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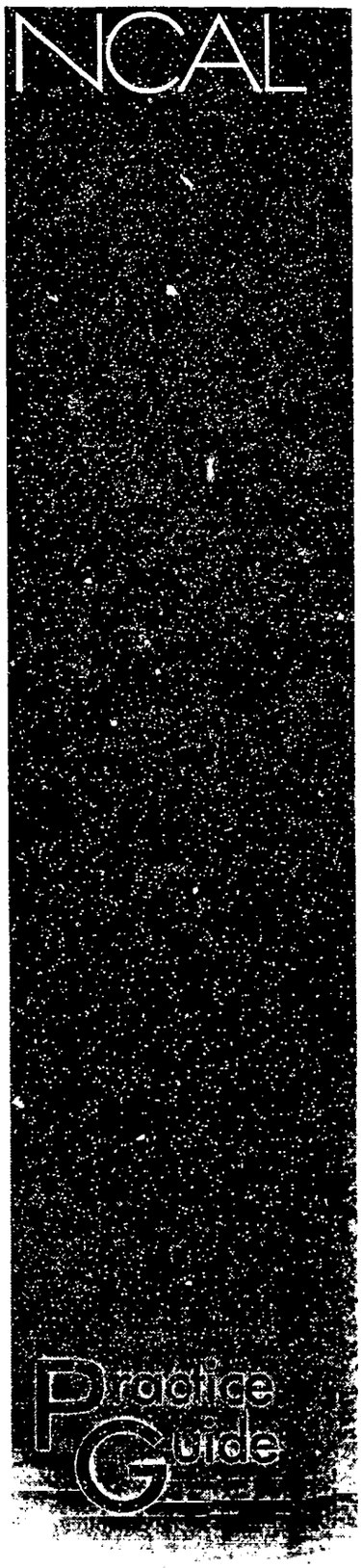
ABSTRACT

Selecting hardware and software for adult literacy instruction is a complicated task requiring careful attention to the integration of various computer models, software packages, and instructional objectives. Decisions surrounding the acquisition and maintenance of technology are further complicated by limited funding, expertise, information, and equipment. This guide is designed to help educators select appropriate technology for their adult literacy programs. It outlines a process for evaluating and selecting software and hardware, provides information regarding appropriate software titles, presents examples of software evaluation criteria, and highlights purchasing practices that can make scarce technology dollars go further. The nine steps of the technology evaluation process include the following: (1) identify software titles; (2) determine the hardware requirements of each piece of candidate software; (3) create an inventory of existing hardware; (4) obtain software preview copies; (5) determine evaluation criteria and conduct software evaluations; (6) determine how students will use the software and explore ways teachers can integrate the software into instruction; (7) compare existing hardware with the hardware requirements for each piece of candidate software; (8) determine the cost of software and hardware for each of the candidate packages; and (9) select a software package and its associated hardware. Four appendixes include software requirements and hardware inventory worksheets, a selected list of software publishers, a student evaluation of software form, and a software evaluation worksheet. (Contains 18 references.) (KC)



MAKING THE RIGHT CHOICE: EVALUATING COMPUTER SOFTWARE AND HARDWARE FOR ADULT LITERACY INSTRUCTION

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University of Pennsylvania

NCAL PRACTICE GUIDE PG95-04
NOVEMBER 1995

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The National Center on Adult Literacy (NCAL) was established in 1990 by the U.S. Department of Education, with co-funding from the Departments of Labor and Health and Human Services. The mission of NCAL addresses three primary challenges: (a) to enhance the knowledge base about adult literacy; (b) to improve the quality of research and development in the field; and (c) to ensure a strong, two-way relationship between research and practice. Through applied research and development and dissemination of the results to researchers, policymakers, and practitioners, NCAL seeks to improve the quality of adult literacy programs and services on a nationwide basis. NCAL serves as a major operating unit of the Literacy Research Center at the University of Pennsylvania.

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ABSTRACT

Selecting hardware and software is a complicated task, requiring careful attention to the integration of various computer models, software packages, and instructional objectives. Decisions surrounding the acquisition and maintenance of technology are further complicated by limited funding, expertise, information, and equipment. This guide is designed to help educators select appropriate technology for their adult literacy programs, given these constraints and difficulties. It outlines a process for evaluating and selecting software and hardware, provides information regarding appropriate software titles, presents examples of software evaluation criteria, and highlights purchasing practices that can make scarce technology dollars go further.

INTRODUCTION

For many adult literacy practitioners, purchasing hardware and software for instructional purposes is a painful process. The terminology is alien, the prices are often high, the choices are either far too extensive or far too limited, and buying is often driven by fiscal deadlines or funders' vagaries. Just as in the K–12 system, many multithousand dollar purchases become door stops or props for other materials stored in a resource cabinet. This guide is intended to help demystify the options and choices.

The first section of the guide addresses the connection between technology planning and hardware/software selection. Many programs purchase hardware and software before they have decided what role technology should play in their organization. Planning must precede technology selection, as this section emphasizes. The second section provides an overview of a nine-step technology selection process. Technology selection should include all stakeholders: administrators, instructors, and students. However, the selection process is primarily an information-gathering process—one that identifies software that will help meet student and program educational goals, matches software to existing hardware infrastructure and funding resources, and supports decision-making that is informed by research and practice. The third section contains a series of helpful hints regarding purchasing hardware and software. Several appendices supplement these sections with worksheets and contact information.

Technology selection is not a stand-alone process. It is part of the larger process of technology planning and information gathering. Accordingly, we recommend using this guide in conjunction with two other NCAL Practice Guides, *Technology Planning for Adult Literacy* (Hopey & Harvey-Morgan, 1995) and *Making Sense of Technology Terminology for Adult Literacy: A Glossary and Annotated Bibliography* (Donohoe, Campbell, Ciggs, Rethemeyer, & Hopey, 1995). These documents contain essential information on technology planning and technology terminology that you will need to make full use of this guide.

KNOWING WHAT YOU WANT BEFORE YOU BUY

As in other areas of adult literacy, the key to making good technology purchasing decisions is to have a firm grasp of what you wish to accomplish using technology. All too frequently, adult literacy organizations fail to consider thoroughly their educational goals and/or the needs of their student populations before purchasing hardware and software. It is necessary to embed hardware and software selection within a larger planning and evaluation process. Technology planning is an ongoing process used to identify educational goals

and objectives, technologies, methodologies for using these technologies with learners, and internal and external resources that may be leveraged to put these plans into use. The NCAL Practice Guide *Technology Planning for Adult Literacy* (Hopey & Harvey-Morgan, 1995) develops these themes in greater detail.

Technology selection proceeds once programs have determined a broad set of goals and objectives for their students and instructors. While technology selection ought to follow the goals and objectives identified in the planning process, it needs to focus on a different set of questions. In the early stages of technology planning, the emphasis is on what we want to accomplish. In technology selection, the emphasis is on how to accomplish these goals, what software and hardware products are available to help reach these goals, and whether these products work with the existing hardware infrastructure. If not, other resources must be identified in order to make the infrastructure capable of using these products.

The first issue in the technology selection process is not hardware but software. Ideally, adult literacy educators and administrators should attempt to select appropriate software packages before focusing on hardware issues, since the software (not the hardware) dictates educational content. Hardware such as computers is really nothing more than a delivery system for different types of software. One minute the computer can be a word processor, the next a movie screen by changing the software. Computer hardware has no inherent content. Only the software contains useful information that students can use.

Despite this fact, programs often focus on hardware first, letting their hardware determine what software and thus what content their students encounter. No literacy program would let the size or shape of their chalkboard limit their instructional options. Yet when literacy programs focus solely on hardware issues, they are essentially letting the chalkboard dictate the content—they permit the machine's capabilities to dictate software choices, content, and, ultimately, educational goals.

Most adult literacy programs must operate under less-than-ideal circumstances. All too often, "bottom-line" realities (limited funding, staff time, and expertise) affect software and hardware decisions, sometimes preventing literacy organizations from purchasing the "perfect" software package or placing software issues before hardware issues. We recognize these practical concerns and have tried to address these constraints in the approach outlined below. The nine-step process is designed to help you make software and hardware decisions that are both commensurate with your educational goals and objectives and "software-centered."

