Chapter

Managing Hardware and Software

Chapter 6

Table of Contents

Managing Hardware and Software

Managing Your Infrastructure

A key piece of your technology implementation plan is the one composed of hardware—computers, printers, software, wires, cables, and connections—and software. While we have emphasized in previous chapters the importance of understanding technology in relationship to curriculum and staff development, the types of software and hardware you select will clearly impact the precise details of your staff development and, to a certain extent, just how your curriculum is supported by the technology. Therefore, making the appropriate choices here is just as important as making the right choices in other areas.

In this chapter, we offer some insight into key issues surrounding your hardware, software, networks, and connections, which make up the technology *infrastructure.* In general, the tools we offer are designed to help you think about the most important issues that you need to consider in order to make technology a useful part of your teaching and learning environment.

As you plan for infrastructure, we strongly advise you to assess the physical environment of the various facilities where you plan to add technology components. The condition of these facilities will have a major impact on your decisions. If you are building a new facility, you can design it to suit your own telecommunications, network, and computer needs. But if you have older facilities, will you need to add electrical outlets or telephone lines? Will you need to adapt heating, cooling, or ventilation systems? Or will you need to add or remove carpeting, alter acoustics, or repair a leaky roof? Do you have adequate storage and a plan to protect equipment, supplies, records, files, and such?

Before making any decisions regarding the hardware and software we describe in this chapter, you should have a reasonably well-formed notion of how you plan to use the technology you select. Have you thought about your curriculum and how technology can be used to enrich teaching and learning? How will you design your staff development so teachers can effectively learn new tools and techniques? Be cautious of planning for and spending money on technology that has little instructional use. This is a warning that we can't give too often.

Remember first to inventory your current hardware and software. You shouldn't assume that you know what already exists in your classrooms. Even though your school or district may not have widespread technology use, it is possible that some teachers or principals have already taken the initiative to obtain computer technology through grants, donations, or other funding sources. As a result, you may find a variety of existing hardware and software across your school or district. Most importantly, don't ignore the expertise of those teachers

who are already using computers in their classrooms. Find out what they are using, how they are using it, and how well it is working for them. This is valuable knowledge you can use in planning.

Be sure to consider how you will provide ongoing support for your infrastructure after the hardware or software has been installed. One detail that schools often overlook is including the cost of diskettes, printer cartridges, and printer paper in their annual supplies budget. One of our schools forgot to allow for the purchase of these items and was scrambling around at the last minute reallocating funds.

Finally, technology systems and software will become outdated, and equipment will wear out. While you don't need to keep up with every single technological innovation, your technology planning process should also include provisions for regular assessment and updating of your infrastructure.

Tools in this Chapter

We have included several resources in this chapter to help you plan and manage your infrastructure.

Computer Configurations for Educators. The configuration information presents some of the possible ways to organize or configure computers within your school. You will find ideas, costs, and pros and cons for computer labs, classrooms, media centers, and combination configurations.

Making the Most of a One- or Few-Computer Classroom. The material suggests scenarios for using and managing the one- or few-computer classroom. While it is beneficial to place computers in the classroom, many schools begin technology implementation with only one or two computers for each classroom. In this scenario, teachers are faced with new classroom-management issues. We have observed that teachers who are not able to overcome these issues simply don't use the computers at all. Or worse yet, they allow students to use computers for electronic recess. We hope this section provides you with some ideas and strategies for maximizing computer use in a classroom with a limited number of computers.

Choosing Educational Software. The guidelines address such issues as basic software packages every teacher should have and questions to consider when choosing content-specific applications.

Evaluation Practices. A step-by-step guide to evaluating software for your school or district is included to help in your decision-making process.

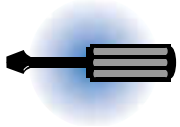
Software Selection Framework. The rubric is designed to assist you in converting your conceptual framework for educational software into a practical selection tool. You can share this rubric with colleagues and refer to it as you begin to preview various software packages.

Educational Software Evaluation Form. You can use the template to record your observations while previewing and reviewing educational software.

Creating a Base for Support. The information on support will give you some practical ideas on how to create a base of support from which to manage hardware and software throughout future months and years.

Hardware and Software Resources. The section includes lists of educational software publishers, titles, evaluation sites, and online distributors, as well as online resources for student technology support.

Selecting Hardware



Computer Configurations for Educators

When selecting computers, printers, and associated equipment, you will be faced with an additional set of questions: How many computers do we need? How will the computers be arranged in the classroom? How much computing power is necessary? Are multimedia stations necessary? Again, consider the educational use of the computers to guide your decisions. We have seen the following configurations used successfully.

