DOCUMENT RESUME

ED 260 289 CE 042 308

TITLE	Computer Assisted Instruction for Adult Basic Education. A 310 Special Demonstration Project 1984-1985.
INSTITUTION	Rio Salado Community Coll., Ariz.
SPONS AGENCY	Arizona State Dept. of Education, Phoenix. Div. of Adult Education.
PUB DATE	85
NOTE	31p.; For a related document, see CE 042 307.
PUB TYPE	Guides - Non-Classroom Use (055)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Adult Basic Education; Classroom Techniques; *Computer Assisted Instruction; Computer Oriented Programs; *Courseware; Demonstration Programs; Educational Benefits; Equipment Maintenance; Equipment Utilization; Evaluation Criteria; *Fused Curriculum; *Instructional Material Evaluation; *Media Selection; Microcomputers; Records (Forms); Teaching Methods
IDENTIFIERS	310 Project

ABSTRACT

This handbook is designed to familiarize adult basic education (ABE) instructors with the basics of computer-assisted instruction (CAI). Addressed in the individual sections of the manual are the following topics: computers in ABE, benefits of CAI, hidden cost considerations and necessary commitment for CAI, vocabulary, getting started, incorporation of CAI into the adult learner's class time, procedures for monitoring actual computer time, considerations for purchasing a computer, criteria for evaluating software (use of a model evaluation form, areas of available computer programs, and software companies), care for software, computer repairs, and guidelines concerning copying programs. (MN)

COMPUTER ASSISTED INSTRUCTION

FOR ADULT BASIC EDUCATION

A 310 Special Demonstration Project
funded by the Arizona Department of Education
Adult Education Division
(1984-1985)

Rio Salado Community College
Phoenix, Arizona

DISCLAIMER AND ACKNOWLEDGEMENT

This publication is made possible through funding received from the U.S. Office of Education P.L. 91-230 and the Department of Education of the State of Arizona ARS 15-232-234. The opinions expressed here do not necessarily reflect the position or policy of the U.S. Office of Education or the department of Education, State of Arizona, and no official endorsement by either office should be inferred.

Acknowledgements

Computers have become an invaluable asset in most businesses. As a delightful provider and center of entertainment, they have become a "loved" member of many households. But perhaps most importantly, the computer has become an integral part of most educational systems and institutions. This handbook is the result of efforts to incorporate computer-assisted instruction into adult basic education.

With much graditude and appreciation, the following people are acknowledged for their support and encouragement:

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For their support and commitment to this project, a very special recognition is extended to:

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Peoria Unified School District

Ms. Peg Mosley
Director of Staff Development
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Presciption Learning

*All computer graphics were provided by the Apple MacIntosh™ Computer/Click Art disk.

Table of Contents

Computers in Adult Education

The world is becoming increasingly dependent upon technology -- hospitals, auto assembly plants, law offices, grocery stores, international trade -- and our educational system must be aware of this reality. "Ready or not," computers are here. The adult student who learns how to operate a computer will find more open doors in the working world.

No longer does literacy mean the ability to write one's name, count change and minimally read. The technology age requires one to read, write, compute well, and further, to be able to use high tech machinery to solve complex problems.

The classroom of the adult student is not immune from the impact of technology. As teachers become more and more comfortable with the "wizardry" of the computer, they are finding it a useful tool to provide practice in English, Social Studies, Math and Science -- something akin to having another instructional aide in the classroom; an aide that doesn't get tired and will provide the individual pacing and repetition that so many adult students need.

Not only does the computer provide expanded learning opportunities for the individual student, it is also capable of providing direct assistance to the instructor. Collection of test items tied to course objectives provide a convenient way to prepare exams geared to what is currently being taught either on an individualized or group basis, to keep track of student progress and to provide item analysis of test items -- time consuming tasks made simple by the computer.

Students who learn to operate a computer terminal in the adult education classroom are learning vital skills for today. They are also learning the lifelong ability to adapt to change -- an absolutely necessary attitude for survival.

Benefits Of Computer-Assisted Instruction (CAI)

- CAI frees the teacher from drill and practice and gives the teacher more time to teach, develop and select instructional materials.
- CAI gives the student who needs additional practice an innovating approach and a more motivating method of review.
- With CAI the student must actively participate and be involved in the programs.
- CAI allows the student to make mistakes privately -- and thus removes the fear of making mistakes. It has been said that "a computer is infinitely patient."
- CAI is objective and does not make judgments on the basis of race, sex or age.
- CAI can provide immediate and systematized feedback and reinforcement. (Many times percentages are given at the end of a lesson.)
- The pace of CAI is largely learner-controlled.
- CAI can prepare students for new ways of communication and encourages creative thinking.
- There are indications that adults who learn with CAI seem to become more self-directed.
- CAI seems to have a direct and positive effect on retention.

Hidden Cost Considerations for CAI

It is important to be concerned about cost, and to consider what the "trade-offs" might be in order to buy computers* and/or software.

In addition to initial purchase cost, there are "hidden costs" -- and if you prepare yourself for these, the impact will be minimized.