General Considerations Before Beginning

The successful integration of technology into adult literacy instruction depends on the careful selection of software and hardware appropriate to each individual adult literacy program. There is no one clearly superior software product—any piece of software can be effective if embedded in an appropriate

curriculum and surrounded with support materials (Sorge, Campbell, & Russell, 1993). Different populations require different kinds of software. For example, students who are trying to pass the GED exam would benefit from software that addresses the broad range of topics covered on the GED and "drills" them for the actual test. For students who need numeracy instruction, a more specific software package focusing on topics in math would be most useful. In fact, literacy programs may need a variety of software packages on the same subject to meet the needs of their various learners.

Before attempting to identify or purchase software or hardware, literacy programs also need to identify and address management concerns (Beattie & Preston, 1989). Such concerns are often critical to the eventual success of purchased software or hardware. Common management concerns are: Where will the technology be located? Which students will have access and when? Who will maintain the equipment and/or software? What type of ongoing staff and student training will be needed? Although these questions are not easily answered, they should be kept in mind throughout the technology evaluation, selection, and purchasing process.

THE STEP-BY-STEP PROCESS OF TECHNOLOGY EVALUATION

The nine steps listed below provide an overview of software and hardware selection and evaluation. This basic outline should help you sort through the countless software packages and computer systems now available.

Step 1:	Identify Software Titles
Step 2:	Determine the Hardware Requirements of Each Piece of Candidate Software
Step 3:	Create an Inventory of Existing Hardware
Step 4:	Obtain Software Preview Copies
Step 5:	Determine Evaluation Criteria and Conduct Software Evaluations
Step 6:	Determine How Students Will Use the Software and Explore Ways Teachers Can Integrate the Software Into Instruction
Step 7:	Compare Existing Hardware With the Hardware Requirements for Each Piece of Candidate Software
Step 8:	Determine the Cost of Software and Hardware for Each of the Candidate Packages
Step 9:	Select a Software Package and Its Associated Hardware

STEP 1: IDENTIFY SOFTWARE TITLES

Selecting software is not the first step in the process. The first step is creating a technology plan to guide the selection process. Once you have considered your educational goals through the technology planning process, you are now ready to begin compiling a list of potential software packages (Beattie & Preston, 1989).

Sivin-Kachala and Bialo (1992) have identified more than 1,451 adult literacy instructional software programs in reading, writing, math, and career guidance. It is impossible for any program to review comprehensively every piece of available software (even in a sub-area such as ESL or GED preparation). It is best to reduce the number of software packages available to 4–10, those that are likely to fit the program's educational goals and objectives.

As mentioned, this is primarily an information-gathering process. The choice of who will carry out this step is an important consideration, as this person will influence which pieces of software are evaluated throughout the rest of the process outlined below. Software and hardware evaluations need to respect multiple perspectives—those of students, instructors, administrators, and (if you are so blessed) lab technicians and support people. One way to start the process of soliciting different points of view is to involve representatives of those groups in this first step.

Once the person or persons who will be responsible for gathering information on software options are identified, it is necessary to identify information resources. Literacy providers have often commented on the lack of resources regarding software appropriate for adult literacy learners. Recently, state and federal agencies have invested in the creation of information resources on adult literacy software, though none are complete or always current. Below are a few recommended sources of information.

- *Software Guides:* Many software guides are published and updated annually. Most are not adult literacy specific, but they may still include a few relevant software titles. In the field of adult literacy, three guides are particularly useful:

  Software Buyers Guide
  Northwest Regional Literacy Resource Center
  1701 Broadway Street
  Seattle, WA 98122
  206-587-3880
  Price: $8.00

  Educational Software Preview Guide by the
  Educational Software Evaluation Consortium
  Computer Learning Foundation
  P.O. Box 60007
  Palo Alto, CA 94306-0007
  415-327-3347
  Price: $14.95 plus $1.00 shipping

National Center on Adult Literacy
Adult Literacy Software Database
(Electronic copy only—diskette)
3910 Chestnut Street
Philadelphia, PA 19104-3111
215-898-2100
Price: $7.00
(download free of charge from NCAL's Internet server at
http://ncal.literacy.upenn.edu)

- *Software Companies and Sales Representatives:* Many sales representatives can provide timely information about products and options. In order to use vendor representatives effectively, you must know how to ask questions that move the representative beyond her/his standard sales pitch. This requires homework, which too few purchasers do before contacting a vendor.
- *Software Reviews:* Many magazines, journals, and trade publications publish software reviews; these publications may be found in your local libraries or requested from hardware and software vendors.
- *Software Catalogs:* A number of companies serve as clearinghouses for educational software, including adult literacy software. These clearinghouses and large distributors usually publish catalogs that contain listings for several software companies. For instance, see the catalog issued by Educational Resources (800-624-2926) or the Educational Software Institute (800-955-5570).
- *Internet Resources:* Some software companies make software demonstration copies available on the Internet. You can also find software reviews in databases and on-line magazines. For instance, NCAL maintains a database of 250 products on its Internet-based World-Wide Web server at:
(URL: http://ncal.literacy.upenn.edu).
- *Other Literacy Programs:* Other literacy programs may be the best resource at your disposal. Most adult literacy organizations are willing to share their software lists with other literacy providers, and such lists are frequently the most valuable information available. You may want to contact several literacy providers who serve clients similar to yours, find out what software they are using, and then cross-reference the lists. The products that appear on two or more lists are probably worth reviewing.

Although software packages vary, many are categorized by vendors and reviewers according to content areas (reading, writing, math, etc.), instructional levels (ESL, GED, ABE, and ABE+), formats (drill and practice, tutorial, simulation, etc.), and price. When looking for a software package, it is best to begin the search by content area first, followed by instructional level and price.

This information-gathering process should not be a one-time affair. Ideally, instructors, administrators, and students should be constantly looking for new software packages. You should save information about these discoveries in a database or common folder so that you can easily access and consider them the next time you review potential software options.

After gathering information about software options from several sources, you will need to create a set of criteria to determine a package's eligibility for the next steps. These criteria will vary from program to program, but a few basics should always be considered:

- Are other literacy providers using the software?
- Will this package require an investment of time and money that the program could not possibly support?
- Does this software replicate the functions of other packages that the program already owns and finds useful?
- Are there other packages on the market that use a clearly superior design, educational methodology, and so forth?

Depending on the nature of the program, a committee or individual can make the final decision. Though informal, this step is crucial because it determines which software packages are reviewed in later steps. We will refer to the software selected to undergo the formal review process as *candidate* software.

STEP 2: DETERMINE THE HARDWARE REQUIREMENTS OF EACH PIECE OF CANDIDATE SOFTWARE

Once candidate software has been selected, each product's hardware requirements must be determined. The "Software Requirements Worksheet" in Appendix A maybe a helpful tool for this process. Additional information about the hardware requirements can generally be found on the software's packaging. It is also helpful to contact the publisher and request a product description. The following sections are discussions of elements that should be considered when determining hardware requirements.

COMPUTER

First, software/computer operating system compatibility must be determined. Most software runs on one type of computer operating system, though a few versions run on both Apple Macintosh™ and Microsoft Windows™ systems. Also, it is important to find out which version of the system software is needed. Many Macintosh™ programs require System 7.0 or higher. Programs written for IBM-compatible computers (also known generically as "PCs") usually require DOS version 5.0 or higher. Additionally, most PC software now requires Microsoft Windows™, the most commonly used version of which is still Version 3.1. Most adult literacy software requires Windows™ Version 3.1, though some will work with Version 3.0. In August 1995, Microsoft released the new version of Windows™, Windows 95™. Most existing literacy software is compatible with Windows 95™, though it will probably be a while before literacy software will require Windows 95™.

It is also necessary to know your computer's type of microprocessor. Some manufacturers recommend a certain model or type of microprocessor for their

products. For instance, Microsoft Windows™ 3.1 will operate on computers with an Intel 80386 or newer microprocessor; however, for most multimedia software the 80386 (or simply 386) processor is too slow, so publishers recommend using a computer with an 80486 or Pentium processor instead. Similarly, some Macintosh™ software will only run on newer models (i.e., Quadra, Performas, or PowerMacs). The publisher will usually alert you to these requirements.

You then must determine the amount of computer memory needed to run the program. Memory (also called RAM) refers to a computer's temporary storage capacity. The computer's memory stores the instructions used to execute a program. Memory is usually measured in megabytes (i.e., millions of bytes of information). The more memory a computer has, the larger the programs it can operate. Most literacy software requires at least 4 megabytes of RAM to operate; many multimedia packages require 8 or more megabytes of RAM.