Computer Lab

Although this is perhaps the most common arrangement found in schools today, the trend is towards more computers in classrooms rather than in labs. The lab arrangement allows for centralization and convenient administration of hardware resources and the ability for a large number of students to use a particular software program simultaneously. A computer-lab teacher remains in the lab while groups of students rotate through the room.

The computer-lab configuration supports an instructor-led teaching strategy with group learning. While it may be appropriate for some basic skills training, this arrangement tends to limit the time that the individual student can spend using technology. A problem with the lab configuration is that it flies in the face of the recently increased emphasis on *integration* of technology into the curriculum; it separates technology from the classroom where learning usually takes place. Furthermore, many technology uses within the curriculum are not well-suited for large group work. Labs sometimes don't allow the classroom teacher to provide individual attention to students while they use technology. Instead, the lab teacher is expected to provide that support. The focal point of the student experience in a lab setting tends to be the technology itself, rather than collaborative interaction with the teacher or other students.

However, labs do provide a valuable resource that supplements classroom-based computers. Teachers can use labs for those subjects where a large group is appropriate (e.g., writing laboratories or integrated learning systems). They may also use classroom computers for experiences such as technology-facilitated

cooperative learning experiences, student and teacher presentations, or Internet access and research. In addition, many schools open their labs to individual student use before and after school.

Single Classroom Computer with Large-Screen TV

The single classroom computer with large-screen TV is the next most common configuration. A single multimedia workstation might be attached to a large TV with a device known as a *scan converter*. The scan converter is a simple and relatively inexpensive device—between $100 and $200—that converts the output from a computer (Macintosh or PC) to a signal that can be displayed on the television screen. A suitable large-screen TV would be one measuring at least 29 inches diagonally. Smaller TVs are sometimes used, but these cannot be adequately seen from a distance. When not being used to display computer output, the TV can serve traditional classroom purposes, such as use with a VCR or cable television. Following are some web sites for researching scan converters:

- AVerMedia Technologies: http://www.aver.com/aver/
- Focus Enhancements: http://www.focusinfo.com/
- Zenith Electronics: http://www.zenith.com/index_flash.html

One factor to consider when employing the single-computer arrangement is the physical placement of the classroom computer. The computer should be placed close to the TV monitor (assuming that the TV is fixed in a permanent position, such as at the front of the class on the wall), and it should be easily accessible to students. The ideal situation is to have both the computer and the TV movable, so that the teacher can position the equipment differently according to different and changing classroom layouts. This configuration can support teacher-led or student-led demonstrations or presentations. When the TV is turned off, the computer functions as a workstation for individual or group work.

Presentation devices such as video projectors or LCD panels are sometimes used in classrooms, but they can be very expensive. Since they are projection devices, they require a large blank wall or screen. They are more commonly used for large group presentations in large rooms. Following are some web sites for researching presentation devices:

- Proxima Corporation: http://www.prxm.com/
- Sharp Electronics: http://www.sharp-usa.com/
- Infocus: http://store.infocus.com

Multiple Computers Per Classroom

The key factor in adopting this configuration may be access to electrical power supply, especially for older buildings. A desirable arrangement would be one computer attached to a scan converter and large-screen TV and one or more additional computers distributed around the classroom. These additional computers need not be attached to a scan converter. Ideally, the additional computers will be placed in different locations around the room (not all lined up against

one wall). The optimum arrangement is for all of the computers in the classroom to be networked in order to share a common printer. Network connections beyond the immediate classroom are highly desirable as well (see the following information on Networks).

Shared Computer on a Cart with Large-Screen TV

When it is not possible to have at least one computer per classroom, many schools make one or more computers available to teachers on a sign-up basis. These shared computers are placed on large rolling carts and are moved from room to room on an as-needed/as-available basis. If a large-screen TV is not available in each classroom, the rolling cart may include a TV with scan converter as well. In this way, an entire multimedia system is made available to each teacher.

Some schools have school-wide network connections in each classroom, even though there may not be computers in each classroom. In this case, the rolling computer can be plugged into the network from the room where it currently resides. When the machine moves, it is unplugged from the network and plugged back in at its new location.

Aside from the computer (and perhaps TV and scan converter), the rolling cart might include other devices such as a printer, scanner, or laserdisc player.

Large-Screen TV on a Cart

Sometimes it is the large-screen TV that is more rare than the classroom computer. Perhaps all classrooms have computers, but there are only a few TVs with scan converters available in a building. In these cases, schools place the TV and scan converter on a cart and move it around to different classrooms when teachers want to display output from their classroom computer for an entire class (or large group) to view.

Portable Computers on a Cart

Some schools have found an alternative to purchasing several expensive computers for each classroom. This configuration utilizes a simple portable computer about the size of a keyboard. Several of these computers are kept on a cart and shared among teachers. Or, one teacher could have several of these in the classroom. To supplement the portable computers, a classroom might have only one or two multimedia computers. AlphaSmart at http://www.alphasmart.com/ is one of the well-known commercial brands for this type of computer. These computers cost much less than a regular workstation—$200-$300 per unit versus $1,000 per workstation.