1. Additional Hardware and Software.

   There is sometimes a tendency to try to compensate for a lack of computer knowledge by overbuying or by buying only the cheapest system without considering other devices and software that could make the particular computer more useable. It is important to strike a proper balance between keeping expenses realistically low and overbuying unnecessary gadgets.

2. Service and Maintenance

   Computer systems are mechanically fragile and thought must be given to maintenance. It is really important to find out what kind of warranty there is on your computer. It may be adviseable to buy some kind of long term service contract.

3. Training

   Serious consideration needs to be given to staff and training (for example: consultant, materials, etc.).

   Teachers need to consider the cost of any college courses or workshops they might choose to take to help them feel more comfortable with CAI.

*Because few Adult Basic Education Programs have the money to purchase computers, it is important to explore "cooperative arrangement" possibilities. In the case of the Rio Salado Pilot Project for Computer-Assisted Instruction in Adult Basic Education, the Peoria Unified School District granted permission for the use of their Prescription Learning lab at the Alta Loma Elementary School and because "Prescription Learning" is a specialized basic skills program, it was an additional bonus to have teacher-training, books, and materials provided by the Prescription Learning Company. All of this was done with no charge to the Rio Salado Adult Basic Education Program.

Necessary Commitment For CAI

When considering CAI, it is important to think about the commitment that will be required on the part of administration and staff. Whenever possible, efforts should be made to assure that all staff members develop a fundamental understanding of computers and how they operate. Some things to be considered are:

1. Become familiar with using the hardware and software in order to feel comfortable with the new technology.

2. Develop a knowledge of the history of computers -- how computers work and how computers have current and future application in our lives.

3. Become familiar with

   - o Microcomputer applications in education
   - o Types of computer-managed instruction (CMI)
   - o Types of computer-assisted instruction (CAI)
   - o Hardware selection and courseware evaluation.

Every newcomer to computing will have to commit a considerable amount of time to the demand of learning not only how to operate the computer, but what materials will be necessary for the program in which they plan to be involved. There is a very, definite time commitment involved. If you want results and success, you have to be willing to devote a good share of "extra time."

The use of computer instruction should be viewed as a support or reinforcement for good teaching -- not a replacement of it. Therefore, the most important commitment is probably staff training. Those involved in CAI should make a continual search for quality courseware which can add diversity to the program while remaining appropriate for the level of the adult learners.

The administrator and teacher should carefully consider how many staff members will be needed in the CAI classroom. Even though the computers do free the teacher from some tasks, it is still very necessary to have adequate supervision for those students who have questions or need materials and information. If you have CMI, it is helpful to have a person at the management system to keep students "on task" and keep computers operating to the optimum. In order to keep students feeling productive, at ease, and successful, sufficient help is of prime importance.

Vocabulary

1. Basic - (Acronym) Beginners All-purpose Symbolic Instructional Code.

2. Bug - Is a malfunction either in a program or in hardware. Software bugs usually result from a logical error in the creation of the program.

3. Byte - 1 byte = 1 character -- usually a byte is made up of 8 bits.

4. CAI - Computer assisted instruction (direct instruction)

5. CBI - Computer based instruction: The overall term used to describe the use of computers in the instructional process.

6. Cartridges - These are about the size of a deck of cards and plug right into the computer console.

7. Cassette tapes - These look just like the cassettes you use in a regular cassette player or car stereo system. You'll need a special computer cassette player to operate these tapes.

8. Command - Communication from the user to a computer system (usually typed from the keyboard) directing it to perform some immediate action.

9. Computer Literacy - History and application of computers in society.

10. Controller - A piece of hardware that usually monitors an input/output device(s)

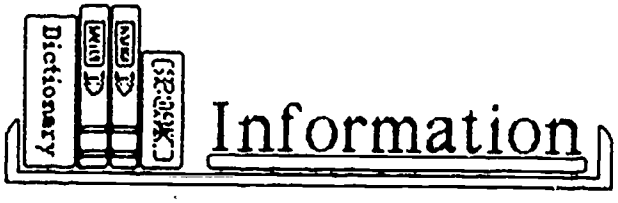
11. Courseware - A combination of subject matter content, instructional design, teacher and student materials, and software that causes a computer to implement instructions.

12. Cursor - Flashing place-indicator on the terminal screen.

13. Data bank - Large amount of stored information (data) capable of having selected items pulled from it.

14. Debug - Process of finding, locating and correcting errors in the program that might create problems or provide inaccurate information.

15. Disks (diskettes, Floppy) - These disks are like flexible record albums, spinning inside a protective sleeve. They measure about 5" across and store data. A disk drive is required to operate them.



Vocabulary, cont:

16. Graphics - Information presented in the form of pictures or images.

17. Hardware - Describes all items in a computer system that are not software.

18. Keyboard - Typewriter-like device used to communicate with computers (input).

19. Load - A term that indicates the transfer of data from a storage location, such as a disk or tape, into a computer.

20. Memory - The component of a computer system that retains information

21. Menu - A list of choices presented by a program, usually on the display screen, from which the user can select.

22. Monitor - A screen that appears much like a T.V. screen upon which information is displayed.

23. Network - A collection of inter-connected individually controlled computers together with the hardware and software used to connect them.