Finally, you will need to determine how much hard disk space is required to install the program. The hard disk refers to a computer's permanent storage capacity (i.e., where program instructions are stored after installation from a floppy disk or CD-ROM). Hard disk storage space is also measured in megabytes, so it is easy to confuse hard disk storage requirements and memory requirements. If you are confused, call the publisher for more details.

MONITORS AND VIDEO ADAPTERS

The second most important unit in a computer system is the monitor. There are four generic types of monitors: monochrome (i.e., green, amber, or gray letters displayed against a black background), black and white, gray scale (i.e., able to display shades of gray rather than just black and white), and color. Most recently released software requires a color monitor.

Monitors, like televisions, are available in a number of sizes. Most software can be run on a monitor that is at least 13 inches diagonally, though some multimedia programs require 15-, 17-, or 21-inch screens. Monitors also come in different resolutions. Resolution refers to the number of dots (usually known as pixels) displayed horizontally and vertically across the screen. Many programs require that the monitor be able to display a certain number of horizontal and vertical pixels. Most programs will work on a monitor capable of displaying 640 x 480 pixels, though some programs require a resolution of 800 x 600 pixels or 1024 x 768 pixels. Some monitors can display differing resolutions, depending on the capabilities of the computer.

The quality and capability of a monitor does not totally determine the size and quality of the displayed image. The computer's video adapter also plays an important role. The video adapter turns data from the computer into an image on the screen. On Macintosh™ computers (except the Mac II models), the video adapter is built into the computer. It is usually necessary to buy a separate video adapter for PCs.

The video adapter controls two very important characteristics of the computer's monitor. First, the adapter can determine the resolution that the monitor can output. If the monitor can switch between, for example, 640 x 480 and 800 x 600, the capabilities of the adapter will determine the resolution. The

video adapter also controls the number of colors a monitor can display simultaneously on the screen. This measure of simultaneously displayed colors is known as color depth. The more colors a monitor can simultaneously display, the more lifelike the pictures and graphics will appear. Most software programs require a color depth of 256 simultaneous colors, though some older DOS programs require only 16 colors.

Most Macintosh™ software publishers list the necessary monitor size and color capacity on the software packaging. IBM-compatible software publishers usually state this information by referring to one of three or four video graphics standards. The most common standards are EGA, VGA, SVGA, and XGA. Most manufacturers will state on the package "requires SVGA graphics," or something to that effect.

SOUND

Software developers are increasingly using digitized audio to enhance their products. This does not pose a problem for Apple Macintosh™ users because all Macintosh™ computers include sound capability and built-in speakers (newer Macs also include plug-in ports for headphones or mini-speakers). For IBM-compatible computers, however, it is usually necessary to install a "sound board" (i.e., a computer expansion card that holds the circuitry necessary to turn electronic signals into sounds). Be sure to note which type of sound board the software publisher recommends. The most commonly used sound board in the IBM-compatible world is the SoundBlaster™ line from Creative Labs.

Some programs also require the ability to store and manipulate sounds on the computer. For instance, some ESL software packages allow the user to speak into a microphone and then play back what was just said. Be sure to note whether sound input is necessary. Most Macs built after 1990 include sound input capabilities. Some SoundBlaster™ cards also include this capability, though cards with sound input are usually more expensive than ones only offering sound output.

PERIPHERALS

A wide range of devices can be attached to the computer to enhance or extend its capabilities; these are called peripherals. The most widely used peripheral, besides printers, is the CD-ROM drive. CD-ROM discs are used to store multimedia software. Many of the newest and best software programs can only be run on a CD-ROM drive. Another popular (though expensive) device is the videodisc player. Videodiscs are essentially large CD-ROM discs. Because they can store more information than a CD, videodiscs are usually used to deliver programs and content that include large digitized "movies" (i.e., 5-30 minutes of video). Several integrated learning systems (ILSs) use videodisc players. Other peripherals include writing tablets (i.e., devices that allow one to draw electronically), optical scanners, electronic networks, and bar code readers. In some cases, software publishers will "bundle" their software with the required peripherals (this is especially true of software using bar code readers).

OTHER REQUIREMENTS

There are a number of other special devices or boards that a computer program might require. For instance, some software packages need a

connection to the Internet or a joystick. Be sure to review information thoroughly regarding the software and to note any special requirements.

STEP 3: CREATE AN INVENTORY OF EXISTING HARDWARE

The next step is to assess the capabilities of existing hardware. Unless you have a very large budget with which to purchase hardware, you will need to find ways to use some of your existing hardware to run the software you choose. Creating an inventory of current hardware will allow you to estimate how much you will need to spend on hardware in order to use a given piece of candidate software. The "Hardware Inventory Worksheet" in Appendix A is designed to help develop an inventory of existing hardware. This worksheet could be set up in a database program, allowing for updates as you buy new or discard old equipment. Many of the categories are the same as in the "Software Requirements Worksheet," so be sure to review that section first. For each of the worksheet sections, note a serial number or some other form of identification for each piece of equipment. Below are some important points about each section of the worksheet.

COMPUTERS

The capabilities of a computer can be effectively assessed by determining what type of microprocessor the computer uses. Apple Macintosh™ computers use either a Motorola 68000 series microprocessor or a PowerPC microprocessor. You may want to note the model name of all the Macintosh™ computers you own, as some Mac-compatible software packages refer only to the model name. IBM-compatible computers use one of the Intel 80x86 series (the "Pentium" was originally the "80586"). To determine the type of microprocessor that a computer has, consult one of the following:

- The computer's manual
- A computer reference book (for instance, PC Magazine's *PC Magazine 1995 Computer Buyer's Guide*)
- The manufacturer's help/technical support hotline (be sure to have the model number/name handy)

Each microprocessor also has its model number printed on it. You can find the microprocessor's model number by opening the computer's case and searching for a large, square chip that has the Intel or Motorola name and/or logo on it. The type-of-computer chart included in the worksheet lists the types of microprocessors from the least to the most powerful.

Next, determine the amount of memory and the size of the hard disk you have in each computer. On Macintosh™ computers, you can discover the amount of available memory by selecting the "About This Macintosh..." command in the "Apple" menu. The amount of RAM will be displayed in kilobytes next to either the line "Built-In Memory" (if you are using virtual memory) or "Total Memory" (if you are not using virtual memory).* You can

find the size of the hard disk on a Macintosh™ by double clicking on the hard drive icon and then choosing the "by Icon" command from the "View" menu. You will find two numbers at the top of the hard drive's window. Add the "in disk" and the "available" numbers to determine the size of the hard drive.

On IBM-compatible computers, you can find the amount of installed memory by going into DOS, typing "mem" at the command prompt, and hitting the "return" key. To display the size of the hard drive, type "fdisk/status" at the command prompt and hit the "return" key. (NOTE: Be EXTREMELY careful when using the "fdisk" command, as fdisk is used to format your hard drive. Do not leave off the "/status" switch when using fdisk to determine the size of your hard drive.)

Next, you need to determine what type of video graphics adapter you have. The video graphics adapter is built-in on Macintosh™ computers, so you need not fill in this entry. On PCs, the types of graphics cards are listed on the worksheet. To discover what type of video graphics adapter you have, consult either the computer manual, the video graphics adapter card's manual, or the computer or card's manufacturer. If you have Windows™ 3.1 installed, see which video driver is selected in the "Control Panels." (Control Panels are found in the "Main" program group.)

Next, note whether or not the computer has a sound capability. On Macintosh™ computers, sound capability is built-in. On PCs, you will need to see if a sound card has been installed or whether a sound capability was built into the computer. In general, if you hear a "tada" sound when Windows™ 3.1 starts, your computer has sound capability. Again, the best way to determine the capabilities of your computer is to read the manual or to call the computer's manufacturer.

Finally, you may want to note the repair record of each computer. It is not worth using an old computer if it spends three weeks in the repair shop every few months. It is often cheaper to replace a balky computer than to repair it.

MONITORS

In general, a monitor's most important characteristics are its type (i.e., EGA, VGA, SVGA, XGA), size, and resolution. You can directly measure size, but you must look up the other characteristics. Sometimes monitors include such information on the back or bottom of the monitor; otherwise, you will have to review the manual or call the manufacturer.