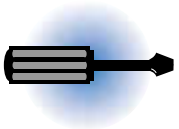
Computers in the Library/Media Center

Most school library/media centers have one or more computers available for student use within that facility. Often, these computers are attached (directly or via modem) to the Internet, as well as to the school's online library catalog. Computers in the library/media center are invaluable tools for student research and are also often used before and after school by students desiring extra time on a computer. Nevertheless, we don't recommend placing all of your computers in the library.

The library is not a suitable place to send groups of students to do computer work, as they tend to disturb those students using the library's nontechnology resources. This creates an access problem that can result in most students having little access to technology. If a school has only a few computers, it would be well-advised to try the computers-on-carts arrangement.

Networks

Local Area Networks (LANs) allow the sharing of resources among the machines located in a given school, classroom, or lab. These resources might include printers, CD-ROM towers, and other data storage devices on which reside shared programs and software. Wide Area Networks (WANs) connect LANs to resources located outside of the school. A prime example of a WAN resource is the Internet or, more specifically, the World Wide Web. WAN connections can be full-time (using leased data lines/circuits) or part-time (using modems and dial-up connections to resources such as the Internet). You should consult with network professionals to determine how, and whether, you want to create a network. They can best advise you on cost and support issues.



Making the Most of a One- or Few-Computer Classroom

How well teachers are able to make use of the single computer in the classroom has much to do with their instructional strategies and how they organize to teach the curriculum. As is often noted, integration of technology requires teachers to *rethink* how they teach.

In the one-computer classroom, the teacher often sets up a schedule by which students take turns using the computer, or each student may have a special weekly time on the computer. This is a kind of pullout model in which the student on the computer is excused from the work the rest of the class is doing. In setting up a schedule, teachers may give consideration to students' academic strengths. For example, if Nancy is especially strong in math, math time would be a good time to schedule her Internet time. Other teachers may choose to set up a computer station through which students rotate one at a time, using a posted list.

With practice, most teachers find that the benefits of technology integration—such as increased student motivation, improved interaction with content, and development of cooperative learning skills, just to name a few—are worth the time it takes to modify existing curriculum activities.

A single computer can be used effectively in the classroom as a presentation tool, a tool for the generation or production of student work, a cooperative learning tool, and an in-class information resource. While many teachers are very familiar with how the computer can be used to present audio-visual information to an entire class (see the following information on Display Issues), other uses may require a bit more investigation.

Computer Placement and Portability

Where is the best place to locate a classroom computer? If it is on the teacher's desk, how easy will it be for students to access it? If it is securely fastened to a table in the back of the classroom, then how could it be used to display something (e.g., images from a CD-ROM) to the entire class? What if it is necessary to borrow a computer from the teacher next door in order to have two computers available for a particular activity? Clearly, computer placement and portability have a practical impact on how teachers are able to use computers in their classrooms.

In most schools, portability and security are equally important, yet sometimes competing, issues. Computers that are not permanently affixed to tables or desks often disappear during nights, weekends, and holidays. On the other hand, locked-down computers often result in computers that cannot be used in a wide variety of ways. The solution that many schools have found is to affix classroom computers to small media carts. The same sort of device that can lock a computer to a table can also lock it to a media cart. This cart can be moved around the room (or into the room next door, up the hall, etc.) where needed. If you have a network in your school, remember to get a long cable so that the computer cart can be located fairly close to the network jack. The same thing goes for a phone cable if you are using a modem on your classroom computer.

Since a media cart is not altogether immobile, it is important to have a way to lock down the cart to an immobile object such as the building wall. We have seen some schools do this with a bicycle chain and a large eyelet affixed to the wall. Some particularly security-conscious schools require that the media carts be wheeled into a lockable closet or very secure room in the evenings (and especially during school vacations). A media cart that is just big enough for the computer, monitor, and maybe a small printer costs only $100 to $200, which is well worth the added flexibility it brings.

Display Issues

It doesn't take much to realize that thirty children cannot easily view a single nine-inch computer monitor. So, how is it possible to turn that little display into something a whole class can see? Teachers address this issue by using various devices to take the video output from the computer and either project it or display it on their classroom TVs. In the chart that follows, we summarize the features of some of the more common display devices and give the pros and cons of each.