24. Printer - Output printed form the computer onto paper.

25. Program - A series of instructions to a computer that cause it to solve a problem or perform a task.

26. Programmer - The human author of a program.

27. Programming - The activity of writing programs

28. Public Domain - Property rights that belong to the community-at-large.

29. Ram - Temporary memory in the computer
Rom - Read only memory (permanent)

30. Software - A set of operating instructions, procedures and programs that direct a computer system to perform a desired task.

31. Word Processor - A computer/software system designed for writing and editing letters, reports or any other written document.

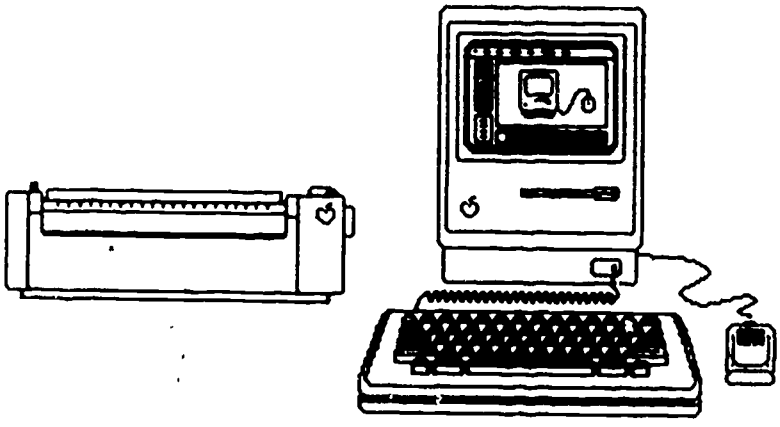
Getting Started

It seems like everyone is jumping on the bandwagon to use computers and CAI. Now it is your turn, but where will you begin? A good starting place is to find out what materials are already available to you along with information about the scope and capabilities of your computer system.

Maybe you have never had your hands on a computer. As with any new tool, you will want to be comfortable with your new equipment before getting down to work. The computer will be on your side, interacting with you as you learn. Read the instructions carefully and soon you will be running programs and feeling good about your results.

If you are considering computer classes for your own professional growth and development, "Computer Programming" may not be a wise first choice. Before getting into the actual programming, it is a good idea to learn the basics -- how to make the computer do what you think it should, the scope of what it can do, how to use it to its best advantage...

As you become better informed and more comfortable with your computer, you will discover just how effective and efficient it can be.



Incorporating CAI in the Adult Learner's Class Time

First of all, there is no one set pattern to follow in using CAI. The following routine is just one approach to the task of actual classroom management with CAI. As you review the process, you will want to look for ways to make the actual CAI experience more efficient for you and more useful for your students.

1) When a new student enters the classroom, he/she is given a temporary Registration, Reinstatement, and Separation form.

2) After the student has completed this form, it is checked for the addition of any needed and necessary information. The student is then given a "Plasment Test-Level 4". If the student is observed to be on a lower ABE level, he/she is given Level 2. The Plasment Test is a test provided by Prescription Learning and gives vocabulary/comprehension and math grade level scores. If the student scores high, 10th grade or higher in either area, the student is very close to being ready to take the sample GED tests. However, unless there is a high pressure deadline, the student is given the computer Hands On Test (HOT) in an effort to create an introduction and a comfortable relationship with the computer.

   After the computer grades the Plasment Test, it gives each student a number, and designates a level. When the student enters his number, he is given a series of tests with five questions for each skill.

   As soon as the student misses two questions for one skill, he is given a printed "prescription" with assignments to help him master the skill. These activities are not all on the computer -- some are in workbooks, other machines, or "teacher directed."

   If a student is observed to need more help--he/she keeps working on the continuum* and Basic Skills list. Some students progress very quickly while others take longer.

   If the student has proven himself to be very competent, he/she is given either a reading or math sample test -- whichever seems to be his/her strongest area.

   *Like the "Plasment" tests, the continuum (a list of competencies) is one of the specialized materials that Prescription Learning provided for the Peoria Pilot Project. Upon request, both items are available for review.

Monitoring Actual Computer Time

The actual class period for the Peoria Pilot Project was 2 1/2 hours long with a break halfway through the time. If a student worked on the computer the first half of the period, they worked on traditional materials the second half.

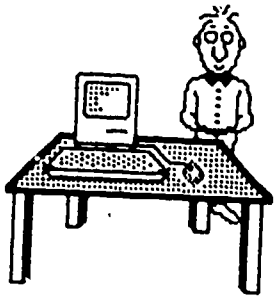
- Even a computer becomes tiresome and loses its motivation when used for too long a time.

- There have been times when there has been an insufficient number of computers for everyone to use. Therefore, a rotation schedule gave everyone a fair chance to take advantage of the available system and software.

Another reason for not keeping a student on the computer too long is that there are many more traditional workbook materials available for Social Studies, Science and Writing. Students need exposure to a variety of kinds of material in an effort to avoid boredom and eventual loss of interest.

