.

### **FISCAL IMPACT**

There will be costs associated with implementing this recommendation, but they are impossible to determine at this time, given that prices are negotiable and vary from vendor to vendor; the actual number of courses to be used is unknown; and the areas of need have yet to be determined. Thus it becomes clear why a representative group of people is needed to help assess the options and develop plans for expanding upon this type of professional development.

It should also be noted that, since funds are usually available for professional development, they should be used for this purpose, making these expenditures more of a reallocation of funds than a new budget item.

## **8.6 Technical Support**

Only training is more important than technical support in determining how effectively technology is used in the classroom. Frequently teachers, even those with considerable experience with technology, encounter difficulties that interrupt their planning or classroom activities. Unless they are able to get quick responses, their effectiveness is diminished. Teacher questions typically include:

- Why is one of the computers in my classroom malfunctioning so often?
- Why does my connection to the Internet keep disappearing?
- How do I direct a document to another printer in the building?
- How do I transfer this file to a colleague at Bath County High School?
- Why can't I import this Excel chart into my Word document?

In addition to these technical questions, teachers have a multitude of instruction-related questions. Particularly when they have had limited experience in using technology, they frequently want and need help in incorporating some specific technology-related resource into their lessons. At those times, they need an experienced technology-using teacher to work with them one-on-one to address the specific issue with which they are dealing.

Those schools that are able to answer technical questions quickly and assist individual teachers with instruction-related issues will be the schools that most effectively prepare their students. The best way of addressing questions such as those above is to place at least one full-time technology specialist in every school. Unfortunately, because of the cost, few school systems are able to place a full-time technology support person in every school.

## **FINDING**

A strategy that some divisions have found to be successful in improving technical support without significantly increasing costs is to draw upon the expertise of a resource available in every division, but not often tapped: the students.

BCPS has created a unique program that involves students in the technology support function. Known as the Technology Assistant Program, it is designed to accomplish two things:

- Maximize educational and experiential opportunities for students with exceptional technology potential and skills.
- Provide a valuable technology support resource for the division.

Bath County High School sophomores, juniors, and seniors are encouraged to apply to the Technical Assistance Program for part-time contracted services work with the school division. Applicants must provide documentation of professional technology certification from an approved certifying entity in at least two of the following areas:

- Computer Fundamentals
- Computer Industry Knowledge

- Computer Technical Support
- Computer Electronics
- Information Technology Terminology
- Internet Concepts or Internet Technology Fundamentals
- MS Access 2000, Excel 2000, Word 2000, or Outlook 2000 Fundamentals
- MS Internet Explorer 5.5 Fundamentals
- MS Windows 95 Administration or Navigation
- MS Windows 2000 Fundamentals
- Network Technical Support
- Networking Concepts
- Typing Speed and Accuracy

Approved Technology Assistants (TAs) and their parents must sign the Technology Assistant Agreement before any work can be performed. As the need arises, a building-level computer coordinator, the principal, or the director of technology will select one or more TAs from the approved list. A Technology Assistant Work Order is then completed, detailing the nature of the task, the location of the assignment, and an estimate of the amount of time required to complete the task.

TAs work as independent contractors in the schools—outside of normal class time—installing, troubleshooting, and repairing computer hardware and software, and otherwise assisting with school technology projects. TAs typically work two to five hours per week during the school year (and more in the summer), and are paid \$10 per hour for pre-approved projects.

In the ISTE Support Index, *outstanding* school divisions utilize students to provide technical support and have a program that “is designed to train students in technical support.” These outstanding divisions do not rely solely on the expertise of these students, but expand their support capability in a way that benefits both students and the division.

### **COMMENDATION**

**Bath County Public Schools is commended for creating the Technology Assistant Program, which provides students an opportunity to work for the division in a technical support role.**

As one parent in another division recently observed, “We are a technical society. Students should be given the opportunity to get a certification in Microsoft Office products with their diploma.” Clearly, the Technology Assistant Program provides an

opportunity for students to learn the technology support function, which can be a very valuable experience for them in the future.

## **FINDING**

Most technical support personnel have numerous stories about calls they have made to labs or classrooms, only to find out that a computer or another device was not plugged in or was not turned on, or that a cable was not connected properly—or not connected at all. Those stories can be quite humorous; however, the costs associated with responding to such calls are not funny at all. Some divisions have found that by delivering elementary training to users on how to deal with various types of technology problems, they have reduced the cost of providing technical support.

## **RECOMMENDATION**

### **Recommendation 8-4:**

**Implement a training program for teachers and other staff that provides basic troubleshooting skills.**

A significant way to strengthen the technical support available to schools is to help teachers learn to diagnose and resolve problems they encounter while using technology. One large school district in Tennessee did a study a few years ago that indicated that as many as 90 percent of the problems their teachers sought help desk assistance to resolve could be handled by the teachers if they received basic troubleshooting training. While that percentage seems to be unrealistically high, it does indicate that a large number of problems could be resolved by teachers if they were more knowledgeable. Since current BCPS staff members are able to offer this type of professional development, providing such training should be a high priority for the division.

Providing troubleshooting training is another characteristic of an *outstanding* school division, according to ISTE's Technology Support Index. Specifically, the index states that in *outstanding* school divisions "basic troubleshooting is built into the professional development program, and is used as a first line of defense in conjunction with technical support."

## **FISCAL IMPACT**

This recommendation can be implemented with existing resources.