Selecting a Display Device

Device	Advantages	Disadvantages
Existing computer monitor	• No additional cost • No additional set-up time/skills required	• Too small for more than a few people to view at once • Unless you have a notebook computer, the monitor is probably not portable.
Video Projector	• Single device, no overhead required • Can be used in virtually normal room light • Very clear and sharp image • Easy to set up • Very portable • Will work with Macintosh, PC, laser disc player, VCR • Most also have speakers for sound	• Costly
Scan Converter	• Single device, no overhead required • Connects to any existing TV • Very cost-effective	• Image not as clear as video projector (especially with the inexpensive ones) • Not all are cross-platform (i.e., may need one for Macintoshes and another for PCs).

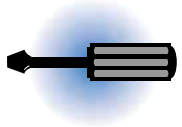
Our recommendation for educators with limited funds? Go with the scan converter. The video projector is technically the best choice, but until the cost comes down on these units, it is unlikely that your school could afford to buy even one, much less two or three to circulate around the school. The LCD panel is a good concept, but in practice it is worthless in most schools. They are fragile and difficult to set up, and most classrooms cannot be made dark enough to allow anyone to see the projected image. If you have the money to buy an LCD panel, you ought to spend it on a video projector instead.

The scan converter is inexpensive and works with all of those big TVs (nineteen-inch or larger) you already have. You do not need to buy a new or special TV. If the TV works with a VCR (i.e., you can plug the VCR into the TV and the picture is good enough for a class or large group to view), it will work with the scan converter. You can buy several converters and schedule their use along

with the TVs. True, the image quality is not up to monitor or video-projector standards, but the combination accomplishes the primary task of allowing an entire class to see the output of a single computer.

Selecting Software

Choosing Educational Software



Before purchasing new computers for your school, ask the vendors what software is included on the machines. When an individual buys a personal computer, software applications are commonly preinstalled. This is not generally the case for computers sold to schools. Therefore, software purchases must be included in your technology planning. Many schools purchase computers but don't properly plan to purchase the software tools necessary to make those computers useful.

In the course of our work with schools and districts around the country, we are often asked to recommend the one or two best software packages for teaching particular subjects. Our usual responses are unfortunately *not* what many teachers want to hear. When confronted with the best-software question, we respond by asking what software they are currently using and what they want to accomplish with the software. The responses are quite interesting, because it is common for the questioner to report that they haven't used any *educational* software. The only software that they might have is a word processor or spreadsheet application. What the questioner is really asking is what curriculum-specific software can be used to teach a particular subject.

There are many excellent educational software packages that can serve as valuable curriculum resources in the hands of creative and innovative teachers. All too often, teachers seem to be looking for the technologic equivalent of the magic bullet; that is, the piece of software that will make learning come alive and solve a host of educational problems. Sometimes this magic bullet is thought to be the World Wide Web or an integrated learning system that can raise standardized test scores and have students reading well beyond grade level.

As we discussed in Chapter 3 on integration, what does make a difference is teacher skill in using technology tools intelligently within the context of the curriculum. And when it comes to software tools, a teacher's skill is manifest in his or her ability to select the appropriate tool for the particular student learning style and task. Often, the appropriate tool is a basic application such as a word processor or spreadsheet. Other times, a communications tool such as e-mail or the World Wide Web might be in order. Yet again, learning might best occur through the use of a technology-based simulation. Finally, when there is a need for basic-skills development or reinforcement, a technology-based tutorial tool might be an excellent choice. All of this needs to be balanced with the fact that sometimes good old paper-and-pencil technology works as well as a computer for a particular task.

So, what basic software do we recommend for classroom computers? What software do teachers across the country most frequently use in their classrooms? The following summarizes our observations and conclusions.

Word Processor

The word processing applications in either AppleWorks or Microsoft Office are the most popular among educators. Microsoft Works features another word processing application that is popular with teachers. Beware of word processors that are unique, because they might not allow you to transfer or share files with other word processors.

Spreadsheet

The Microsoft Excel application that is included with most versions of Microsoft Office and the spreadsheet functions within AppleWorks and Microsoft Works are the most popular spreadsheets used by educators. In this case, most teachers find that simple programs work best for them.

CD-ROM Encyclopedias

Microsoft Encarta, Grolier's, and Compton's are the most common electronic encyclopedias.

Presentation Manager

Microsoft PowerPoint is especially popular, and it comes with most versions of Microsoft Office. The slide-show function in AppleWorks is similar to PowerPoint. Hyperstudio is a popular multimedia software application that incorporates sound and graphics.

Web Browser

Netscape Navigator and Microsoft Explorer are the most popular browsers available. You need an Internet connection on your classroom computer to use this software.

E-mail

There are several e-mail software applications in use. Many people use the e-mail program that comes with the web browser on their computer. However, you must be connected to the Internet through a modem or through the school's network to access e-mail.