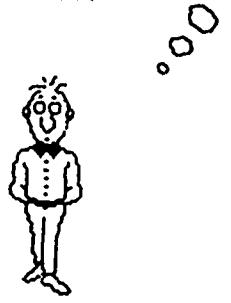
At the present time, the GED test is not given on the computer. Therefore, the materials as presented in the traditional skills workbooks and GED study materials, are more representative of the actual test. Thus, the varied approach of presenting materials tends to be very effective.

It should also be remembered that there is always the chance that at some time the computers will be not functioning correctly; if all students have only computer assignments, a lot of valuable time could be lost... It seems much wiser to know students can use other materials and continue their study without interruption.



Considerations for Purchasing a Computer

It is easy to walk into a store and pay a lot of money for a system just because you know someone who has one just like it. Before purchasing a system, you need to answer to your satisfaction some basic questions...



1. You need to consider what you want the computer to do.

   - o Do you want to learn to program?
   - o Do you want to use it for drill and practice?
   - o Do you want to play video games?
   - o Do you want to use it for enrichment activities?
   - o Do you want to use it for letter writing or other word processing tasks?

2. You should try to get the most bytes for your money.

3. You should do as much looking, reading and asking as you would when you buy a car. (Visit your bookstore -- there are many good introductory books).

   Ask what the company's policy is on service. What is the company's policy concerning warranties? Is there a user hotline you can call when you are in a jam?

4. Do you need a monitor or can you use you own television?

   It is important to choose between a color and a black and white monitor. Many educational activities require color while business applications do not. (Make sure the interface cable is included -- it often costs extra).

   Attention needs to be given to the differences in keyboard. The full-travel keys, like those on an ordinary electric typewriter, are better for word processing or good typists. Keyboard comfort is an individual matter; therefore, it is important to try the machine.

   Another important consideration is printer quality -- it generally varies with the cost. The products of some printers are barely legible while others promise "letter quality." Look for sharpness and readability.

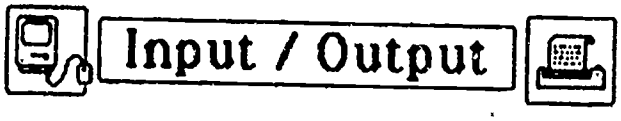
Evaluating Software

For each piece of software you consider purchasing, you need to ask:

- Is it worth the money?
- Are the instructions clear?
- Will it encourage challenge and/or motivate the user?
- Will it supplement the curriculum?
- Is the material educationally sound?
- Is the lesson the appropriate age or grade level of the user? (This is especially important for the adult student).
- Is the material free from error?
- Is the software compatible with the system that is used?

Software Reports (through Allenback Industries, $59.95) reviews almost 400 programs for Apple, Atari, Commodore, IBM PC, and TRS-80 computers. Programs in 20 subject areas for students, preschool through college, as well as adults, school administrators, and special education students, are reviewed. (Regular updates will fit into the book's three-ring binder.)

Each review includes a summary of the product's features, a brief description of the program and a graded evaluation. Materials ai indexed by subject, program title, and computer brand. Complete software ordering instructions are included.



LAKEPARK HIGH SCHOOL
COMPUTER SOFTWARE EVALUATION FORM

PACKAGE TITLE:
PROGRAM TITLE (IF A COMPONENT OF ABOVE):
PRODUCER: COPYRIGHT DATE:
VENDOR (IF DIFFERENT FROM PRODUCER): COST:
MICROCOMPUTER (BRAND, MODEL, MEMORY REQUIREMENT):
MEDIUM (CIRCLE) 5" DISK 8" DISK CARTRIDGE CASSETTE OTHER
NECESSARY HARDWARE/SOFTWARE TO ACCOMPANY:
SUGGESTED GRADE LEVEL(S): SUGGESTED ABILITY LEVEL(S):

PART I/PROGRAM DESCRIPTION AND EVALUATION

1. Subject area and specific topic:

2. Appropriate group instructional size (circle): individual/small group/class

3. Is the program networkable or may it be adapted to be networkable?

4. Briefly describe the program and its content.

5. Briefly list the program's objectives. Are they clearly stated in the program or the documentation? Are they educationally valuable? Are they achieved?

6. What are the strengths and weaknesses of this program in terms of the criteria noted at the bottom of this sheet.

7. In what course(s) would this material be used?

8. How are the course objectives satisfied by the software?

PART II/EVALUATION CRITERIA

A. Educational Content

- Is the program content accurate?
- Is the program content appropriate for intended users?
- Is the difficulty level consistent for material, interest, and vocabulary?
- Is the program free of racial, sexual, or political bias?
- Does this program duplicate one currently in our collection?

B. Presentation

- Is the program free of technical problems?
- Are the instructions clear to the user?
- Is the curriculum material logically presented and well organized?
- Do graphics, sound, and color (if used) enhance the instructional presentation?
- Is the screen display clear and easy to read?

C. Interaction

- Is the feedback effective and appropriate?
- Do cues and prompts help students to answer questions correctly?
- Can students control the pace and sequence of the program?
- Are there safeguards against students "bombing" the program by erroneous inputs?