PERIPHERALS

The list of peripherals on the worksheet is not exhaustive, but it includes the most popular add-ons. Be sure to note the compatibility of each device. For instance, you may use many CD-ROM drives with both IBMs and Macs if you have the right cables and driver software. Modems, scanners, speakers, and

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* If you see the phrase "Built-In Memory" above the phrase "Total Memory," the correct amount of RAM is the one listed next to "Built-In Memory."

some printers also work with both types of computers. Completing an inventory from scratch can be a very time-consuming process, but it is absolutely essential if you hope to make good software and hardware decisions—both now and in the future.

STEP 4: OBTAIN SOFTWARE PREVIEW COPIES

The best evaluative information comes from a firsthand examination of a software package (Beattie & Preston, 1989), therefore, the next step is to obtain preview copies of candidate software. Many vendors and dealers have a 30-day preview policy, which allows potential customers to review the actual software packages before they purchase a copy. (See Appendix B for preview policy and publisher information.) While a few software companies are reluctant to give out preview copies, many vendors offer at least a demonstration copy (i.e., a copy of the software that either does not have all the features of the purchase version, will work for only a specified period of time, or contains only "slides" showing what the full version looks like).

If the vendor only offers a demonstration copy, then we recommend that you contact and/or visit sites where the software is installed. In either case, you need to talk to other users of the candidate software package. Most sales representatives will supply the names and phone numbers of customers. It is also important when talking to other customers to identify similar programs for comparison; ideally, a correctional facility should talk to staff at another correctional facility about the same product.

One general word of warning: Never purchase on the basis of a vendor demonstration alone (Turner, 1993). Demonstration software cannot provide the in-depth information needed for a major purchasing decision. If you can only get a demonstration copy, talk to the vendor again or go to a software demonstration center to preview the candidate package. Many vendors will also point you to a local demonstration center that lends preview copies for short periods of time or has computers with the software installed for in-depth previews. Demonstration centers are usually located at universities, community colleges and sometimes at school districts, state agencies, or state literacy resources centers (SLRCs).

STEP 5: DETERMINE EVALUATION CRITERIA AND CONDUCT SOFTWARE EVALUATIONS

Once you have obtained preview copies, you should thoroughly evaluate and test the candidate software packages to assess their quality and appropriateness. It is wise to involve as many people as possible (especially students and teachers) in this evaluative process. Our experience indicates that students' and instructors' perspectives on the value and usefulness of a piece of software are very useful.

The first step is to determine evaluation criteria that everyone in your organization is comfortable using. There is no one set of "correct" evaluation criteria. Each program needs to create a set of criteria that are commensurate with its technology plan and the educational goals and objectives established in

that plan. The questions listed below suggest a few issues that need to be addressed in an evaluation process. This list is not prescriptive, however; only you can decide which ones belong in your program's process.

The software evaluation process usually begins with a cursory review of the candidate software (Anderson, 1991; Turner, 1993). Consider the following issues:

- Is the product appropriate for the student population?
- Is the content appropriate for the adult learner?
- How much computer experience would a student need to operate the program?
- Are screen displays easy to understand, informative and uncluttered?
- Can students easily enter and exit the software program?

After the initial review, consider testing the software with students. Student previews can generate important information about the quality and effectiveness of a software package (Beattie & Preston, 1989). We recommend that you allow two or more students to use the candidate software for at least one hour and test it. Such tests should be as realistic as possible—if the software is to be used in a lab while others are working, the test should be held in an actively used lab. Sivin-Kachala and Bialo (1992) suggest that teachers observe students testing the candidate software and focus on the following questions:

- Is the candidate software easy for students to use?
- Can students proceed without confusion or frustration?
- Do students seem motivated by the candidate software package?
- How much did the instructor/lab manager need to intervene in order for students to use the package successfully?

Student testing should end with a more summative but informal evaluation. A student summative evaluation should not typically address the issue of learning outcomes but instead should focus on students' reactions to and feelings about the program. We have included a student evaluation worksheet in Appendix C. Student summative evaluations should answer the following questions (Harvey-Morgan, Hopey, & Rethemeyer, 1994):

- Do you think this program helped improve your skills?
- What did you like most about using this program?
- What did you like least about this program?
- How do you feel about using a computer for learning new skills?
- Would you recommend using this program to a friend?
- Do you think this program is too hard, too easy, or just right?
- Do you have any suggestions about how we could make this program better?

Finally, you should conclude the software evaluation process with a more in-depth evaluation of the software. At this point, administrators and teachers should construct a software evaluation instrument appropriate to their needs. Evaluation instruments vary greatly and are available from many different sources. The criteria will vary according to software instructional types, the needs of students, teachers, and the program. Included with this Guide are several model evaluation instruments (see Appendix C & Appendix D). We recommend that you use these as models, but not as ready-to-use instruments, for they are not tailored to any given literacy program or context. The best instrument will be the one you design in cooperation with your own instructors and students. The following areas should be considered as you develop evaluation criteria:

Content Questions: Content questions relate to instructional objectives, appropriateness and accuracy of materials, exercises, graphics, and situations relevant to adult learners (Anderson, 1991; Askov & Clark, 1991; Bender, 1987; Gonce-Winder & Walbesser, 1987; Harvey-Morgan et al., 1994; Power On, 1989; Schueckler & Shuell, 1989; Sorge et al., 1993; Turner 1988a, 1988b, 1993). Questions might include the following:

- Is the content relevant to adults?
- Are the exercises appropriate?
- Is the exercise frequency adequate?
- Are directions clear?
- Is the feedback helpful?
- Does the program provide a final evaluation of the learner's performance?
- Is the type and placement of requested response clear?

Instructional Questions: Instructional questions should relate to the curriculum and the assessment of student performance, and they should adhere to sound educational techniques and theories (Anderson, 1991; Askov & Clark, 1991; Bender, 1987; Gonce-Winder & Walbesser, 1987; Harvey-Morgan et al., 1994; Miller-Parker, 1993; Power On, 1989; Schueckler & Shuell, 1989; Sorge et al., 1993; Turner 1988a, 1988b, 1993). Questions might include the following:

- Is the instruction organized from general to specific?
- Are there enough explanatory exercises and examples?
- Do visual cues clarify major concepts?
- Are there different learning opportunities for different ability levels?
- Do the graphics, photos, and/or video enhance the instruction?
- Does the program provide a pretest? If so, what test?
- Does the program provide a posttest? If so, what test?
- Are the tests easy to administer and score?
- Can the instructor easily assess student assessment data?
- Can students easily access their own assessment data?

- Does the program adequately assess and evaluate student progress?

Operation and Design Questions: Operation and design questions refer to the ease of operation, the level of user control, and the use of multimedia (sound, graphics, and digitized video) (Anderson, 1991; Bender, 1987; Gonce-Winder & Walbesser, 1987; Harvey-Morgan et al., 1994; Power On, 1989; Schueckler & Shuell, 1989; Sorge et al., 1993). Questions could include the following:

- Is the software easy to operate?
- Are the options, menus, and choices readily available?
- Can the learner control the display time?
- Are mouse exercise directions adequate?
- Is it possible to move easily within the software?
- Are the program exits obvious at all times?
- Is the screen layout pleasing?
- Are instructions provided in areas separate from text?
- Is color used effectively?
- Do the mouse exercises require dexterity appropriate to students' ability?
- Do the screens contain an amount of text appropriate to students' reading ability?
- Is the reading level appropriate?
- Does the software teach important reading comprehension skills?
- Are procedures for enrolling new students clear and easy?
- Is student progress easily tracked?
- Is student progress slowed by unnecessary multimedia effects?
- Can students choose to access audio and visuals on an as-needed basis?
- Is audio used appropriately, given students' reading level?

Remember to bring others (students and teachers) into the software selection process and to come up with selection criteria that everyone is comfortable using. Software evaluation is a process of consensus; students and teachers will more readily use software that they have helped to select. By taking into account student evaluations and conducting in-depth software evaluations, you will better see the instructional potential of particular candidate software packages.

Step 6: Determine How Students Will Use the Software and Explore Ways Teachers Can Integrate the Software Into Instruction

At this point, take some time to envision how your students and instructors would actually use the candidate software packages. Literacy programs often buy software that they think only a few students will use, only to discover that their instructors want all their students to use it. For each package, determine

how many computers you need in order to use the software effectively. Then ask the questions that Turner (1993) recommends:

- How does the technology purchased fit into the curriculum design?
- Will you add the technology to a preexisting curriculum or will the technology curriculum subsume present instruction?
- Who will attend to the integration (of technology) and curriculum design?