Beyond the Basics

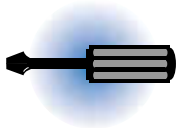
Most teachers would add to the preceding list of basic software a number of content-specific programs. Included in this type of software would be those programs that focus on simulations, drill and practice, critical thinking, and cooperative learning (see the Chapter 3 tool *Integrating Technology into the Curriculum* for examples of titles). The software application that you choose has everything to do with content area, grade level, instructional strategy, and a whole host of teaching and learning issues. To make informed decisions regarding selection of other software applications, you first need to answer the following questions:

- What software do you currently have? Be sure to remember and consider basic applications software that might have been bundled with your computers when they were purchased.

- How are you using your existing software (either basic applications or subject-area-specific packages)? Have you received training in the use of that software?
- What are your curriculum objectives? Have you thought about the ways that software or technology in general might improve your work with students? How might you explore those ideas without just going out and buying technology largely sight unseen?
- Are you working with other teachers—such as a grade or subject-area team—to develop software recommendations and units/lessons within which that software will be used?

When you can answer these kinds of questions, *then* you are in a position to begin to evaluate educational software packages. The focus of the questions places software evaluation and selection into a contextual framework that helps define the notion of best within a particular educational environment. As with all tools and practices, *best* is a relative term.

Evaluation Practices



Once you have a conceptual framework for selecting software, there are a number of things you can do to actually begin previewing applications.

Accumulate information on available packages. To help you gather information to evaluate software, we have provided a *Software Selection Framework* and an *Educational Software Evaluation Form* that you can reproduce and use when reviewing potentially useful applications. Software catalogs, educational technology conferences, and the web sites listed later in this chapter are starting points for this.

Preview software at a preview center. It can be quite expensive to buy and try new software. You should first try to locate a software preview center. Your regional education center or local college or university might have a facility where you can try out several packages and compare them side by side. Most software preview centers will not allow you to check out or borrow materials, but all have facilities to enable you to experiment with software on the center's own equipment.

Arrange to use software on a trial basis. When you have identified software from catalogs, online directories, or preview center visits, you need to arrange for trial use of packages that seem interesting. By trial use, we mean that you should arrange to have the software sent to your school for a thirty-day (or longer) period to use before you purchase the software. This is a common procedure. All educational software publishers expect that teachers will want to preview their software before committing to purchase. Some publishers will agree to send you trial software based solely on a phone call. Others will require that you send a purchase order which will not be charged unless you decide to purchase, or fail to return, the software by the end of the agreed-upon trial period. In most cases,

you will need to pay return shipping for any software you decline to purchase and instead return. While this is an expense, it is much less than spending hundreds of dollars on software that turns out to be unsuited to your needs.

Record your observations about the software you try. When evaluating software, you will want to use tools such as the *Educational Software Evaluation Form* found later in this chapter to record and keep track of your observations. We also strongly recommend that you work with another educator or team of educators to share impressions of the software that you are reviewing. If at all possible, try the software out with students. You need to see if you will be able to use the software in its real-life context to know if it is something that will really benefit your students.

Thoroughly review the licensing parameters. Once you are sure that the software is pedagogically sound—that is, that it fits your current curriculum and student needs—make sure that it can be advantageously licensed. This means that the manufacturer should price the software so that you are encouraged to purchase a sufficient number of *legal* copies to fit your needs. Many software publishers are sensitive to the particular circumstances found in schools, such as multiple workstations, the need to share licenses, and machines located both in labs and classrooms.

Check compatibility with existing hardware. Verify that the desired software will run on your existing hardware. The majority of current educational software is sold on hybrid disks that will run on either a Macintosh or PC platform. However, you need to check to make sure that you order the proper type or that the software will run on either system. Also, if you have older machines, do they have the capacity to run the new software? Do they have the capability for accepting new software that is now almost exclusively on CD-ROM? In general, verify that your machines are fast enough, have sufficient disk space, have CD-ROM drives, and have appropriate multimedia devices (speakers, graphics monitors, etc.) to run new software.

Find out about support. Make sure that the package you choose has a complete manual and reliable technical support, whether paid or free. Many times, the educational versions of certain packages contain teachers' manuals and guides that are not sold with the home or commercial versions.

Maximize your purchasing power. Before purchasing your software, find out what buying power your district already has. Some states have a list of approved software that can be purchased at a considerable discount.

Share with others in your school and district. Find time to share advocacy for the software you locate, use, and enjoy. This will help raise the overall awareness of instructional technology.

Software Selection Framework

Complete the following framework for software that you want to find. The framework is not intended to describe a particular software package. Rather, you should use it to take note of the desired attributes of the software you are seeking. It's a good idea to share the framework with your colleagues to get their feedback and comments before you begin to preview software; a reproducible version of the form is included in the Appendix. For more information on ways of using software in the curriculum, see the discussion of integration in Chapter 3.