D. Teacher Use

- Is record-keeping possible (within the program or through documentation worksheets)?
- Does the teacher have to monitor student use?
- Can the teacher modify the program to fit individual needs?
- Is the document clear and comprehensive?

PART III/CONSENSUS EVALUATION OR REVIEWERS

Check the statement which most clearly reflects the consensus evaluation...

...1) Excellent program; recommend without hesitation
...2) Good program; consider purchase
...3) Fair program; will wait for something better in this area
...4) Not useful; do not recommend purchase

Areas of Available Computer Programs

- Instructional Management. This includes, grading tests, tracking individual student progress, diagnosing student strengths and weaknesses, and planning remedial action.
- Authoring programs. This enables teachers to create individualized instructional materials such as lessons, tests and puzzles.
- Drill and practice for skill reinforcement.
- Tutorial (programmed learning for supplemental step by step instruction and acceleration).
- Simulations - (A new tool)
- Creative writing (using the word processor).
- Research and retrieval - (using data banks).
- Games to develop mind/body coordination, strategy, and problem solving skills.
- Enrichment
- Simple programming to teach logical thinking and problem solving skills.
- Problem solving (example): Models and algorithms for high school physics)
- Teach non-English speaking students the English language using talking computers.

Software Companies

It is a mamouth job to keep up with software, but it is important to be on a constant lookout for what is best for your particular program and students.

Thousands of individuals and companies now publish educational software, allowing new programs to enter the market each day. Therefore, it is extremely important that your software purchases reflect careful consideration.

The following is a list of some of the companies that carry software materials; however, very few have materials directed only to the adult learner. Therefore, for the present, it will not be uncommon for your purchases to be materials that are prepared for elementary or high school skills and competencies.

Academy Software
P.O. Box 6277
San Rafael, CA 94903
(415) 499-0850

Addison-Wesley Publishing
School Products Division
2725 Sand Hill Road
Memlo Park, CA 94025
(415) 854-0300

Allenback Industries (Software Reports)
2101 Las Palmas Drive
Carlsbad, CA 92008
1 (800) 854-1516

Artificial Intelligence Research Group
921 North La Jolla Avenue
Los Angeles, CA 90046
(213) 656-7368

Artwork Software Company
150 North Main Street
Fairport, NY 14450
(800) 828-6573

Atari Corp
P.O. Box 69657
Sunnyvale, CA 94088

A/V Concepts Corp
30 Montauk Blvd
Oakdale, NY 11769
(516) 567-7227

Avant-Gardell Publishing
P.O. Box 30160
1907 Garden Avenue
Eugene, OR 97403
(503) 345-3043

Basic and Beyond
Pinesbridge Road - Box 10
Amawalk, NY 10501
(914) 962-2355

BLS Inc
2503 Fairlee Road
Welmington, DE 19810

Borland International
4113 Scotts Valley Drive
Scotts Valley, CA 95066
(800) 255-8008 or in CA
800/742-1133

Brainbank
220 Fifth Avenue
New York, NY 1001
(212) 686-6565

Software Companies, cont.

Broderbund
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170

CBS Software
One Fawcett Place
Greenwich, CT 06836
(203) 622-2500

Centurion Industires
1526 Main Street
Redwood City, CA 94063
(415) 364-9546

Charles Clark Co., Ins
168 Express Drive South
Brentwood, NY 11717

Commodore
1200 Wilson Drive
West Chester, PA
(800) 247-9000

Compress - Division of Wadsworth
P.O. Box 102
Wentworth, NH 03282
(603) 764-5831

COMPU-TATIONS
P.O. Box 502
Troy, MI 48099
(313) 689-5059

Conduit
University of Iowa
Oakdale Campus
Iowa City, IA 52242
(319) 353-5789

Creative Publications
P.O. Box 10328
Palo Alto, CA 94303
(415) 1968-1101

Continental Press
Elizabethtown, PA 17022
1 (800) 233-0759

Cross Educational Software
P.O. Box 1536
Ruston, LA 71270
(318) 255-8921

Data Command
P.O. Box 548
Kankakee, IL 60901
(815) 933-7735

Davidson & Associates
6069 Groveoak Place #2
Rancho Palos Verdes, CA 90274
(213) 383-9473

DCH Educational Software
125 Spring Street
Lexington, MA 02173
(800) 225-1149

Devok Data Products
1500 Martin Avenue
Box 58051
Santa Clara, CA 95051
1 (408) 980-1360

E. David & Associates
Russett Lane
Storrs, CT 06268
(203) 429-1785

Educational Activities
P.O. Box 392
Freeport, NY 11520
(516) 223-4666

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171

Software Companies, cont.

Essertier Software Corp.
1020 Manhattan Beach Blvd, Ste 200
Manhattan Beach, CA 90266
(213) 346-5895

EMC Publishing
Materials for Consumer/Lifeskill Experience
Changing Times Education Service
300 York Avenue
Saint Paul, MN 55101
1 (800) 328-1452

EBSCO Curriculum Materials
Division EBSCO Industries, Inc
Box 11542
Birmingham, AL 35202
1 (800) 233-0759

Gamco Industries
Box 1911
Big Springs, TX 79721
(800) 351-1404
(915) 267-6327 In TX

Hartley Courseware
123 Bridge
Diamondale, MI 48821
(517) 646-6458

JMH Software of Minnesota
P.O. Box 41308
Minneapolis, MN 55441
(612) 424-5464

L & S Computerware
1589 Fraser Drive
Sunnyvale, CA 94086
(408) 738-3416

Learning Company
545 Middlefield Road, Ste 170
Menlo Park, CA 94025
(415) 328-5410

McCarthy McCormack
1440 Oak Hills Drive
Colorado Springs, CO 80919
(303) 598-5579

McGraw-Hill
1221 Avenue of the Americos
New York, NY 10020
(212)512-2646

MECCC Minnesota Educational Computing Corp
3490 Lexington Ave N
St Paul, MN 55112
(612) 481-3500

Midwest Software
Box 214
Farmington, MI 48024
(3130 477-0897

Milliken Publishing Co
P.O. Box 21579
St Louis, MO 63132
(314) 991-4220

Minnesota Educational Software
P.O. Box 36
Circle Pines, MN 55014
(612) 297-2065

Prentice Hall
P.O. Box 819
Englewood Cliffs, NJ 07632
(201) 592-2611

Prescription Learning
5240 South Sixth Street Road
P.O. Box 2377
Springfield, IL 62705
1 (800) 637-8598

Software Companies, cont.

Random House School Division
Department 9305
400 Hahn Road
Westminister, MD 21157
(800) 638-6460

Scholastic Inc.
P.O. Box 7502
Jefferson City, MO 65102
(300) 325-6149/(800) 392-2179

Society for Visual Education
Department 106-FD
1345 Diversey Parkway
Chicago, IL 60614
(312) 525-1500

South Western Publishing Co.
5105 Madison Road
Cincinnati, OH 45227
(513) 271-8811

Spinnaker Software
One Kendall Squate
(617) 4941-1200

Springboard Software
7807 Creekridge Circle
Minneapoles, MN 55435
(612) 944-3912

Steck-Vaughn Company
807 Brazos - P.O. Box 2028
Austin, TX 78768

Sunburst Communications
39 Washington Avenue
Pleasantville, NY 10570
(800) 431-1934

Synopse Software
5221 Central Avenue
Richmond, CA 94804
(415) 527-7751

University of Evansville Press
P.O. Box 329
Evansville, IN 47702
(812) 479-2488

Ventura Educational System
3440 Brokenhill Street
Newbury Park, CA 91320
(805) 499-1407

Zephyr Services
306 S. Homewood Avenue
Pittsburgh, PA 15208
(412) 247-5915

Care For Software

Computer software is extremely fragile. Careless handling can ruin any software. The most common villians are dust and dirt (especially for floppy disks and cassette tapes whose magnetic surfaces are exposed). Improper storage, abrupt temperature changes, and equipment misuses can have a detrimental effect as well.

General Precautions

Handle disks and tapes carefully -- never touching the magnetic surfaces. (Oil from fingerprints may damage the surfaces as well as trap dust and lint.)

- Avoid eating or drinking around computer equipment. Also, watch out for pet hair, smoke or anything else that could leave residue on the surface.

- Magnetic coatings on disks and tapes may be altered by fumes from nail polish, copy machine fluids and the like.

  Magnetic objects can be dangerous. Do not place software on top of video screens; the screens emit both electromagnetic and radio frequency interference. NOTE: X-rays won't damage software.

- Static not only attracts dust, it can rearrange data on software surfaces. The humidity level in your computer room may run safely between 10 and 80 percent, but 50 percent is best.

- The acceptable temperature range for use and storage of software is between 50 degrees and 122 degrees (60 degrees to 80 degrees is preferrable.) Avoid large sunlit windows. Wait 24 hours before using software you have moved from a much warmer or cooler place.

- Always make backups (copies) of software that you do not want to risk losing.

- Periodically inspect disks and tapes. It is normal after some usage for shiny rings to appear on a disk. Shiny wide rings and scratches, or folds, indicate damage. Make a backup before matters get worse.

Floppy Disks

- Most likely, any original material you create or records you want to store, will be transferred to floppy disks -- so treat the disks with special care.

- Insert disks correctly; do not use force. Hold them between your thumb and index finger, with the thumb on top of the label.. Insert with the label side up, or to the left if drives are installed vertically.

- Never use both sides of a single-sided disk -- the cleaning will not work properly.

- Disks must be perfectly flat to be read properly; do not bend or fold.

- Never use rubber bands or paper clips to hold disks together. Rubber bands can bend disks, and the paper clips may be magnetized.

Use Equipment Properly

- Blank tape cassettes and disks should be of the right quality and format for your equipment.

- Learn the right sequence for powering up your system -- such as which do you turn on first -- the disk drive or the computer? Otherwise random data will appear on the disk.

- Learn to "write-protect" disks and tapes to avoid accidental erasing of data.

Storage

- Always store software in protective sleeves and cases. Never place two disks in the same sleeve.