Turner (1993) argues that integrating new technology into an existing program brings unique challenges. While integrating technology into the K–12 curriculum is the subject of numerous books and articles, there is less of a knowledge base in adult literacy. Although the issues are similar to K–12, they are not identical. Often a formal curriculum does not exist in adult literacy programs, and technology presents an opportunity to provide more flexibility and learner control (Turner, 1993). In other instances and depending upon the teacher and philosophy espoused by a literacy program, the degree to which a standardized curriculum and technology can be integrated is a major question to ask vendors and other literacy programs that use the candidate software packages.

A second crucial concern is the level of staff expertise in and comfort with technology. While integrating technology into the curriculum requires a consensus among literacy providers about the role that technology will play, many teachers are simply not comfortable using computers. Many instructors feel intimidated by computers and have never considered how they could be used effectively. Again, the need for a good technology plan is apparent. Technology planning will help determine what training is needed and what types of technology expertise must be acquired.

In many cases, training can help break down resistance to the implementation of new software and hardware. Many vendors have realized this and include staff training as part of the software package. In fact, some literacy programs find that the best reason for purchasing technology is the staff development/education offered by the vendors (Turner, 1993). Trainers can actually help resolve a myriad of staffing and curriculum issues by simply showing staff how to use technology to access information and materials not previously available to them by traditional means (Hopey & Harvey-Morgan, 1995).

If training is not included in the software package, it is essential to determine how much and what type of training is necessary to make the application of technology successful. The crucial questions are: How much training (time) is needed to use the candidate software package effectively in instruction? Who can do the training (other staff or vendors)? How much will the training cost (i.e., dollars and staff time)?

Step 7: Compare Existing Hardware With the Hardware Requirements for Each Piece of Candidate Software

Now that you have selected software that you would like to use, know the capabilities of existing hardware, and have determined the number of learner stations needed to make a given piece of candidate software effective, you are ready to make decisions and purchase hardware. At this point, think creatively about your computers and needs. Most computers sold today are modular, so it is possible to pull a video graphics adapter out of one computer and use it in another or to borrow memory from an old computer to make a newer one more useful. Think of your current hardware as pieces of a puzzle that you can fit together in different ways in order to use a piece of software. The puzzle will be different for each piece of candidate software. One package may require an investment in CD-ROM drives while another requires more memory than a computer currently has. You will need to go through this exercise for each piece of candidate software.

Once the puzzle has been pieced together, you should be able to see gaps in the existing hardware. These gaps will need to be filled with new purchases if you choose this candidate software package. In some cases, you will discover that your only option is to buy new computers. In others, it may be possible to upgrade current computers or add a peripheral. In still others, it may be possible to "cannibalize" parts to create enough user stations to make the software workable. In any case, develop a list of hardware needed to run candidate software.

Step 8: Determine the Cost of Software and Hardware for Each of the Candidate Packages

At this point, you should be able to develop a "bottom-line" estimate for each candidate package. The bottom-line estimate should include the cost of the software and hardware for all of the student stations. For this part of the process, a rough estimate of the costs for the necessary computers, peripherals, and expansion boards should be generated. This information can be obtained by scanning mail-order catalogs, interviewing local dealers, or reviewing past purchases.

When estimating costs (especially for hardware), consider ongoing service needs. For example, you should determine who will repair the equipment and determine whether or not there is a maintenance agreement. Occasionally, maintenance agreements are signed by literacy providers unaware that they could have had access to repair services provided by their local school district or community college (Turner, 1993).

Ongoing maintenance needs to be factored into the costs. Too often, a literacy program will finance the initial purchase but fail to include the costs of maintenance, resulting in computers that sit idle and frustrate instructors and learners.

STEP 9: SELECT A SOFTWARE PACKAGE AND ITS ASSOCIATED HARDWARE

Having completed the previous steps, you are now ready to choose a software package. Since the majority of the work has already been accomplished, choosing a software package at this point only requires making comparisons between candidate packages. This requires understanding the trade-offs and pros and cons of a particular package as compared to another. Common trade-offs can involve hardware issues such as computer processing speed versus computer sound and graphics. They can involve instructional issues such as the need for specific instructional content for particular students versus the need to choose a more general software package that many students can use. The tradeoff process is also a balancing act, where you are trying to balance the instructional objectives set forth in a technology plan and the desire of teachers and students to use a satisfactory software package. What may appeal to the emotional and personal desires of students or instructors may not satisfactorily meet the sound instructional objectives of the organization. The tradeoffs are numerous but the software choice should be based upon the fit between a candidate software package and the organization's goals, taking into account the cost of the software package, training required to use the software, and the amount of time and money required to update and maintain the software. It is also important to be realistic and question whether your organization has the resources on hand or could find them from other places (i.e., grants, in-kind services, etc.) for a given candidate package and its associated hardware. Taking the easy or inexpensive route is not always the best. Your technology and fund-raising plans should help you decide what you realistically can spend on a software/hardware solution (for more information on technology fund-raising, see the NCAL Practitioner Guide *Funding Technology in Adult Literacy*, Hopey & Harvey-Morgan, 1995).

The best way to complete the software selection process is to list both the benefits and disadvantages of candidate software packages, including issues like cost, hardware required, ratings from the review criteria, comments from other programs, and the feelings and professional judgments of students and staff. Then, by a process of elimination, compare and contrast the packages, whittling down the list to one package that everyone is comfortable with.

Ultimately, the final selection should not be driven by either hardware or software, but by your organization's educational objectives and the comments, feelings, and judgments of staff and students. Properly chosen software should complement and contribute to the instructional and learning needs of adult learners. Only at the end of the process does the actual purchase of hardware enter the picture. However, these steps will help you consider the existing infrastructure in planning for your future use of technology. Having decided on a package, it is time to think about buying software and hardware in a cost-effective and wise fashion.

THE PURCHASING PROCESS

Once you decide what to purchase, develop a set of strategies for purchasing your selections at the lowest possible cost. The first thing to realize about purchasing technology is that there is never a perfect time to buy. Inevitably a new, improved, and less expensive piece of hardware or software will be released within weeks of your purchase. It is also inevitable that large manufacturers will announce new products that are supposed to "revolutionize" computing and then delay the actual release of the product for months. We know of several literacy programs that waited to buy computers for more than a year because they wanted Windows 95™, which Microsoft said would be available in the fall of 1994 but did not deliver until August 1995. During that year, students lost the opportunities that computer-enhanced instruction might have afforded them. Waiting for the perfect time to buy is futile.

There are several different types of vendors that sell hardware. The most familiar is the local computer store. Buying from local merchants can be a good strategy, because locals often provide prompt technical support and delivery. Patronizing a local computer store may also lead to donations of in-kind services or equipment. The major drawback is that local computer retailers are usually 10–25% more expensive than other vendors.

Another common option is purchasing via mail-order. Mail-order houses are usually less expensive, and delivery is usually prompt. Many mail-order vendors offer one-stop shopping: You can buy the computer, peripherals, and software all from one vendor. The danger with mail-order vendors is that you cannot be sure that the vendor will deliver what was promised, when promised, and in working order. Be sure to check a mail-order house's reputation with people who have used it before. Also, magazines like *PC Week*, *MacWeek*, and *PC Magazine* often rate mail-order houses. The largest mail-order vendors are MacWarehouse and MacConnection for Macintosh™ hardware/software and MicroWarehouse and PC Connection for PC hardware/software.

Another option is buying from large warehouse stores (e.g., Sam's, BJ's, or Price Club). These stores sell computers at a substantial discount over retail outlets. If you choose this option, you will need to visit these stores regularly to know when they have a particular model in stock, as they do not keep regular inventory levels. More recently, large computer "superstores" (e.g., CompUSA and ComputerCity) have offered very competitive pricing. Some appliance superstores (e.g., Silo and Circuit City) now carry computers as well.

A final option is to form a technology purchasing consortium and buy directly from the manufacturer. Many groups and organizations have been able to save 10–25% by buying in bulk. It may be possible to consolidate an order with others in the area in order to get a large discount. Also, check with your local computer users groups to see if they have discount options. Many vendors offer discounts (up to 10–25%) to nonprofit educational organizations. You may also be eligible for government pricing, if your organization relies

primarily on federal funds. Make sure to ask for the discounts before you buy; vendors will not volunteer such discounts unless they are requested.