Appendix page 262

Appendix SEIR•TEC

Software Selection Framework

Desired subject areas (e.g., mathematics, language arts, social studies, etc.)
Social Studies-Civics and Government

Targeted grades
Grades 9-12

Intended use (What curriculum objectives will it serve? When during the year will it be used? How many students will use it?)
Package should help students understand the processes involved in creating a government and establishing the rule of law. To be integrated into the first week of US History (after the Revolution) as a kick-off activity. Whole class should use (separately? simultaneously?).

Type of software (i.e., tutorial, communications)
Some sort of simulation would be good.

Teachers/departments using the software
Every US history teacher should try this and consider for adoption.

Special student considerations (primary language, special needs, etc.)
English. Software must not overly emphasize computer skills in order to use. Must be very user-friendly and primarily driven by rich content!

Infrastructure considerations (hardware platform, network requirements, multimedia, special support, etc.)
Must be able to run on the single Mac in each history teacher's classroom.

Used with the permission of Sun Associates

Planning into Practice

Educational Software Evaluation Form

Once you have decided on the instructional needs for a piece of software, you will need to evaluate some specific applications. The following form can help you organize the information gathered during that process. A reproducible copy of the form is included in the Appendix.

Appendix page 263

SEIR•TEC Appendix

Educational Software Evaluation (page 1 of 2)

Evaluator Andy Carroll
Today's Date 5/25/99
Software Title Decisions, Decisions 5.0– Building a Nation
Cost $380
Publisher Tom Snyder
Subject Area(s) Social Studies etc.

Date Published ?
Age/Grade Range 7-12
Platform Mac or Win95
Network Version? No, but available
System Requirements CD-ROM drive, sound card

1. What is the overall purpose or use of this software application?
   To help students understand the processes involved in developing government and establishing the rule of law in a new society.

2. How would you best classify the use of this software?
   a. Tutorial (including drill and practice)
   b. Exploration
   c. Application or productivity tool
   d. Reference
   e. Entertainment
   f. Other

3. Does the content appear educationally sound and well-researched, e.g., does it mesh with national standards and curriculum frameworks, is the information current and free of bias and stereotype?
   Very sound. Unusual product in that it focuses on postcolonial Africa. Good use of cultural diversity in this subject area (govt.) Good interface. Definitely req. some practice and review first. Read the manual? Good manuals.

4. Is the program sufficiently easy to maneuver through, e.g., does it allow you to save your work at any point, can you easily return to a main menu or orienting point, are the graphics and icons clear?)
   Use either to introduce US History at the Revolution unit or as culminating activity to this unit. Also could be used in Lester's African History course!

Planning into Practice

Appendix
page 264

Appendix

Educational Software Evaluation (page 2 of 2)

5. Describe how you envision your students using this software, e.g., would they be working alone or in cooperative groups, in the classroom, laboratory, or library, as part of regular classroom work or as an add-on, reward?

   Requires full class. Not a stand-alone software package. Built on coop lrn./problem-solving model. Ideal for use on single classroom computer!!

6. What do you most like about this software?

   Great simulation. Unique subject focus (postcolonial Africa) on this curriculum area (basic US govt./civics). Love the coop learning model. Great that it can be done with just one computer!!

7. What do you like least?

   Kind of expensive for a package that just focuses on one curriculum area. Really does require teacher to interact with the students while this activity is taking place.

8. What are your impressions of the supporting documentation, e.g., installation and troubleshooting instructions, teacher's guide, lesson plans, extension activities?

   Terrific teachers' guide! Manual looks pretty good. Nice graphics.

9. Does the cost of the software seem appropriate? Is there enough flexibility to allow students to use the program multiple times, can the difficulty level grow with the student, are you paying a premium for fancy graphics that don't necessarily impact the learning experience?

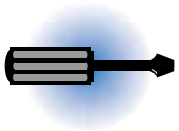
   A little expensive, but cheaper than comparable laserdisc products. I think it's worth getting for the 45-day preview to try it with actual students this fall. If it works, then it's probably not too expensive.

10. Does the publisher offer technical and educational support for its products? How accessible is this support, how quickly do they respond, are they sensitive to the needs of teachers using the program in a classroom setting?

    There's an 800 number for tech support. This publisher is at all of the ed tech conferences, so they seem reputable. Good reputation! Many of these packages are on the state bid list. Try and see?

Planning into Practice

Keeping It Together



Creating a Base for Support

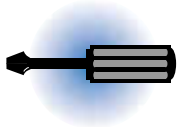
Keeping everything running smoothly will require some type of coordinated support plan that is adequately funded and staffed. As more and more people begin using computers, more and more demands will be made for support.