- Place disks vertically in plastic, not metal, cases. Do not overcrowd containers, and avoid stacking.

- Store tapes vertically. Rewind tapes properly.

- Prepare labels before application to the disks. To change labels, use a soft felt-tip pen.

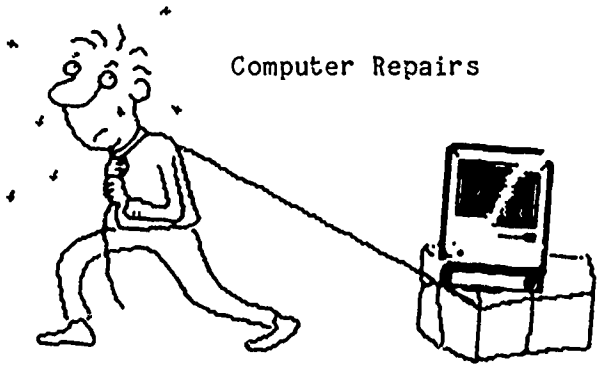
- Do not erase labels on any kind of software. Replace the label -- residue can be damaging.

- Do not put labels on top of each other - a buildup can jam the disk drive or tape mechanism.

Software comes in so many different forms of packaging that it is difficult to come up with an efficient method for storage. Repackaging is usually quite expensive; however, here are a few inexpensive tips.

- Disks that are used frequently (several times a day) can be conveniently alphabetized in a flip-type file box. (Something like a recipe box.)

- Disks that require special instructions (a description of the program or other information) can be placed in clear plastic bags or hung on racks. (Any heavy duty bags will do). You can attach shower curtain rings for hooks for hanging. This will allow you to see materials at a glance. This method is also useful for storing accompanying books and lessons.



Computer Repairs

Remember the adage "an ounce of prevention is worth a pound of cure"? Even if your school has a service contract, there are some simple "do-it-yourself" repairs and tests you can perform that will save important time and perhaps valuable dollars. Because it is not always possible to have a computer expert handy, it is convenient to know that there are some simple things that can be done that do not require an "electronic genius." It would be very beneficial for you to take a course or workshop in simple computer maintenance, but if that is not possible, here are some simple cautions and suggestions.

You will need just a little courage to experiment and a lot of willingness to ask quesions.

Many computer users waste valuable time and money because they are afraid to take the top off the keyboard and see what is inside.

What Are Some Precautions That Should Be Observed?

- o Keep foreign objects out of the computer. Flakes of graphite from a pencil can conduct electricity and therefore are damaging around the computer.

- o It is wise to keep food away from the computer, crumbs and small particles can fall into the computer.

- o Smoking is not only a danger to your health, it can harm your floppy disk. Floppy disks are very susceptible to dirt and dust.

- o Power failure, power surges, or a faulty chip are just a few of the things that can make your computer "crash" in the middle of a program.

  The importance of having backup disks for any important programs cannot be emphasized enough.

- o Remember to turn the electricity off when components are moved around.

- o Do not work on the power unit, which is loaded with electricity, even when the computer is unplugged.

Will I Need Any Special Equipment On Hand For Repairs?

Kathie Price, in an article written for the May 6, 1985, ARIZONA REPUBLIC entitled "Most Cases Are Not Terminal," made the following equipment suggestions:

> Some inexpensive and unsophisticated tools that are essential are needle-nosed pliers, regular pliers, non-magnetized slot-head and Phillips-head screwdrivers, plastic tweezers, scissors, a needle-like pick, epoxy, cotton swabs, Q-tips and rubbing alcohol.

None of these are expensive and may be kept in a small cardboard box.

What If The computer Will Not Turn On?

- Check the monitor -- are all connections plugged in correctly? If the screen still does not "boot" up correctly, check the horizontal hold to see if an adjustment is necessary. If the screen still is not clear, check all other adjustment knobs - brightness, etc.

- If the screen begins to flicker, make sure all wires and cables are secure. If something is loose, replace it.

  Several times when it looked like everything was plugged in -- it turned out tht many of the wires and cables were not pushed in tightly.

- If your students tell you they are getting strange characters or "Chinese writing" on their screen, check the shift lock key. Be sure the shift lock key has not been pressed down accidently.

What If The Disk Drive Will Not accept The Disk Correctly?

- The disk may be damaged by scratches or smudges and require replacement. That is why it is very important to have a backup file.

  If there is any question about a disk, it is helpful to try it in another disk drive to determine whether the problem is in the disk drive or the disk.

- Check the label on your disk, if it is bent or curled, it will not fit correctly.

- If the message "device not present" appears on the screen, be sure to check if the disk drive is turned on. It is easy to think that something needs to be repaired only to find tht the switch has not been turned on.

What If The Printer Will Not Print Clearly?

Printers require a little more maintenance than most computer equipment because they are both electronic and mechanical.

- It is helpful to clean the platen with ink-cleaning liquid. This is available through your office supply or computer store. Ink from the ribbon gets on the platen and will cause ink marks to appear on the paper.

- When the printer will not print, check every cord, and the on-off switch. It sounds ridiculous, but is very common to forget to turn on the printer.

- If the paper gets jammed on the roller, use your tweezers or something sharp to pull it out as you turn the feeder.

  If only part of the letters are being printed, clean where the pins sit. Dust and excess ink can clog pins that should move freely.

- Be sure you keep the ribbon changed in order to assure clean print. When you change the ribbon, be sure you brush out any dust that has collected.

Copying Programs

The process of copying programs is rather easy; therefore, mention needs to made of something often referred to as "computer ethics." The definition of computer ethics is "appropriate behavior that takes into account that individual's actions on all the parties involved in a particular situation."

As more and more computers come into the classroom, educators are facing new and more complex legal problems regarding proper use of computers and software. The courts have not yet set clear guidelines for all the questions that have been asked, but copyright is the most important to study. The copyright statement is found in books, magazines and now on computer screens and software packages - with an intent to help authors protect their work. Authors may not copyright an idea, procedures, process or principle; therefore, other people may use the ideas from a copyrighted work -- but the specific expression of those ideas cannot be duplicated without permission.

Computer technology is still very new, so questions pertaining to software remain unsolved.

The most common violation involves outright duplication of a copyrighted program. The law allows the purchaser of software to make a backup copy of a disk. This backup disk must be destroyed or transferred to the new owner when the other is sold or changes hands. However, some schools buy one copy of a program -- then make a backup copy as well as several copies for other teachers to use. This is <u>not</u> legal. Any unauthorized copying is prohibited and the copyright owner has the right to sue. The law provides for a fine of $100.00 per infringement -- plus court costs and attorney fees.

Anyone who helps, directly or indirectly, in the duplication of a copyrighted work, may be considered an infringer. If students bring in their own blank disks and make copies of copyrighted materials, not only are they violating the law -- but the program is liable if it does not try to stop this practice. For software programs that load completely into a RAM, the suggestion has been made that the software be loaded into one computer, then the disk taken out of the drive and used to load the program into another machine. Those who do this feel a violation of the copyright law occurs only if a copy is "fixed" in some tangible form such as a disk. However, this has not been tested in court.

Software companies are beginning to take serious action against businesses and schools suspected of unauthorized copying.

To protect your program, take necessary steps to make copying in the classroom difficult:

1. Students should be warned not to copy unauthorized software.

2. Appropriate disciplinary action should be taken to discourage any violaters.

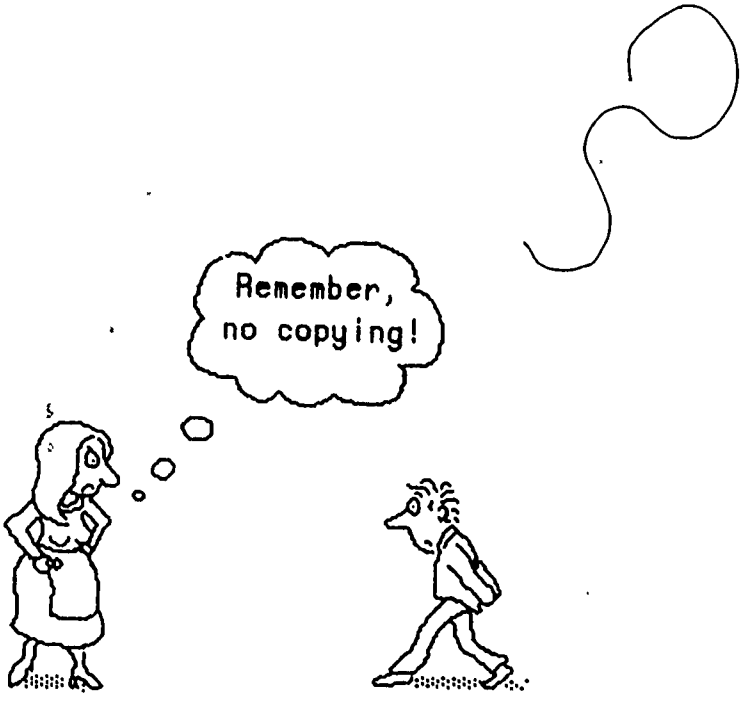
3. Software should be kept in a limited access area.

4. Student-use of software should be well supervised.

It is difficult to completely eliminate this problem -- but if the program demonstrates a good effort to control it, chances of liability will be lessened.

On the other hand, it is important to remember that there are some ways you can work within the law. Some companies will supply a software selection with the understanding that an educational institution is allowed to make a certain number of copies for an additional, nominal fee.

Many copyright issues remain unresolved; so until further clarifications are made, use common sense, and to be safe -- don't copy it!



CONCLUSION

A 1980 report by the U.S. Department of Education and the National Science Foundation stated that most Americans are moving toward scientific and technological illiteracy. It was estimated that 75 percent of all jobs by 1985 would involve computers in some way.

We are 1985, and computers are here to stay. They have become an integral part of our lives. Joseph Garber, a New York management consultant, predicts that, "within ten or fifteen years, some degree of computer efficiency will be necessary in order for people to be employable." Therefore, in every way possible, we must strive to meet the needs of the adult student in this technological society as he/she looks for employment.