The return and warranty policies of vendors should also be examined. Most reputable vendors will allow returns up to 30 days (though they may charge a small re-stocking fee) and provide a warranty for all components for at least one year. Also, ask for information on extended warranties, which often cost less than having the computer repaired locally and may offer a faster turn-around on damaged items.

It is important to research the existence and availability of technical support services. Some local vendors repair machines and/or provide basic technical support while other vendors offer only telephone support. When telephone support is offered, call the tech hotline before you buy the software or hardware to see how rapidly they respond and (if possible) to test the depth and range of knowledge of those handling technical support for the company.

You may want to ask the vendor to set up your system (especially complicated DOS/Windows multimedia machines). This will make your life much easier and decrease the possibility of costly equipment failures. Many vendors now offer bundled systems of hardware and software, which often saves hundreds or even thousands of dollars. Remember to compare cost differences between systems with and without bundled software. Sometimes the bundled software is not what you need, and it increases the price considerably.

Finally, read the fine print. Often, the advertised price is ultimately not the price that you will pay for the complete system. Monitors, speakers, sound boards, and keyboards (on Mac systems) are usually extras. Also watch out for hidden costs such as shipping and handling costs, installation costs, and so forth.

CONCLUSION

The software and hardware evaluation process should be relatively straightforward as long as program goals and student needs are clearly articulated. Making good technology decisions means planning for technology. The process of technology selection can be anxiety ridden due to the belief that a specialized body of knowledge is required and that the process is somewhat esoteric and doomed from the outset (Turner, 1993). Although it is helpful to know technology, it changes so rapidly that no one can be certain of having all the information. Choices and decision-making risks are minimized by establishing goals, previewing software, using evaluation criteria with which you are comfortable, involving staff and students in the decision-making process, and using common sense.

REFERENCES

Anderson, J. (1991). *Technology ard adult literacy.* New York: Routledge.

Askov, E. N., & Clark, C. J. (1991). Using computers in adult literacy instruction. *Journal of Reading, 34*(6), 434-48.

Beattie, E., & Preston, N. (1989). *Selecting microcomputer courseware.* ERIC Digest. Syracuse, NY: ERIC Clearinghouse on Information Resources. (ERIC Document Reproduction Service No. ED 315 062)

Bender, E. (1987). *Evaluation of educational microcomputer courseware/software: A content analysis of published reviews.* Paper presented at the Annual Convention of the Association for Educational Communications and Technology (Atlanta, GA, Feb 26-Mar 1, 1987). (ERIC Document Reproduction Service No. ED 285527)

Donohoe, A., Campbell, J., Ciggs, C., Rethemeyer, R. K., & Hopey, C. E. (1995). *Making sense of technology terminology for adult literacy. A glossary and annotated bibliography* (Practice Guide No. PG95-01). Philadelphia: University of Pennsylvania, National Center on Adult Literacy.

Gonce-Winder, C., & Walbesser, H. (1987). Toward quality software. *Contemporary Educational Psychology 12*, 261-268

Harvey-Morgan, J., Hopey, C. E., & Rethemeyer, R. K. (Eds.). (1994). *Technology: New tools for adult literacy* [Videoconference Participant Materials] (Practice Report No. PR94-01). Philadelphia: University of Pennsylvania, National Center on Adult Literacy.

Hopey, C. E., & Harvey-Morgan, J. (1995). *Technology planning for adult literacy* (Practice Guide No. PG95-02). Philadelphia: University of Pennsylvania, National Center on Adult Literacy.

Hopey, C. E., & Harvey-Morgan, J. (1995). *Funding technology in adult literacy* (Practice Guide No. PG95-03). Philadelphia: University of Pennsylvania, National Center on Adult Literacy.

Miller-Parker, D. (1993). *Instructional technology resource guide for staff development.* Washington, DC: U.S. Department of Education, Division of Adult Education and Literacy, Clearinghouse on Adult Education and Literacy.

Northwest Regional Literacy Resource Center. (1993). *Software buyers guide.* Seattle, WA: Author.

Power on! New tools for teaching and learning. (1988). Office of Technology Assessment, Congress of the United States.

Schueckler, L., & Shuell, T. (1989). A comparison of software evaluation forms and reviews. *Journal of Educational Computing Research 5*(1), 17-33.

Sivin-Kachala, J. P., & Bialo, E. R. (1992, June). *Software for adult literacy: Scope, suitability, available sources of information, and implications for federal policy.* Contractor report prepared for the Office of Technology Assessment, Congress of the United States.

Sorge, D., Campbell, J., & Russell, J. (1993). Evaluating interactive video: Software and hardware. *Tech Trends* (April/May), 19-26.

Turner, T. C. (1988a). Using the computer for adult literacy instruction. *Journal of Reading 31*(7), 643-647.

Turner, T. C. (1988b). An overview of computers in adult literacy programs. *Lifelong Learning 11*(8), 9-12.

Turner, T. C. (1993). *Literacy and machines: An overview of the use of technology in adult literacy programs* (Technical Report No. TR93-3). Philadelphia: University of Pennsylvania, National Center on Adult Literacy. (ERIC Document Reproduction Service No. ED 356408)

APPENDIX A SOFTWARE REQUIREMENTS WORKSHEET AND HARDWARE INVENTORY WORKSHEET

SOFTWARE _____

COMPUTER TYPE

_____ Apple II

_____ Apple Macintosh™ w/System 6

_____ Apple Macintosh™ w/System 7

_____ IBM-compatible DOS

_____ IBM-compatible w/Microsoft Windows™3.0

_____ IBM-compatible w/Microsoft Windows™3.1

_____ IBM-compatible w/Microsoft Windows95™

_____ Other (specify) _____

_____ Does the manufacturer recommend a certain model or type of microprocessor? If so, specify which model or microprocessor: _____

_____ Memory required (kilobytes or megabytes):

_____ Space on hard drive required (kilobytes or megabytes):

MONITORS & VIDEO ADAPTERS

Type of monitor needed:	IBM-compatible: Type of video adapter
_____ Monochrome	_____ Hercules
_____ Black & White	_____ EGA
_____ Gray scale	_____ VGA
_____ Color	_____ SVGA
_____ Size (diagonal inches)	_____ XGA

Resolution (pixels x pixels) _____ x _____

Macintosh™: Number of colors required _____

SOUND

Is sound capability required? _____ Yes _____ No

IBM-compatible: What type of sound card is needed? _____

_____

_____

Are speakers or headphones required? Yes _____ No _____

Does the software require a voice recording capability? Yes _____ No _____

PERIPHERALS REQUIRED

CD-ROM _____

Videodisc _____

Writing Tablet _____

Scanner _____

Multiple _____

Modem _____

Electronic _____

Bar-Code _____

Other _____

OTHER HARDWARE REQUIREMENTS

_____

_____

_____

_____

_____

_____

_____

HARDWARE

COMPUTERS

Serial Number	Type of Computer: (by ID# *)	Memory (in Mb)	Hard Drive Space (in Mb)	Type of Graphics Adapter	Sound Capability (if PC, type of card)

**Note*: ID# refers to numbers found on the chart below.

Total Number of Macintosh™ Computers _____

Total Number of IBM-Compatible Computers _____

ID# *	Type of Computer
1	Apple II, II+, IIe, IIgs
2	Apple Macintosh™ w/68000
3	Apple Macintosh™ w/68020
4	Apple Macintosh™ w/68030
5	Apple Macintosh™ w/68040
6	Apple Macintosh™ w/PowerPC
7	IBM-compatible w/8086
8	IBM-compatible w/80286
9	IBM-compatible w/80386
10	IBM-compatible w/80486
11	IBM-compatible w/Pentium
12	Other (specify)

Type of Graphics Adapters
Hercules
EGA (External Graphics Array)
CGA (Color Graphics Array)
VGA (Video Graphics Array)
SVGA (Super Video Graphics Array)
XGA (Extended Graphics Array)

MONITORS

Serial Number	Type (by ID #)	Size (in inches)	Resolution(s) (pixel x pixel)	Compatibility (Mac, PC, both)

ID#	Type
1	Monochrome
2	Black & White
3	Gray scale
4	Color

OTHER PERIPHERALS

Type of Device	Number	Compatibility (Mac or PC, or both)
Printer		
CD-ROM		
Videodisc Player		
Writing Tablet		
Scanner		
Multiple Monitors		
Modem		
Electronic Network		
Bar-Code Reader		
Speakers		
Headphones		