Most schools report that one key strategy in addressing the support issue is to have an on-site support person taking care of the everyday problems within a school. There is nothing more frustrating for a teacher than to have to wait several days or weeks for a district support person to arrive. On the other hand, it is a waste of resources to send a district support person out to a school to fix a jammed printer or, worse, to find that a student already fixed the problem.

Some districts are selecting and training capable students to become Techno-Pals who can help teachers and students with small problems. Some teachers are adding hardware and software troubleshooting courses to the curriculum. Another strategy is to use community volunteers who can devote a few hours per week.

Certainly, students cannot be the only source of technology maintenance and support. In a similar vein, many districts are trying to develop classroom teachers' skills so that they can take care of all but the most time-consuming technical-support issues. This can be effective—and we discuss some of these efforts in Chapter 4—but the fact remains that dedicated technical support is still required at some level. In short, we highly recommend that your district engage professional technology support either on a full-time or a contract basis. One way or another, you *will* need this support. Each district will have to assess its resources to determine what kind of hardware and software support they will be able to provide and how they will be able to manage.

Resources



Hardware and Software Resources

Educational Software

Educational software companies provide web sites with much to offer teachers. You can download software for preview, add your name to the mailing list to receive catalogs and new-product announcements, purchase products online, and get technical support. Many educational software companies also offer worthwhile curriculum resources. Not all educational software publishers have previews available for download from their web sites. On the other hand, most publishers have free CD-ROM-based previews that they are happy to send you via regular mail. See their web sites for details. Following are some of the larger educational publishers and major software titles.

Educational Software Publishers

http://www.broderbund.com
Broderbund Software

http://www.donjohnston.com
Don Johnston, Inc.

http://www.edmark.com
EdMark

http://www.foresttech.com/index.html
Forest Technologies

http://www.knowledgeadventure.com
Knowledge Adventure

http://www.tlc.com
The Learning Company

http://www.microsoft.com
Microsoft

http://www.mindscape.com
Mindscape

http://www.scholastic.com/
Scholastic

http://www.simcity.com/index.shtml
SimCity

http://www.sunburst.com
Sunburst

http://www.teachtsp.com
Tom Snyder Productions

Software Titles

Title	Publisher	World Wide Web Address
Appleworks	Apple Computer	www.apple.com/appleworks.shtml
Decisions, Decisions	Tom Snyder Productions	www.teachtsp.com
Encarta	Microsoft	www.microsoft.com/Encarta
EnviroNet	Simmons College	http://earth.simmons.edu
Excel	Microsoft	www.microsoft.com/excel/default.htm
Grammar Games	Knowledge Adventure	www.knowledgeadventure.com
Great Ocean Rescue	Tom Snyder Productions	www.teachtsp.com
Grolier's Multimedia Encyclopedia	Grolier	www.gigrolier.com
HyperStudio	Roger Wagner Publishing	www.hyperstudio.com
Journey North	Annenberg/CPB	www.learner.org/jnorth
KidPix Studio Deluxe	Broderbund Publishing	www.broderbund.com
MathBlaster	Knowledge Adventure	www.knowledgeadventure.com
Microsoft Office	Microsoft	www.microsoft.com/office
Oregon Trail	The Learning Company	www.tlc.com
PowerPoint	Microsoft	www.microsoft.com/powerpoint/default.htm
Rainforest Researchers	Tom Snyder Productions	www.teachtsp.com
SimCity	Maxis	www.simcity.com/home.shtml
Sim Earth	Maxis	www.simcity.com/home.shtml
Spell It Deluxe	Knowledge Adventure	www.knowledgeadventure.com
TimeLiner	Tom Snyder Productions	www.teachtsp.com

Software Evaluation Sites/Clearinghouses

http://clearinghouse.k12.ca.us/
California Instructional Technology Clearinghouse

http://www.enc.org
Eisenhower National Clearinghouse

http://www.evalutech.sreb.org/
EvaluTech

http://www.siia.net
Software and Information Industry Association

Online Software Distributors

http://www.edresources.com/
Educational Resources

http://www.edsoft.com/q/index.html
Educational Software Institute

http://www.queueinc.com/queueinc/product.html
Queue, Inc.

Student Technology-Support Resources

http://www.kde.state.ky.us/oet/customer/stlp/default.asp
The Kentucky Student Technology Leadership program is a very successful program for developing student leaders in the area of technology support. The Kentucky Department of Education organizes training and support for these students at the district and regional levels, and students work in their own schools to support their teachers and fellow students.

http://genwhy.wednet.edu/
Generation www.Y (WorldWide Horizons for Youth) is a national project that helps students in grades 6-12 become technology leaders, supporters, and mentors within their schools. Originally funded as a US Department of Education Technology Innovation Challenge Grant, Generation www.Y has partner schools across the country and serves as a very replicable model.

Putting It All Together

A conversation about technology infrastructure

Let's get right to the point. How can a school district best address its problems related to too few computers and too many students?
That's a concern for a majority of schools across the nation. The schools we primarily work with are traditionally underserved populations who struggle with the issue of resources every day. Support from the federal government through such programs as the E-Rate (available through the Universal Service Fund) and Technology Literacy Challenge Grants are making significant headway in terms of getting more technology into schools. Nevertheless, there is still a tremendous way to go before children and teachers in many of our states have equitable access to tools.

Gaining access to technology is an issue that is being addressed by most schools; however, we are also finding more and more that schools and teachers who already have access to technology are not fully utilizing what they have. We feel that this problem can be remedied by implementing better staff-development sessions, promoting more teacher collaboration, providing more release time, and giving recognition for use of technology, not by buying *more* technology.

Here is a story that illustrates my point. A number of years ago, a friend bought his father a simple computer to use for word processing. Dad was retired and he wanted to write his memoirs. My friend figured that the computer might be a good way to get his dad to both exercise his creativity and learn a new skill. Well, after about a month, when my friend asked him how it was going, his dad said that using the computer was okay, but that he really didn't see any advantage to it over his old manual typewriter. He went on to say that the computer was actually lots more work and if it was okay with his son, his response was: "thanks, but no thanks." Finally, he added that the biggest problem with the computer was the huge number of files (and disks) that resulted from this one writing project. This really piqued my friend's interest, and he asked his Dad how many files he had. Dad said "Oh, I don't know . . . a couple hundred." It turns out that my friend's dad was starting a *new* disk file for every page of his book! His frame of reference was the typewriter, and he therefore assumed that when you typed to the bottom of the page you needed to start a new sheet of paper. On the computer, he did this by starting a new file. Two hundred pages equal two hundred files!

What can we learn from Dad? What I learned is that you can't simply apply new technology to old paradigms. You can use a computer as a typewriter, but when you do this without modifying your underlying understanding of the process, you actually manage to make your life much harder than before the innovation.

Teachers who assume that instructional-technology tools must be used in a one-student-one-computer model haven't modified their paradigm to make best

use of the innovation. For the vast majority of learning activities, it is quite unnecessary to have one computer per student. This doesn't mean that it's wrong to have more than one computer per classroom. On the other hand, we often see teachers who assume that technology has not been integrated if every student doesn't touch the computer at least once at some point in the unit or lesson. Technology is a tool that can assist the processes of teaching and learning and can be introduced in many ways and at many different points during a unit.

So, when we hear that a school has a shortage of technology, we first ask exactly what that means. And then we try to find out whether the teachers in that school have explored the technology thoroughly and whether they have received appropriate staff development to facilitate that exploration. It is a mistake to assume automatically that teachers need more technology.

What basic infrastructure is required for teaching?

I think that each classroom should have at least one Internet-ready, networked, multimedia workstation with a suite of basic software. This configuration should be connected to a printer either directly or via the local area network. Also very important is that the classroom workstation be configured so that its output can be displayed either by projection or on a large television screen. This latter method—the large TV screen—is definitely preferable from the standpoint of cost, and we find it to work quite well in terms of visibility.

After a school has acquired the basics, what peripherals can you recommend?

In terms of hardware, I've found that equipment for digital imaging is gaining popularity in schools. By this, I mean scanners, digital cameras, and video input devices. The price on decent-quality digital cameras is still a bit high, but scanners have come down to the point where a perfectly good scanner can be had for under $200. Many school computers (particularly Macintoshes) already have the hardware to accept video input. The newer multimedia PCs frequently have these features.

What trends do you see?

First, the price of basic workstations is falling as smaller, more portable, and less expensive units are being made available. The hardware industry has finally realized they can sell lots of less expensive, moderately powered machines instead of continually developing faster and more powerful machines. I think that we may be starting to reach a plateau in terms of *marketable* computer power, at least for certain markets, as manufacturers begin to focus more on price than on increased performance and to search out broader markets. As a result, schools will benefit by being able to buy more computers. However, the software industry seems to be a bit behind the hardware industry. Each year they introduce new software versions that need more power and memory, which contributes to an escalating need for more powerful machines.

I see the second major trend in technology infrastructure as related to the Internet and, specifically, to bandwidth. Basically, I believe that the next several

years will see a continuing growth in speed and reliability of network access. As they become more common, cable television-based and wireless service will drive up user expectations related to speed and bandwidth. As access improves, more and more people will think of the Internet (or more accurately, the World Wide Web) as their primary technology tool.

We think that in the future educators will be able to get more hardware for their money, but where they will need to spend *more* money is in improving network access—getting more bandwidth. Fortunately for needy school districts, the E-Rate made available through the Universal Service Fund will provide financial assistance in this area.