OTHER HARDWARE

APPENDIX B SELECTION OF CURRENT SOFTWARE PUBLISHERS

Academic Hallmarks
P.O. Box 998
Durango, CO 81301
303-247-8738
Preview Policy: *Software available for preview.*

Aldus Corporation
9770 Carroll Center Road Suite J
San Diego, CA 92126
619-628-2320
Preview Policy: *Contact company.*

Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014
800-776-2333
Preview Policy: *Contact company.*

Aquarius Instructional
P.O. Box 128
Indian Rocks Beach, FL 34635
800-338-2644
Preview Policy: *Will send preview copies on demand.*

Aztec Software
Box 863 24 Tulip Street
Summit, NJ 07901
908-740-0470
Preview Policy: *Contact company.*

Broderbund Software
P.O. Box 6125
Novato, CA 94948-6125
800-521-6263
Preview Policy: *Contact company.*

CALI, Inc.
734 E. Utah Valley Drive
Building 1, Suite 200
American Fork, UT 84003
801-756-1011
Preview Policy: *Contact company.*

Center for Rehabilitation Technology, Inc.
Georgia Institute of Technology (Tesco)
490 Tenth Street
Atlanta, GA 30332-0156
800-457-9555
Preview Policy: *Contact company.*

Claris Corporation
Box 58168
Santa Clara, CA 95052
800-325-2747
Preview Policy: *Contact company.*

Compton's NewMedia
2320 Camino Vida Roble
Carlsbad, CA 92009-1504
619-929-2500
Preview Policy: *Contact company.*

Computer Curriculum Corporation
1287 Lawrence Station Road
Sunnyvale, CA 94089
800-227-8324
Preview Policy: *Contact company.*

Condrey Software
P.O. Box 6067
Irvine, CA 92716
714-854-3096
Preview Policy: *30 days; need to send a letter on official letterhead.*

Conover Company Ltd.
P.O. Box 1555
Omro, WI 54936
800-933-1933
Preview Policy: *Contact company.*

Contemporary Books
Department AB94
Two Prudential Plaza, Suite 1200
180 North Stetson Avenue
Chicago, IL 60601-6790
800-621-1918
Preview Policy: *Contact company.*

Curriculum Associates, Inc.
5 Esquire Road
North Billerica, MA 01862
508-667-8000
Preview Policy: *Preview for 30 days.*

Cyan, Inc.
P.O. Box 28096
Spokane, WA 99228
509-468-0807
Preview Policy: *No central preview policy.*

Davidson & Associates
P.O. Box 2961
Torrance , CA 90505
800-545-7677
Preview Policy: *Contact company.*

Discis Knowledge Research, Inc
P.O. Box 66
Buffalo, NY 14223-0066
416-250-6537
Preview Policy: *Contact company.*

Educational Activities, Inc.
P.O. Box 392
Freeport, NY 11520
800-645-3739
Preview Policy: *Preview for 30 days when requested in writing.*

Educational Developmental Laboratories Inc. (EDL)
P.O. Box 210726
Columbia, S.C. 29221
803-781-4040
Preview Policy: *Demo software available.*

EduQuest - IBM
101 Union Street
Plymouth, MI 48170
800-426-4338
Preview Policy: *Contact company.*

Electronic Arts
P.O. Box 7530
San Mateo, CA 94403
800-245-4525
Preview Policy: *Contact company.*

Fairfield Language Technologies
122 South Main Street--Suite 400
Harrisonburg, VA 22801
800-788-0822
Preview Policy: *Contact company.*

Franklin Learning Resources
Education Division
122 Burrs Road
Mt. Holly, NJ 08060-9913
800-525-9673
Preview Policy: *Contact company.*

Glencoe Macmillan/MacGraw-Hill
936 Eastwind Drive
Westerville, OH 43081
800-334-7344
Preview Policy: *Contact company.*

Great Wave Software
5353 Scotts Valley Drive
Scotts Valley, CA 95066
408-438-1990
Preview Policy: *Preview for 30 days; request must be made on program letterhead; request must be accompanied by a payment instrument.*

HEC Software Inc.
3471 South 550 West
Bountiful, UT 84010
801-295-7054
Preview Policy: *Request for new version of software must be in writing.*

Houghton Mifflin Company
One Memorial Drive
Cambridge, MA 02142
617-351-5490
Preview Policy: *Provide preview copies for thirty days.*

Humanities Software, Inc.
408 Columbia Street, Suite 222
P.O. Box 950
Hood River, OR 97031
800-245-6737, ext. 19
Preview Policy: *Demo disks available for preview; may preview software by sending request with a payment instrument.*

Hyperglot Software Company
P.O. Box 10746
Knoxville, TN 37939-0746
615-558-8270
x115
Preview Policy: *Fax preview request on program letterhead, 30-day trial period.*

Institute for the Study of Adult Literacy
The Pennsylvania State University
College of Education
204 Calder Way, Suite 209
University Park, PA 16801-4756
814-863-3777
Preview Policy: *Contact company.*

Intellimation
130 Cremona Drive
P.O. Box 1530
Santa Barbara, CA 93116
800-346-8355
Preview Policy: *Contact company.*

Interactive Knowledge, Inc.
P.O. Box 560865
Charlotte, NC 28256
704 344-0055
Preview Policy: *Contact company.*

Invest Learning
9920 Pacific Heights Blvd. Suite 100
San Diego, CA 92121
619-677-5858
Preview Policy: *Contact company.*

Jostens Learning and Hartley's Courseware, Inc.
9929 Pacific Height Blvd.
Suite 500
San Diego, CA 92121
800-247-1380
Preview Policy: *Contact company.*

Kentucky Educational Television
KET - The Kentucky Network
Enterprise Division
500 Cooper Drive
Lexington, KY 40502-2200
800-354-9067
Preview Policy: *Contact company.*

Learning Company, The
6493 Kaiser Drive
Fremont, CA 94555
800-852-2255
Preview Policy: *Contact company.*

Lexia Learning Systems, Inc.
P.O. Box 466
Lincoln, MA 01773
617-259-8752
Preview Policy: *May request preview copies of software by calling them directly.*

Marsh Media
P.O. Box 8082
Shawnee Mission, KS 66208
800-821-3303
Preview Policy: *Contact company.*

MECC
6160 Summit Drive
Minneapolis, MN 55430-4003
800-685-6322
Preview Policy: *Contact company.*

Merit
P.O. Box 392
New York, NY 10024
800-753-6488
Preview Policy: *Will send preview products to program facility only.*

Microsoft Corporation
One Micro Way
Redmond, WA 98052-6399
800-227-4679
Preview Policy: *Contact company.*

Mindplay
3130 North Dodge Blvd.
Tuscon, AZ 85716
800-221-7911
Preview Policy: *Trial for 30 days; request must be mailed or faxed on institutional letterhead.*

New Readers Press
Department Two
P.O. 888
Syracuse, NY 13210-0888
800-448-8878
Preview Policy: *Will provide preview; an invoice will be sent, but may be returned within 45 days, no questions asked.*

Optical Data Corporation
30 Technology Drive
Warren, NJ 07059
800-524-2481
Preview Policy: *Contact company.*

Phillip Roy
Aquarius
P.O. Box 130
Indian Rocks Beach, FL 34635
800-255-9085
Preview Policy: *Contact company.*

Quality Computers
20200 Nine Mile Road
St. Clair Shores, MI 48080
800-777-3642X746
Preview Policy: *Contact company.*

Quantum Leap Technologies, Inc.
2916B Ponce De Leon Boulevard
Coral Gables, FL 33134
305-446-4141
Preview Policy: *Will provide preview copies of their instructional software, but not their shareware collections like Macademic.*

Queue, Inc.(Microcomputer Workshop Course)
338 Commerce Drive
Fairfield, CT 06430
800-232-2224
Preview Policy: *Contact company.*

Scholastic, Inc.
P.O. Box 8633
Sunnyvale, CA 94088
800-554-4411
Preview Policy: *Contact company.*

Scott Foresman
99 Bauer Drive
Oakland, NJ 07436
800-554-4411
Preview Policy: *Contact company.*

Serius Corporation
6400 Commerce Park
488 East 6400 South, Suit 100
Salt Lake City, UT 84107-7590
801-261-7900
Preview Policy: *Contact company.*

Skills Bank Corporation
6350 Presidential Court
Fort Meyers, FL 33919-3570
813-482-0202
Preview Policy: *Contact company.*

South-Western Publishing Company
5101 Madison Road
Cincinnati, OH 45227
513-271-8811
Preview Policy: *Contact company.*

Steck-Vaughn Company
8701 North Mopac Expressway
Austin, TX 78759-8364
512-343-8227
Preview Policy: *Demo disks are available; can arrange for a full preview by calling Ms Clifton.*

Sunburst Communications/Wings for Learning
101 Castleton Street
Pleasantville, NY 10570
800-321-7511
Preview Policy: *Provide preview copies of software upon request so long as requesters make clear that they are educators and that the software is shipped to an institutional address.*

Teacher Support Software Company
1035 N.W. 57th Street
Gainesville, FL 32605-4486
904-332-6404
Preview Policy: *Demo disks, but not for previewing. Use letterhead and prospectus.*

The Kentucky Network
650 Cooper Drive
Lexington, KY 40502
800-354-9067
Preview Policy: *Contact company.*

The Learning Skills Company
1232 West Little Creek Road, Suite 200
Norfolk, VA 23505
804-423-4903
Preview Policy: *Contact company.*

The Roach Organization (TRO)
Woodfield Corporate Center
150 North Martingale Road, Suite 700
Schaumburg, IL 60173
800-869-2000
Preview Policy: *Will provide preview copies; call Ms Staff for assistance.*

The Software Toolworks
60 Leveroni Court
Novato, CA 94949
415-883-3000
Preview Policy: *Contact company.*

The Voyager Company
1351 Pacific Coast Highway
Santa Monica, CA 90401
310-451-1383
Preview Policy: *Contact company.*

The Wisconsin Foundation for Vocational, Technical, and Adult Education, Inc.
2564 Branch Street
Middleton, WI 53562
608-831-6313
Preview Policy: *Contact company.*

Time Warner Interactive Group
2210 W. Olive Avenue
Burbank, CA 91506-2626
818-955-6492
Preview Policy: *Contact company.*

Tom Snyder Productions
80 Coolidge Hill Road
Watertown , MA 02172-5003
800-342-0236
Preview Policy: *Will provide preview; call directly, order product. Will be billed but may return the software in 30 days, no questions asked.*

Tutor Systems - BLS, Inc.
Woodmill Corporate Center
5153 West Woodmill Drive, Suite 18
Wilmington, DE 19808
800-545-7766
Preview Policy: *Contact company.*

U.S. Basics
1700 Diagonal Road Suite 400
Alexandria, VA 22314
800-486-0087
Preview Policy: *Contact company.*

United Media Corporation
200 Park Avenue
New York, NY 10166
212-692-3700
Preview Policy: *Contact company.*

Ventura Educational Systems
3440 Brokenhill Street
Newbury Park, CA 91320
805-499-1407
Preview Policy: *Contact company.*

Videodiscovery, Inc.
1700 Westlake Ave. N., Suite 600
Seattle, WA 98109-3012
206-285-5400
Preview Policy: *Contact company.*

Visual Information, Inc.
600 Seventh Street, Suite 415 South
Denver, CO 80202
303-892-0304
Preview Policy: *Contact company.*

Wastach Education Systems
5250 South 300 West Suite 350
Salt Lake City, UT 84107
800-877-2848
Preview Policy: *Contact company.*

Wayzata Technology, Inc.
2515 East Highway 2
Grand rapids, MN 55744-3271
800-735-7321
Preview Policy: *Contact Company*

WICAT Corporation
P.O. Box 539 1875 S. State Street
Orem, UT 84058
800-759-4228
Preview Policy: *Contact Company*

WordPerfect Corporation
1555 N. Technology Way
Orem, UT 84057
801-226-6944
Preview Policy: *Contact Company*

Xiphias
8758 Venice Boulevard
Los Angeles, CA 90034
310-841-2790
Preview Policy: *Contact Company*

Zenith Data Systems
2150 East Lake Cook Road
Buffalo Grove, IL 60089
708-808-4851
Preview Policy: *Contact company.*

APPENDIX C STUDENT EVALUATION OF SOFTWARE

Evaluators should use these questions as a guide for having students evaluate software. Before asking questions, make sure that the student has used the program and feels comfortable using it.

1. Do you think this program helped improve your skills?

2. What did you like most about using this program?

3. What did you like least about this program?

4. How do you feel about using a computer for learning new skills?

5. Would you recommend using this program to a friend?

6. Do you think this program is too hard, too easy, or just right?

7. Are there any suggestions that you have about how we could make this program better?

APPENDIX D NCAL SOFTWARE EVALUATION WORKSHEET

Software: _____ Publisher: _____

I. Learner/Computer Interaction

	Strongly agree					Strongly disagree
1. Exercises are appropriate.	6	5	4	3	2	1
2. Exercise frequency is adequate.	6	5	4	3	2	1
3. Directions and instructions are clear.	6	5	4	3	2	1
4. Type and place of requested response is clear.	6	5	4	3	2	1
5. Feedback after response is helpful.	6	5	4	3	2	1
6. Final evaluation of learner's performance is provided.	6	5	4	3	2	1
7. Software is easy to operate.	6	5	4	3	2	1

Additional Comments:

II. Learner Control

	Strongly agree					Strongly disagree
1. Options, menus, and choices are available.	6	5	4	3	2	1
2. Display time is under learner's control.	6	5	4	3	2	1
3. Mouse exercise directions are adequate.	6	5	4	3	2	1
4. Movement within software is easy.	6	5	4	3	2	1
5. Graceful exits are available at all times.	6	5	4	3	2	1

Additional Comments:

III. Sequencing of Instructional Events

	Strongly Agree					Strongly disagree
1. Goals and objectives are specified explicitly.	6	5	4	3	2	1
2. Instruction is organized from general to specific.	6	5	4	3	2	1
3. Adequate exercises and examples are provided to explain concepts.	6	5	4	3	2	1
4. Major concepts are easily identified through visual cues.	6	5	4	3	2	1
5. Different opportunities are provided for different ability levels.	6	5	4	3	2	1

Additional Comments:

IV. Screen Design

	Strongly agree					Strongly disagree
1. Screen layout is pleasing.	6	5	4	3	2	1
2. Instructions are provided in areas separate from text.	6	5	4	3	2	1
3. Color is used effectively.	6	5	4	3	2	1
4. Exercises with the mouse require dexterity appropriate to students' ability.	6	5	4	3	2	1

Additional Comments:

V. Multimedia Features

	Strongly agree					Strongly disagree
1. Digital audio is available.	6	5	4	3	2	1
2. Audio is used appropriately given the reading level of the student.	6	5	4	3	2	1
3. Appropriate graphics, photos, or video enhance the instruction.	6	5	4	3	2	1
4. Student progress is not slowed by unnecessary multimedia effects.	6	5	4	3	2	1

V. Multimedia Features (continued)

	Strongly agree					Strongly disagree
5. Student can choose to access audio and visuals on an as-needed basis.	6	5	4	3	2	1

Additional comments:

VI. Readability

	Strongly agree					Strongly disagree
1. Screens contain an amount of text appropriate to the students' reading ability.	6	5	4	3	2	1
2. Content is relevant to adults.	6	5	4	3	2	1
3. Reading level is appropriate.	6	5	4	3	2	1
4. Software teaches important reading comprehension skills.	6	5	4	3	2	1

Additional comments:

VII. Assessment

1. Does the program provide a pretest? If so what test? _____

2. Does the program provide a posttest? If so what test? _____

	Strongly agree					Strongly disagree
3. Tests are easy to administer and score.	6	5	4	3	2	1
4. Assessment data is easily accessed by the teacher.	6	5	4	3	2	1
5. Assessment data is easily accessed by the student.	6	5	4	3	2	1
6. Program adequately assesses student progress.	6	5	4	3	2	1
7. Program adequately remediates students who are not progressing successfully.	6	5	4	3	2	1

Additional comments:

VIII. Administration

	Strongly agree					Strongly disagree
1. Accessing the software/instruction content is easy.	6	5	4	3	2	1
2. Procedure for enrolling new students is clear.	6	5	4	3	2	1
3. Student progress is easily tracked.	6	5	4	3	2	1

Additional comments: