THE COMPUTER AS AN INSTRUCTIONAL TOOL

Microcomputer Inservice Training Guides
Level 1

Edited By

David V. Loertscher

THE COMPUTER AS AN INSTRUCTIONAL TOOL

Microcomputer Inservice Training Guides, Level I

Edited by David V. Loertscher

Contributors:

Brenda Cantwell, Westark Community College
David V. Loertscher, University of Arkansas, Fayetteville
David Wooley, Alma Public Schools

Prepared under a grant from the
Arkansas Department of Higher Education, 1984-85

Instructional Resources Program
College of Education, University of Arkansas
1985

Copies are available from Project IMPAC, State Department of Education, Little Rock, Arkansas 72201, and from the Instructional Resources Department, University of Arkansas, Peabody Hall 201, Fayetteville, Arkansas 72701

TABLE OF CONTENTS

FORWARD

Applications of microcomputer technology in enhancing elementary school basic skills instructional programs are being implemented in many school districts throughout the United States. The use of computer assisted and computer managed instruction on stand alone systems or networks of microcomputers can be justified as both cost and educationally effective. In addition, applications such as word processing, grade book programs, data bases, and authoring systems are making teachers more efficient.

As persons involved in teacher education, we are being called upon to help give direction to this new technology. Toward this end, and with encouragement from the Instructional Microcomputer Project for Arkansas Classrooms (IMPAC), the Instructional Resources Program of the College of Education at the University of Arkansas prepared and received a grant from the Arkansas State Department of Higher Education. This grant provided funds for the writing of three undergraduate or graduate course guides relating to the applications of microcomputers in the public school. These course guides relate to three groups of educators:

1. Teachers that are using the microcomputer as an instructional tool.
2. Instructional leaders that have a responsibility for computers at the building level.
3. Persons who might wish to complete advanced work to be qualified to help a school district implement technology related programs.

The underlying philosophy of the course guides is that all educational technology including microcomputers is important in providing quality education. These technologies, used wisely, can help the State of Arkansas achieve its new educational standards.

We encourage inservice leaders, college and university professors to use these course outlines as a guide and provide input back to the editor and to Project IMPAC personnel on their effectiveness and to suggest areas for improvement.

Cecil McDermott
IMPAC Project Director

INTRODUCTION

The Level 1 course guide is designed to be an inservice training course which would benefit every public school teacher in the state of Arkansas. As such, the emphasis is upon the computer as a tool for instruction. This means that emphasis on technical and programming skill has been de-emphasized.

The course has been divided into eight modules and 23 lessons. The first five modules are considered core modules and are deemed essential. The balance of the lessons should be included as time permits. At least 24 class hours are recommended. Participants should spend additional time, outside the classroom, in applying the concepts and practicing the skills which have been taught.

This curriculum guide is an outline rather than a complete exposition or textbook to be used in the inservice training. It is assumed that the instuctor is knowledgeable in the various facets of computers as instructional tools. Some attempt has been made to provide lessons useful on any popluar brand of microcomputer but directions for the Apple predominate. Bibliographies contain, for the most part, references to materials produced since 1982. The team recognizes that these references will be rapidly outdated.

The editor wishes to thank the following persons and groups for their contributions. Project IMPAC provided the initial theorectical model for these guides in its publication: "Inservice." The writing team for the present project consisted of: Tom Bishop, Arkansas State University; Brenda Cantwell, Westark Community College; David Carl, University of Arkansas, Fayetteville; Rick Jones, Siloam Springs Public Schools; David Loertscher, University of Arkansas, Fayetteville; Leroy Sullivan, University of Arkansas, Little Rock; and David Wooley, Alma Public Schools. Cecil McDermott reviewed the manuscripts and gave many helpful suggestions. Carolyn Leonard, a graduate assistant at the

University of Arkansas, spent many hours tracking references and proofing the manuscript. May Lein Ho assisted in the printing of the document on the computer. Sonja Bennett served as secretary for the project. Finally, the State Department of Higher Education provided the funds to get the writing team together and funds for the initial printing of the manuscript. IMPAC has provided the funds to print the manuscript for broader distribution.

MODULE A

MEETING THE COMPUTER

Lesson 1

Putting Educational Computing in Perspective

Purpose:

To introduce the idea of educational computing and to give participants an overview of the goals of the course.

Objectives: The participants will:

1. Be introduced to the instructor, buildings, campus, and scheduling for the course.

2. Become acquainted with the goals of the entire course.

3. See the computer not as a replacement for the teacher but as a valuable tool to help the teacher accomplish the task of educating children.

Prerequisite: None.

Required Materials for the Instructor: None.

Required Materials for the Participants:

A handout of the schedule for the workshop including its goals and objectives.

Time Expectation: 15 minutes.

Activities:

1. Provide the necessary introductions to the instructor, building, scheduling, etc.

2. Acquaint the class with the general goals of the workshop. Give them a realistic picture of what they may be able to accomplish by the end of the course. For example, describe to them a few

management tools such as word processors and grade books which will be of use in their everyday teaching.

3. Put the participants at ease by explaining that no experience with a computer is necessary and that programming skill is not required. Use a positive approach to explain that computers can benefit both the teacher and the learner if this technology is used effectively.

Bibliography:

Computers and the Schools

1. Using the Computer in the Classroom. [Training Manual, Adult, Apple, Atari, IBM, and Commodore versions] Minneapolis, Minnesota: MECC, 1984. $20.00.
   An inservice training guide for introducing teachers to educational computing. Divided into six 150-minute sessions.

2. Establishing Instructional Computing: The First Steps. Bloomington, Indiana: Phi Delta Kappa. (available from MECC for $1.50)

3. Moursund, David. Introduction to Computers in Education for Elementary and Middle School Teachers. Eugene, Oregon: Department of Computer and Information Science, University of Oregon, 1982. (Order from International Council for Computers in Education, 135 Education, University of Oregon, Eugene, Oregon 97403. $7.00 ea.)

4. Moursund, David. Parents Guide to Computers in Education. Eugene, Oregon: ICCE, 1983. (Order from address given in #3. $3.50 ea.)

5. Moursund, David. School Administrator's Introduction to Instructional Use of Computer's. Eugene, Oregon: ICCE, 1980. (Order from address given in #3. $2.50 ea.)

6. Chameleon in the Classroom: Developing Roles for Computers. New York, New York: Bank Street College of Education, 1983.

7. Taffee, Stephen J. (ed). Computers in Education 85/86. Guilford, Connecticut: The Dushkin Pub. Group, 1985.

Inservice Training Guides

1. Metzeus, Richard H. The PDK Guide: An Introduction to Microcomputer Literacy for Educators. Bloomington, Indiana: Phi Delta Kappa, 1983.

2. Guide to Learning: Resources for Users of IBM Personal Computers. IBM, 1984.

MODULE A

MEETING THE COMPUTER

Lesson 2

Getting Started and Having Fun Doing It

Purpose:

To get a hands-on introduction to the compouter in a relaxed setting.

Objectives: The participants will:

1. Identify the basic components of a computer system (non-technical).
2. Define the meaning of "booting the system" and demonstrate how to turn on the computer and the monitor.
3. Demonstrate basic keyboarding and computer operation by interacting with several different educational computer games.

Prerequisite: Lesson 1.

Required Materials for the Instructor:

Prepare an educational game disk that will automatically boot and run without having to type LOAD or RUN. A simulation game such as "Lemonade" or "Oregon Trail" would be appropriate. The "Apple Presents Apple" diskette is a good choice if the Apple IIe computer is used. A disk which has several games run from a main menu would give participants the advantage of getting in and out of different programs.

Required Materials for the Participants: A prepared educational game diskette.

Time Expectation: 30-45 minutes.

Activities:

1. Discuss the basic components of the computer system in non-technical language: the monitor, the keyboard, the disk drives or cassette recorder, the disk which holds the programs (or cassette), the turn-on switches and adjustment knobs, and the location of special keys.

2. Demonstrate how to "boot the system" properly.

3. Describe the educational game(s) to be enjoyed and have students boot their diskettes. You may wish to stop everyone half-way through the gaming to discuss any problems with either the games or the computers.

4. Monitor progress carefully so that the students leave with a feeling of success and enjoyment.

MODULE A

MEETING THE COMPUTER

Lesson 3

Basic Computer Components, Terms, and Operations

Purpose:

To acquaint the participant with the basic components of a computer system, some terminology associated with computers, and basic operating system procedures.

Objectives: The participant will:

1. Know the parts of a computer system and give examples of how each component is used.

   a. INPUT DEVICE (keyboard, graphics tablet, OCR device, voice, modem).

   b. CENTRAL PROCESSING UNIT.

   c. PRIMARY STORAGE (Internal memory, RAM, ROM).

   d. OUTPUT DEVICE (printer, CRT, sound, modem).

   e. SECONDARY STORAGE (magnetic tape, disk, microfilm).

2. Know the meaning of terms such as CPU, RAM, ROM, bit, byte, operating system (DOS, etc.), program, hardware, software, firmware, microprocessor, hard copy, soft copy, interface cards, "booting the system," kilobyte, megabyte, and any other terms associated with the particular brand of microcomputer being used.

3. Know how to "boot the system," CATALOG, LOAD, RUN, and LIST programs.

Prerequisite: Lessons 1 and 2.

Required Materials for the Instructor:

1. A film, filmstrip, slide presentation or transparency set describing the components of a computer system. A computer program such as "Apple Presents Apple" might be useful if not already used in Lesson 2.

2. Demonstration equipment and output examples for each part of the computer system. For example: printouts, sample graphic pictures drawn by computer, microfilms produced by computer, equipment which is operated by computer, optical scanning cards or sheets, samples of electronic mail.

3. Sample non-protected disks which require programs to be cataloged, loaded, listed, and run.

Required Materials for the Participants:

A handout of computer terms, difinitions and sample uses of each component and term listed.

Time Expectation: 2 hours.

Activities:

1. Prepare the group for the audiovisual presentation which will introduce the components of the computer system.

2. Present the film, filmstrip or other material.

3. After the audiovisual presentation, amplify the concepts presented and teach other terms and components listed in the objectives. Use the demonstration materials and equipment to interest rather than lecture or drill terminology. Invite questions and discussion as the demonstration proceeds. The emphasis should be on how computer components provide useful products for education and the everyday world.

4. Demonstrate and have participants practice "booting the system," CATALOG, LOAD, LIST and RUN programs until they understand what is happening inside the computer and are comfortable doing any of these operations.

Bibliography:

1. Jones, Warren, et al. Computer Literacy: Programming, Problem Solving, Projects on the Apple. Reston, Virginia: Reston Publishing, 1983.

2. Mowe, Richard. The Academic Apple. Reston, Virginia, Reston Publishing, 1983.

3. A Computer Is. [Computer program, Junior High - up, Apple IIe] Micro Power & Light, 1983 circa, $34.95.
4 lesson sections include basic definitions, computer architecture, peripheral devices, and useful configurations.

4. How the Computer Works. [Sound filmstrip, Grade 7-adult] Produced by Michael Hardy Productions, distributed by Sunburst, 1984 circa.
Parts of a computer; terms, ROM & RAM; programming languages.

5. MECC Computer Parts Kit. [Kit] St. Paul, Minnesota: MECC, 1983 circa, $75.00.
Actural Parts of a computer for hands-on presentation.

6. Simulated Computer. [Computer program, Age 10-adult, Apple II Series] Pleasantville, New York: The Micro Center, 1982. $29.95.
Traces the execution of simple programs from input through memory and processing to output.

7. Know Your Apple/Apple IIe. [Computer program, Grades 5-adult, Apple Series] Pleasantville, New York: The Micro Center, 1983 circa, $34.95.
A self-paced, self-guided tour of the Apple computer system.

8. Simulated Computer II. [Computer program, Grades 7-adult, Commodore 64] Pleasantville, New York: The Micro Center, 1983 circa, $29.95.
Designed to let you see what's going on inside your compter.

9. Freedman, Alan. The Computer Glossary. Prentice-Hall, 1983. $14.95.

10. Computers: Tools for People. [16mm film or videotape] Available from the Arkansas State Film Library.

11. Personal Computing: Secondary Series. [Videotape] ITV Coop., 1983. Titles include: The Personal Touch, Hardware & Software, Speaking and Language, Data Processing, Control & Design, For Better or Worse, Extending Your Reach. Available from AETN.

12. Lukers, Thomas B. Dictionary of Microcomputer Terms. Dallas, Texas: Masters, 1984.

13. Mandell, Phyllis Levy. "AV Programs for Computer Know-How," School Library Journal, February, 1985, pp 23-28.

MODULE A

MEETING THE COMPUTER

Lesson 4

What To Do When It Doesn't Work

Purpose:

To present participants with some trouble-shooting techniques for computer programs and equipment.

Objectives: The participant will:

1. Explain trouble-shooting techniques for computer equipment:
   a. How to check power strips, cords, and cables.
   b. How to discern which part of the system is not functioning (monitors, disk drive, total non-response, printers).
   c. Where to get assistance.
2. Explain trouble-shooting techniques for computer software:
   a. Trying to reboot programs.
   b. How to discern why the program is not functioning.
   c. The dangers of erasing programs.
3. Explain the general rules for safeguarding both computer equipment and software.
   a. Problems with dust, food, and drinks.
   b. Electrical problems and safeguards.
   c. Care of disks.

Prerequisite: Lessons 1 - 3.

Required Materials for the Instructor:

Prepare materials for sample malfunction operation demonstrations.

Required Materials for the Participants: None.

Time Expectation: 15 - 30 minutes.

Activities:

1. Demonstrate usual malfunctions of computer equipment and how to recognize them and sources of assistance. Have participants close their eyes while the instructor disables the computer and then have the class ascertain the problem.

2. Demonstrate normal malfunctions of computer software. Help participants discern between a user malfunction and an actual software malfunction.

3. Demonstrate how computer software and equipment can be destroyed and how normal operation safeguards should be practiced by all computer operators. Examples of broken equipment and mutilated computer disks are effective teaching aids.

MODULE B

INSTRUCTIONAL USES OF COMPUTERS IN EDUCATION

Lesson 5

Instructional Applications of Computer Software

Purpose:

To present a wide variety of applications for using the computer as a teaching tool.

Objectives: The participant will:

1. Understand, evaluate, and be able to use various types of instructional software.
   a. Drill and practice programs.
   b. Tutorials.
   c. Simulations.
   d. Problem solving programs.
   e. Demonstration/concept building programs.

Prerequisite: Completion of Module A.

Required Materials for the Instructor:

1. Sample programs for each of the types of software listed above. Prepare sample student output for programs where such would be valuable.
2. Sample software evaluation forms.
3. Prepare a handout giving ideas for incorporating computer programs into units of instruction.
4. A computer for demonstration with a large screen monitor or multiple monitors so that every participant can see the screen easily.

Required Materials for the Participants:

Materials for note taking.

Time Expectation: At least 4 class sessions. 3 - 4 hours.

Activities:

1. For each type of software listed above:
   a. Define the type and what programs are available commercially.
   b. Demonstrate one or two typical examples.
   c. Allow participants time to try out a wide variety of programs of the type both in and out of their subject area.
   d. Discuss strengths and weaknesses of the software.
   e. Review the trends in commerical software for the type.
   f. Discuss how to select the type of software to match the abilities, interests, and learning styles of the student.
   g. Describe how to incorporate the type of software into an instructional unit when there are just a few computers or a computer laboratory available.
   h. Discuss how to evaluate the results of using the type of software with students.
   i. Explore the future for this educational application of computers.
2. The following types of sofware should be seen and previewed by the students:
   a. Drill and practice software. Have programs available which include preset drill problems, allow the teacher to supply drill problems, and programs which provide extensive progress and remediation information.
   b. Tutorials. Show a variety of tutorial types, both brief and extensive. Discuss the role of the teacher and the computer tutorial. Describe teacher follow-up and evaluation of tutorials. Discuss what to do about student boredom if it occurs over long periods of computer tutorial work.
   c. Simulations. Demonstrate several types of simulations in various subject fields. Describe techniques for using simulations so that they are more than just games. Decide whether these progams

are actually simulating the real world.

d. Problem solving programs. Show several of the newer programs available on the market which help students improve their thinking and problem solving skills. Discuss how to incorporate these programs in instructional units to achieve maximum transfer of problem solving skills.

e. Demonstration/concept building programs. Show several programs which can be used by the teacher to teach a concept to a small or large group of students. These are programs where the computer can simulate a variety of situations or conditions or experiments when the teacher types in certain critical information. Have teachers search for programs or parts of programs which can be used in this manner.

2. Demonstrate practical ideas for the use of computer software effectively in instructional activities. This can be done by inviting guest demonstrators and then having participants report their success and problems throughout the inservice course. The first 15 minutes of every class hereafter could be devoted to progress reports and problems encountered with instructional software.

Bibliography:

1. Evaluation of Educational Software: A Guide to Guides. Austin, Texas: Southwest Educational Development Laboratory, 1983. (order from SEDL, 211 E. 7th St., Austin, TX 78701, $6.00)

2. Truett, Carol, and Gillespie, Lorie. Choosing Educational Software. Littleton, Colorado: Libraries Unlimited, 1984.

3. Mowe, Richard. "Using Comercial Software," in The Academic Apple, Reston, Virginia: Reston Publishing, 1983. pp. 25-35.

4. Harper, Dennis O. and Stewart, James H. Run: Computer Education. Monterey, California: Brooks/Cole Publishing, 1983.

5. Bitter, Gary G. and Camuse, Ruth A. Using a Microcomputer in the Classroom. Reston, Virginia: Reston Publishing, 1984.

6. Radin, Stephen and Lee, Fayvian. Computers in the Classroom. Chicago, Illinois: Science Research Associates, 1984.

7. Hofmeister, Alan. Microcomputer Applications in the Classroom. New York, New York: Holt, 1984.

8. Chambers, Jack A. and Sprecher, Jerry W. Computer-Assisted Instruction: Its Use in the Classroom. Englewood Cliffs, New Jersey: Prentice-Hall, 1983.

9. School District Planning, Grades 3-8: Computers in the Classroom. Little Rock, Arkansas: Arkansas Department of Education, Project Impac, 1985.

MODULE B

INSTRUCTIONAL USES OF COMPUTERS IN EDUCATION

Lesson 6

Instructional Uses of Word Processing

Purpose:

To demonstrate the instructional uses of word processing for students.

Objectives: The participant will:

1. Be able to use pre-word processors and identify their instructional applications for students who do not have full word processing skills.
2. Be able to use word processors designed for student use.
3. Be able to incorporate word processing and its output into regular instructional activities.

Prerequisite: Module A.

Required Materials for the Instructor:

1. Several keyboarding programs. Southwestern Publishing Company has a series. "Mastertype" is also recommended.
2. Several pre-word processing programs. "Story Writer" by Spinnaker and "Story Tree" by Scholastic or their equivalents are recommended.
3. A standard word processing program designed for normal student needs. "Magic Slate" by Sunburst and/or "Bank Street Writer" by Scholastic/Broderbund or their equivalent are recommended. Access to a spelling correction package is recommended.
4. Access to computers and printers.

Required Materials for the Participants:

Access to programs, computers, and printers.

Time Expectation: 2 hours.

Activities:

1. Demonstrate keyboarding programs and allow participants to experiment with them. Discuss the need to teach keyboarding to students beginning in kindergarten.

2. Demonstrate pre-word processors and allow participants to experiment with them. Include a demonstration of word wraparound, simple correction, and printing of short paragraphs. Explore various curricular uses of pre-word processors.

3. Demonstrate a word processor for students and allow participants time to become familiar and comfortable with it. Include a demonstration of insertion, deletion, moving sentences and paragraphs, formatting printer output, saving and retrieving files, and automatic spelling correction.

4. Demonstrate a computer program which assists students in outlining their thoughts, a research paper, or a report. Discuss this type of program and its value in writing classes and other subject areas.

5. Discuss when and how word processing should be taught to students. Explore the acceptance of computer output from word processors on disk or paper, in dot matrix or letter quality form, and in all subject areas. Discuss access to computers at school and in the home for this use. Consider the impact of word processing from kindergarten to 12th grade and its impact on the teaching of reading, writing, and language arts no matter what subject is being taught.

Bibliography:

1. Wresch, William, ed. The Computer in Composition Instruction: A Writer's Tool. Urbana, Illinois: National Council of Teachers of English, 1984.

2. Marcus, Stephen. "Computers and the Teaching of Writing: Prose and Poetry," in Terry, Colen, ed. Using Micro-computers in Schools. New York: Nichols Publishing, 1984, pp 117-128.

3. Mowe, Richard. "Using a Word Processor," in The Academic Apple. Reston, Virginia: Reston Publishing, 1983, pp 115-139.

4. Processing Words. [Computer program, Apple II Series] MECC, 1983.

Pre-Word Processors:

1. Story Machine. [Computer program, Ages 5-9, Apple Series, Atari, Commodore, IBM] Spinnaker, 1983. $34.95.

2. Kid Writer. [Computer program, Grades 1-5, Apple Series, Commodore] Spinnaker, 1983. $34.95.

3. That's My Story. [Computer program, Grade 4-adult, Apple Series, printer optional] Micro Center. $59.95.

4. Story Tree. [Computer program, Grade 3-adult, Apple Series.] Scholastick, 1984. $59.95.

5. Brackett, George. Bank Street Story Book. [Computer program, Grades 3-9, Apple Series, IBM, Commodore 64] Mindscape, 1984. $39.95.

Word Processors:

1. Magic Slate. [Computer program, Grades 2-adult, Apple Series, requires a printer] Micro Center, 1984. $65.00. (also distributed by Sunburst)

2. HES Writer. [Computer program, Grades 4-adult, VIC, requires a printer] Micro Center, 1984. $39.95.

3. Apple Writer II. [Computer program, Grades 4-adult, Apple IIe & c, requires a printer] Apple Computer Inc., 1982. $225.00.

4. Bank Street Writer. [Computer program, Grades 4-adult, Apple Series, Atari, Commodore, IBM, requires a printer] Broderbund, 1982. $69.95. (also available from Scholastic)

5. Cut & Paste. [Computer program, Grades 4-adult, Commodore 64, Apple II Series, IBM, requires a printer] Electronic Arts, 1984. $50.00.

6. Paper Clip. [Computer program, Commodore 64, PET, requires a printer] distributed by K-12 Micromedia. $130.00.

7. The Micro Editor. [Computer program and text-workbook, Apple series, TRS-80, requires a printer] Southwest Publishing. $59.00.

8. Quill. [Computer program, Grades 3-12, Apple Series, TRS-80] DCH Educational Software. $150.00. May order Heath English Planner disks to accompany.

Outlining:

1. MaxThink. [Computer program, IBM] MaxThink. $249.00.

2. Thinktank. [Computer program, Apple series, IBM] Living Videotext, Inc., $150.00.

Typing & Keyboarding Aids:

1. Zweig, Bruce. Master Type. [Computer program, Grades 1-adult, Apple Series, Commodore 64, Atari, IBM] Scarborough Systems, 1981. $39.95.

2. Typing Tutor III. [Computer program, Grades 1-adult, Apple Series, Commodore 64] Kriya Systems, 1984. $49.95.

3. Keyboarding. [Computer program, Grades 5-adult, Apple Series, PET, TRS 80] Educational Activities. $139.00.

4. Typemaster. [Computer program, TRS-80] distributed by K-12 Micromedia. $29.95.

5. Typing Strategy. [Computer program, Grades 2-adult, Apple Series, Commodore 64, IBM-PC] Behavioral Engineering. $39.95.

6. Keyboard Cadet. [Computer program, Grades 2-12, Apple Series, IBM, Commodore 64] Mindscape. $39.95.

7. Micro Type, The Wonderful World of Paws. [Compter program, Elementary Apple Series, Commodore 64] Southwester Publishing. $39.95. May order text: Computer Keyboarding, An Elementary Course, which is integrated with disks.

Complete Curriculum:

1. Martin, John Henry. Writing to Read. [Complete program, Grades K-1, IBM] IBM Personal Computer Software, 1984.

MODULE B

INSTRUCTIONAL USES OF COMPUTERS IN EDUCATION

Lesson 7

What Benefits to the Learner Can We Expect from Using Computers?

Purpose:

To acquaint the participants with information from research concerning the use of computers in education.

Objectives: The participants will:

1. Define the benefits of computer assisted instruction in the areas of learning, student attitudes, learner motivation, and time on task.

2. Discuss the techniques which must be employed if positive results are to be achieved.

Prerequisite: None.

Required Materials for the Instructor:

1. Access to a review of the research concerning computers in education.

2. Access to current research articles which update research reviews.

Required Materials for the Participants:

1. A bibliography of research reviews and pertinent articles concerning the benefits of computers in education.

2. Materials for note taking.

Time Expectation: 45 minutes.

Activities:

1. Using one or several reviews of research, lecture, and discuss with the participants the benefits and problems dealing with the use of computers as instructional tools. Points to cover might include:

a. Most of the research thus far has concentrated on drill and practice computer programs and much of the research has been done on mainframe rather than on micromputers.

b. Most studies agree that computer assisted instruction is an effective teaching tool and, possibly, a little bit better than conventional instruction.

c. Teachers can expect positive, affective effects as students interact with computers.

d. Teachers can expect better time-on-task behavior and significant time savings when using computer assisted instruction.

e. Teachers can expect improvements in writing and in the use of English when word processing is a regular part of school assignments.

2. Discuss the techniques which must be used by teachers if computers are expected to deliver positive results with learners. Sample discussion topics might include:

a. Computers, like any other technology, should not be asked to deliver more than they were designed to deliver.

b. Poor computer programs are not likely to contribute anything to student success. Computer programs should use the power of the computer such as active response by the student, instant feedback, multiple presentation levels, self-pacing, and other computer characteristics in an interesting and motivating presentation mode.

c. Teachers need to use proven techniques of incorporating computers into instruction just as they would utilize any other print or audiovisual media properly.

Bibliography:

1. Bracey, Gerald W. "Computers in Education: What the Research Shows," Electronic Learning, Nov./Dec. 1982, pp. 31+.

2. Leiblum, M.D. "Factors Sometimes Overlooked and Underestimated in the Selection and Success of CAL as an Instructional Medium," AEDS Journal, Winter, 1982, pp 67-79.

3. Vinsonhaler, J. and Bass, R. "A Summary of Ten Major Studies of CAI Drill and Practice," Educational Technology, Dec. 1982, pp 29-32.

4. Electronic Learning Laboratory. On Task Behavior of Students During Computer Instruction vs. Classroom Instruction. Teachers College, Columbia University, New York, January 1982.

5. Ragosta, Marjorie, Paul Holland and Dean Jamison. Computer-Assisted Instruction and Compensatory Education: The ETS/LAUSD study. Final Report. Educational Testing Service, 1981.

6. Hartley, S. S. "Meta-analysis of the Efforts of Individually Paced Instruction in Mathematics." (Doctoral Dissertation, University of Colorado, 1977) University Microfilms No. 77-29, p. 296.

7. Edwards, J., S. Norton, S. Taylor, M. Weiss, and R. Dusseldorp. "How Effective is CAI? a Review of the Research," Educational Leadership, 1975, pp 33 & 147-153.)

8. Jamison, Dean, Patrick Suppes, and Studart Wells. "The Effectiveness of Alternative Instructional Media: a Survey," Review of Educational Research, p. 44, 1974.

9. Burns, Patricia Knight and Bozeman, William C. "Computer-Assisted Instruction and Mathematics Achievement: Is There a Relationship?" Educational Technology, October 1981, pp 32-39.

10. Clement, Frank J. "Affective Considerations in Computer-Based Education," Educational Technology, April 1981, pp 28-32.

11. Kulik, James, et.al., "Effects of Computer Based Teaching on Secondary School Students," Educational Psychologist, February 1983, pp 19-26.

12. Thomas, David B. "The Effectiveness of Computer Assisted Instruction (in) Secondary Schools," AEDS Journal, Spring 1979, pp 103-115.

13. Orlansky, Jesse and String, Joseph. "Computer-based Instruction for Military Training," Defense Management Journal, Second Quarter, 1981. pp 46-54.

14. Kulik, James A., Chen-Lin Kulik, and Peter A. Cohen. "Effectivenss of Computer-based College Teaching: A Meta-analysis of Findings," Review of Educational Research, Winter 1980, pp 525-544.

15. Alderman, D.L. Evaluation of the TICCIT Computer-Assisted Instructional System in the Community College, (ETS PR 78-10). Princeton, New Jersey: Educational Testing Service, 1978.

16. Murphy, R.T. and Apel, L.R. Evaluation of the PLATO IV Computer-based Education System in the Community College, (ETS PR 77-10). Princeton, New Jersey: Educational Testing Service, 1977.

17. Kearsley, G.; Hunter, B.; and Seidel, R.J. "Two Decades of Computer Instruction Projects: What Have We Learned?," T.H.E. Journal, Jan., 1983, pp 90-96 and Feb., 1983, pp 88-93.

18. McLaughlin, M.W. and Marsh, D.D. "Staff Development and School Change," Teachers College Record, Sept., 1978 pp 69-94

19. Becker, Henry Jay. Microcomputers in the Classroom: Dreams and Realities. Eugene, Oregon: ICCE (University of Oregon), 1983.

20. Grossnickle, Donald R. and Laird, Bruce A. "Microcomputers: Bitter Pills to Swallow - RX for Successful Implementation Efforts," T.H.E. Journal, May, 1983, pp 106-108.

21. Kulik, James A.; Chen-Lin, C.,; and Cohen, Peter A. "Effectiveness of Computer-based College Teaching: A Meta-analysis of Findings," Review of Educational Research, Winter, 1980, pp 525-544.

22. White, Mary Alice. "Synthesis of Research on Electronic Learning," Educational Leadership, May, 1983, pp 13-15.

23. Varven, Jean. "The Schoolhouse Apple," Softalk, June, 1983, p. 123-4.

24. Chambers, Jack A. and Sprecher, Jerry W. Computer Assisted Instruction: Its Use in the Classroom. Englewood Cliffs, New Jersey: Prentice Hall, 1983.

25. Loertscher, David V. Computer Assisted Instruction: A Review of Research. Fayetteville, Arkansas: Hi Willow Research and Publishing, 1984.

26. Norman, Carol. A Teacher Survey NEA Report: Computers in the Classroom. Washington, D.C.: National Education Association, 1983.

27. Glass, Gene V. "A Meta-Analysis of Effectiveness of Four Educational Interventions." (IFG Project Paper) Stanford, California: Stanford University, Institute for Research on Educational Finance and Governance, 1984.

28. Johnston, J. Howard, "What Research Says to the Practitioner About Computer-Assisted Instruction," Middle School Journal, May, 1983, pp 18-19+.

MODULE B

INSTRUCTIONAL USES OF COMPUTERS IN EDUCATION

Lesson 8

Integrating the Computer into Teaching and Instruction

Purpose:

To explore and re-emphasize techniques for incorporating computers into daily instructional activities.

Objectives: The participant will:

1. Review an instructional model for effective instruction.
2. Be able to demonstrate ways that computers can be incorporated into the instructional model.
3. Be able to evaluate the impact of computer activities as one component in effective instruction.

Prerequisite: Lesson 5.

Required Materials for the Instructor:

1. Prepare a transparency/handout of an instructional model. The PET model or any instructional development model is recommended.
2. Prepare sample teaching unit plans which exhibit an effectively integrated computer component.
3. Prepare a sample teaching unit without a computer component. This unit will be used to demonstrate how to weave a computer activity into an already-planned instructional unit.
4. Invite one or several guest demonstrators or assign participants to demonstrate how they have incorporated a computer component into a unit of instruction effectively.
5. Prepare a handout of various evaluation suggestions for units that have included a computer component.

Required Materials for the Participants:

1. Materials to take notes.

Time Expectation: 1 hour.

Activities:

1. Discuss ways to gain access to enough computers so that a computer component can become a part of a normal teaching activity in any discipline or grade level.

2. Review a model of an exemplary teaching unit. The PET model or any instructional development model will suffice.

3. Demonstrate an actual exemplary teaching unit plan which has an effectively integrated computer component. One or several guest demonstrators or participant demonstrations would be excellent.

4. Distribute a teaching unit that lacks a computer component. Using an actual software program, have the participants decide how to incorporate that software into the proposed unit. Will it be used as an introductory piece? A main presentation module? As a supplementary piece? As a review? As a final evaluation? How will it be used for large groups, small groups or individuals?

5. Explore various logistical plans for incorporating computers into units when: 1) equipment is limited; 2) when computers are in laboratory settings; and 3) when computers are plentiful and in close proximity to the students.

6. Discuss various ways of evaluating a computer component through observation, computerized testing, regular testing, and other evaluation stategies. Include a cost analysis.

Bibliography:

1. Planning for Educational Technology. Minneapolis, Minnesota: MECC, 1984. $12.00.

2. Heinich, Robert; Molenda, Michael; and Russell, James D. Instructional Media. 2nd ed. New York, New York: Wiley, 1985. See chapter 2: "Systematic Planning for the Use of Media," pp. 32-61.

3. Brown, James W.; Lewis, Richard B.; and Harcleroad, Fred F. AV Instruction. 6th ed. New York, New York: McGraw-Hill, 1983. See chapter 1: "Systematic Planning of Instruction," pp. 1-16.

MODULE C

CLASSROOM AND SCHOOL MANAGEMENT APPLICATIONS

Lesson 9

Overview of Management Applications

Purpose:

To explore a variety of ways that a computer can be used to assist teachers in classroom management and administrators in school management.

Objectives: The participants will:

1. Look briefly at a wide variety of classroom management applications of computers including: gradebooks, test generators, lesson generators, test scorers, word processors, and instructional management programs.

2. Look briefly at a wide variety of school management applications of computers including: attendance programs, mailing list generators, student scheduling packages, financial management programs, word processors, and inventory programs.

3. Be able to evaluate management programs in terms of efficiency, accuracy, and time savings.

4. Know when not to computerize a management task.

Prerequisite: Module A.

Required Materials for the Instructor:

1. A demonstration computer with a large screen or multiple monitors.

2. A variety of software programs for classroom and school management.

3. Sample output/handouts for each of the demonstration programs.

4. An evaluation sheet for management software.

5. A rule sheet of do's and don'ts and Murphy's Laws pertaining to management software.

Required Materials for the Participants:

1. Note taking materials.

Time Expectation: 2 hours.

Activities:

1. Present an overview of the potential of using computers to assist in the management of the classroom and the school. Include a list of advantages and also a list of pitfalls in computerizing any task.

2. Demonstrate a variety of packages designed for management purposes. Include the following points for each package demonstrated:

   a. Define the type and what programs are available commercially.

   b. Demonstrate one typical example. Show sample output.

   c. Allow participants brief hands-on experience in small groups if desirable. In-depth hands-on experience may be covered in later lessons.

   d. Discuss the strengths and weaknesses of the management program.

   e. Review the trends in commercial software for this type.

   f. Discuss whether software of this type could be adapted to local situations and conditions.

   g. Probe ways to evaluate the efficiency, accuracy and time savings of the program.

3. Discuss some of the major problems of computerizing a task such as backup of data and malfunction of programs and equipment. Present and develop some criteria for analyzing whether a task should be computerized. Discuss efficiency, time savings and accuracy evaluations.

MODULE C

CLASSROOM AND SCHOOL MANAGEMENT APPLICATIONS

Lesson 10

One Management Application in Depth

Purpose:

To explore one management application from Module E in depth.

Objectives: The participants will:

1. Have an opportunity to realistically assess the computer as a management tool.
2. Be able to make judgements concerning management applications from a base of experience rather than from theory.

Prerequisite: Module A and Lesson 9.

Required Materials for the Instructor:

1. Materials recommended for the lesson chosen (Lesson 13-18).

Required Materials for the Participants:

1. Materials recommended for the lesson chosen (Lesson 13-18).

Time Expectation: 2 hours.

Activities:

1. Choose one of the management applications from Lessons 13-18 for in-depth treatment. Make the choice based on: a) the type of participants taking the class; b) the programs which they are most likely to use in their everyday work; and c) the type of equipment which participants will have in close proximity to their work station.
2. Demonstrate and let participants have enough hands-on experience until they can operate that program comfortably and could integrate it into their everyday management operation.

MODULE D

CARE OF COMPUTERS AND COMPUTER PROGRAMS

Lesson 11

Care of Hardware

Purpose:

To enable participants to provide care for computer equipment and to deal with simple repair and malfunctions.

Objectives: The participant will:

1. Be able to provide normal care and preventative maintenance for computer equipment.
2. Be able to provide care for various popular brands of computers.
3. Be able to do simple repair and discern when to send the piece to a repair service.

Prerequisite: Module A.

Required Materials for the Instructor:

1. Various equipment on which to demonstrate care and maintenance do's and don'ts.
2. Prepare a handout on general do's and don'ts.
3. Produce a handout recommending commercial repair services and maintenance contracts.

Required Materials for the Participants:

1. Materials for note taking.

Time Expectation: 1 hour.

Activities:

1. For each component of the computer system, discuss normal care and preventive maintenance procedures. Items to be

covered might include:

a. Problems created by dust (including chalk dust).

b. Electrical surges and power failures.

c. Temperature and humidity guidelines.

d. Misuse.

2. Discuss the particular needs of some brands. For example:

a. Apple disk drive timing.

b. Commodore ground cable placement.

c. Particular connector problems.

3. Explore the problem unique to each type of device. For example:

a. Keyboard contact cleaning.

b. Tape drive head cleaning.

c. Disk drive head cleaning and timing.

d. Printer ribbon changing.

4. Classify what types of repair can be done in-house and which should be sent out for commercial repair.

Bibliography:

1. Beechhold, Henry F. The Plain English Repair and Maintenance Guide for Home Computers. New York, New York: Simon & Schuster, 1984.

2. Guidelines for School District Planning Grades 3-8 - Microcomputer Instruction Programs. Little Rock, Arkansas: Arkansas State Department of Education, Project IMPAC, 1984.

3. Disk Drive Analyzer. [Computer program, Apple Series, IBM] Verbatim, 1983.

4. The program "FID" or "FILEM" on the Apple "Systems Master" disk does some diagnostic tests.

5. See discussions on equipment in: School District Planning, Grades 3-8: Computers in the Classroom. Little Rock, Arkansas: Arkansas State Department of Education, Project IMPAC, 1985.

MODULE D

CARE OF COMPUTERS AND COMPUTER PROGRAMS

Lesson 12

Care of Software and Copyright Considerations

Purpose:

To enable participants to provide care for computer software and understand ethical and copyright issues.

Objectives: The participants will:

1. Understand principles of care for software including disks, tapes, and cartridges.
2. Know the ethical and copyright considerations connected with computer software.

Prerequisite: Module A.

Required Materials for the Instructor:

1. Examples of software for demonstration.
2. Prepare a handout on copyright law and fair use.

Required Materials for the Participant:

1. Materials for taking notes.

Time Expectation: 20 minutes.

Activities:

1. Discuss the care of computer media in general including the avoidance of magnetism and radiation.
2. Demonstrate care of computer tapes and attendant problems of dust and stretching.

3. Demonstrate care of computer disks and the problems of handling, bending, and dust.

4. Discuss the care of computer cartridges.

5. Discuss the fact that computer software purchased must be compatible with the computer system owned (number of K, the right peripherals, brand of computer, and correct model). Answer typical questions such as:

   a. What should I do if I buy the wrong type of software?

   b. How are returns made to non-local companies?

   c. What happens if I accidentally destroy the program disk?

   d. Is there technical assistance available from most software companies?

6. Explore the ethics and copyright consideration of computer software.

   a. Public domain vs. copyrighted software.

   b. Purchase and registration of software.

   c. Rights to a backup copy.

   d. Procedures for backing up software legally.

   e. Copyright vs. fair use.

   f. Use of one copy of the program with many computers.

Bibliography:

1. Sennett, M.L. "Are There Pirates in Your School?," Educational Computer Magazine, January, 1984, pp. 42-4.

2. Brooks, D.T. "As New Technology Booms, What is 'Fair Use' of Educational Software?," NASSP Bulletin, February, 1984, pp. 66-74.

3. Talab, R.S. "Copyright, Fair Use, and the School Microcomputer Lab," Educational Technology, February, 1984, pp. 30-2.

4. Talab, R.S. "The Problem of Copying Computer Programs Without Breaking the Law," Instructional Innovator, January, 1984, pp. 36-7.

5. Jobe, H.M. "High Tech Raises New Copyright Questions," Instructional Innovator, May, 1984, p. 28.

6. Talab, R.S. "Copyright, Micro Software, and the Library Media Center," School Library Media Quarterly, Summer, 1984, pp. 285-8.

MODULE E

MANAGEMENT

Lesson 13

Word Processing

Purpose:

To provide participants with both skill and application ideas for word processing in the management of classrooms and schools.

Objectives: The participants will:

1. Gain skill on a particular word processor.
2. Learn a variety of uses for a word processor in the management of classrooms and schools.

Prerequisite: Module A and Lesson 6.

Required Materials for the Instructor:

1. Access to a word processor and the proper computing facilities and printing peripherals. This word processor may be the same one used by students or one that is more sophisticated for use in administrative applications. Recommended brands include: Apple Works, Apple Writer, and Super Scripsit.
2. Find or prepare a shortened guide to the word processor to be taught and provide access to complete manuals.
3. Prepare examples of management ideas for teachers and administrators using a word processor.

Required Materials for the Participants:

1. A word processing guide and samples of management applications.
2. Materials for note taking.

Time Expectation: 1-2 class sessions. 1-2 hours.

Activities:

1. Provide an overview of the reasons for word processing and its potential for management operations both in the classroom and in the school.

2. Using an abbreviated guide, demonstrate a word processor to the participants. Allow them to practice after each function or several functions are demonstrated. Have them practice each funtion to create a sample management application. For example, a form letter to parents, a teaching unit plan, a report to administrators, a class list, etc.

3. Review sample handouts of management ideas for word processing and assign participants to practice between class sessions.

4. During the second class session, review previously taught functions, solve participant problems, demonstrate more advanced functions, and generate other ideas for management applications.

5. Follow up this lesson several weeks later to solve participant problems, discouragements, and to generate still further ideas for management applications.

Bibliography:

1. Loertscher, David V. and Greathouse, Sherry. Beginner's Guide to Apple IIe Writer and Bank Street Writer. Fayetteville, Arkansas: Hi Willow Research and Publishing, 1984. (order from: P.O. Box 1801, Fayetteville, Arkansas 72702. $2.50)

MODULE E

MANAGEMENT

Lesson 14

Grade Books

Purpose:

To provide participants with several alternative programs that can be used to record and store grade reports.

Objectives: The participants will:

1. Become familar with several types of grade book programs.
2. Acquire a working knowledge of at least one program.

Prerequisite: Module A.

Required Materials for the Instructor:

1. Several grade book programs which would be useful to the participants.
2. Sample output from each grade book program.

Required Materials for the Participants:

1. Bring their own hand-recorded grade book.

Time Expectation: 1 hour.

Activities:

1. Demonstrate several different grade book software packages. Show various levels of sophistication and adaptability to specific needs of the participants. Discuss strong and weak points of each package demonstrated.
2. Allow participants to try out one or several packages with the object to select and gain some skill with a particular package that is usable in their situation.

Bibliography:

1. Apple Grade Book. [Computer program, Apple Series] J & S Software, 1982. $49.50. (Available from many sources including The Micro Center, P.O. Box 6, Pleasantville, New York 10570)

2. Teacher's Record Book. [Computer program, Apple Series] Successful Software, 1984. $60.00. (Available from The Micro Center)

3. Class Records. [Computer program, Apple Series] Educational Systems Software, 1984. $89.95.

4. Master Grades. [Computer program, Commodore 64, Apple Series] Midwest Software, 1983. $39.50.

5. Grade Calc. [Computer program, Apple Series, Atari, Commodore 64, PET] Tamarack. $29.95.

6. Gradebook. [Computer program, Apple Series, TRS-80] distributed by K-12 Micromedia. $29.95.

7. Classfile. [Computer program, TRS-80] distributed by K-12 Micromedia. $49.95D/$29.95C.

8. PFS Personal Filing System. [Computer program, Apple Series, IBM] Software Publishing. File $125.00/Report $125.00.

9. The Reporter. [Computer program, Apple Series, IBM, TRS-80] distributed by K-12 Micromedia. $495.00.

10. Kalamazoo Teacher's Record Book. [Computer program, Apple Series, Commodore 64, IBM] Hartley Courseware. $69.95.

11. Gradisk. [Computer program, IBM] John Wiley. $75.00.

MODULE E

MANAGEMENT

Lesson 15

Skeleton Programs

Purpose:

To familiarize the participants with skeleton programs which they can adapt to a variety of curricular units.

Objectives: The participants will:

1. Be able to recognize various types of skeleton programs.
2. Be able to create tailor-made software for specific instructional units using one or several skeleton programs.

Prerequisite: Module A.

Required Materials for the Instructor:

1. A variety of skeleton programs.
2. Sample output from each program.

Required Materials for the Participants:

1. A bibliography of skeleton programs with space for notes.

Time Expectation: 1 hour.

Activities:

1. Define a skeleton program as one where the producer provides the main program and the teacher supplies the contents. For example, a spelling drill program for which the teacher may enter a weekly spelling word list.
2. Demonstrate as many skeleton programs as time will allow. Show different types and how they may be adapted to almost any subject matter. Show strengths and weaknesses.

3. Allow participants time to create a few sample programs by supplying the subject matter content.

4. Discuss the use and integration of such programs into normal units of instruction.

Bibliography:

Skeleton programs are too numerous to list but a few examples are:

1. Math Blaster! [Computer program, Apple Series] Davidson & Associates 1983. $49.95.

2. M-SS-NG-L-NKS. [Computer program, Acron, Apple Series, Atari, Commodore 64, IBM, TRS-80] Sunburst, 1984. $55.00.

3. Word Invasion. [Computer program, Apple Series, Commodore 64, IBM] DLM, 1983. $39.95.

4. The Adaptable Skeleton. [Computer program, Apple Series] distributed by Charles Clark Co., 1984. $34.95.

5. Create Your Own--Spell It. [Computer program, cassette control device, and cassette recorder] distributed by Charles Clark Co., 1984. $105.00.

6. Create-Lessons. [Computer program, Apple Series, IBM] Hartley. $39.95.

7. Money! Money! [Computer program, Grades 1-5, Apple Series, IBM] Hartley. $39.95.

8. Spellicopter. [Computer program, All ages, Apple Series, Atari, IBM] DesignWare. $39.95.

9. States and Traits. [Computer program, Grades 6-adult, Apple Series, Commodore 64, IBM] DesignWare. $44.95.

10. Create-A-Vocabulary. (Spanish, German, French) [Computer program, All ages, Apple Series, IBM] Control Data Publishing-Plato. $49.95.

MODULE E

MANAGEMENT

Lesson 16

Test Generation Programs

Purpose:

To familiarize the participants with test generation programs which will fill a variety of test administration and correction needs.

Objectives: The participants will:

1. Be familiar with a variety of test generation programs.
2. Select and be able to use at least one program comfortably.

Prerequisite: Module A.

Required Materials for the Instructor:

1. A variety of test generation programs.
2. Sample output from each program.

Required Materials for the Participants:

1. A bibliography of test generation programs with space for notes.

Time Expectation: 1 hour.

Activities:

1. Demonstrate several test generation programs. Show different types and how they can be adapted to various testing situations and needs.
2. Allow participants time to create a few sample tests and follow-up scoring methods.
3. Discuss the use of such programs in a variety of normal school situations. Point out the need for security, variability, and backup copies of test banks.

Bibliography:

1. Super Quizz II. [Computer program, Apple Series] Sterling Swift, 1983. $50.00.

2. Test Generator. [Computer program, Apple Series] distributed by Charles Company, 1984. $50.00.

3. Test Writer. [Computer program, Apple Series, TRS-80] distributed by Charles Clark, Company, 1984. $49.95.

4. The Grand Inquisitor. [Computer program, IBM] Micro Power & Light, 1985. $125.00.

5. The Biology Test Maker. [Computer program, Apple Series] J & S Software. $75.00.

6. Tutorial Quiz Master. [Computer program, Apple Series, TRS-80] distributed by K-12 Micromedia. $75.00.

7. Testmaster. [Computer program, Commodore 64, Apple Series, printer recommended] Midwest Software. $35.00.

8. Multiple Choice Files. [Computer program, Apple Series, Atari XL Series, IBM] Compu-tations. $29.95.

9. Study Quiz Files. [Computer program, Apple Series, Atari XL] Compu-tations. $29.95.

10. Archive. [Computer program, Apple Series] DCH Educational Software. $45.00.

11. Exam Builder. [Computer program, IBM] A.U. Software. $99.95.

12. The Cactus Gradebook. [Computer program, IBM] Cactusplot Co. $45.00.

MODULE E

MANAGEMENT

Lesson 17

Computer Managed Instruction

Purpose:

To familiarize the participants with computer managed instructional programs and their use as part of the total educational program.

Objectives: The participants will:

1. Be familiar with several levels of sophistication in computer managed instructional programs.
2. Understand the role of the teacher vs. the computer when the burden of instruction is given to the computer.
3. Be able to implement computer managed instructional programs as part of a total instructional program.
4. Be able to discuss the issue: Is a change in the philosophy of teaching required when using CMI?

Prerequisite: Module A and Lesson 5.

Required Materials for the Instructor:

1. Access to computer software and hardware needed to demonstrate computer managed instructional software. This may require the use of a computer network and hard disk drive. Specific types to demonstrate include:
   a. Stand alone CMI (short popular programs which provide evaluative data for the teacher).
   b. CMI programs designed to accompany textbook series.
   c. Major CMI programs designed to provide the bulk of instruction for a unit of instruction or an entire course.
   d. CMI in the network mode.
2. Sample student output and management/prescriptive data from each program demonstrated.

Required Materials for the Participant:

1. Materials for taking notes.

Time Expectation: 1 hour.

Activities:

1. Demonstrate stand-alone CMI which presents diagnostic information to the teacher (available on many popular programs). Discuss the use of data generated by the computer and its incorporation into normal teaching evaluation strategies.

2. Demonstrate major programs designed to accompany texts and which provide extensive evaluation data and prescribe or regulate student pace through the material. Discuss the use of data generated by the computer and its incorporation into long-range course objectives.

3. Demonstrate major programs designed to carry the bulk of a teaching unit or course of instruction. Explore the role of the teacher and the computer in implementing such a course. Show prescriptive data and discuss ways that the teacher can humanize and control instructional progress and quality.

4. Demonstrate networked CMI. Discuss the issue: Is a change in the philosophy of teaching required when using CMI?

MODULE E

MANAGEMENT

Lesson 18

Teacher Utilities

Purpose:

To allow participants to experiment with teacher utility computer programs in order to see their value in managing the classroom.

Objectives: The participants will:

1. Be familiar with several teacher utility programs and be able to use them effectively in their classrooms.

Prerequisite: Module A.

Required Materials for the Instructor:

1. Several teacher utility programs.
2. Sample output from each program.

Required Materials for the Participants:

1. A bibliography of teacher utility programs with space to take notes.

Time Expectation: 1 - 2 hours.

Activities:

1. Demonstrate several teacher utility programs. Allow participants time to become proficient in the use of one or more of the demonstrated programs.

Bibliography:

1. The Print Shop. [Computer program, Apple Series, Commodore 64, requires a printer] Broderbund, 1984. $49.95.
2. The Professional Sign Maker. [Computer program, Apple Series, requires a printer] Sunburst, 1984. $59.00.

3. The Learning System. [Computer program, Apple Series] Micro Lab, 1983. $75.00.

4. The Self-Instructional Management System (SIMS). [Computer program, Apple Series] Sunburst, 1983. $195.00.

5. Vanilla PILOT. [Computer program, Commodore 64, VIC-20] Tamarack Software, 1983. $29.95.

6. Teacher Utilities, Volume 1. [Computer program, Apple Series, Atari, IBM] MECC, 1980. $39.95.

7. Worksheet Wizard. [Computer program, Apple Series] distributed by Charles Clark Company, 1984. $24.95.

8. Fact Sheets. [Computer program, Apple Series, IBM] Hartley, 1984. $49.95.

9. Math Worksheets. [Computer program, Apple Series] distributed by Charles Clark Company, 1984. $49.95.

10. Time-Saver: Teacher-Created Puzzles and Tests. [Computer program, Apple Series] distributed by Charles Clark Company, 1984. $39.00.

11. Parent Reporting. [Computer program, Apple Series] distributed by Charles Clark Company, 1984. $39.95.

12. Word-A-Tach. [Computer program, Apple Series] Hartley, 1983. $26.95.

13. Crossword Magic. [Computer program, Apple Series, IBM, Commodore 64, Atari] Mindscape. $49.95.

14. Medalist Series: Create. [Computer program, Apple Series] Hartley, 1983. $40.00.

15. Create - Elementary. [Computer program, Apple Series] Hartley, 1983. $27.00.

16. Create - Intermediate. [Computer program, Apple Series] Hartley, 1983. $27.00.

17. Time Saver: Teacher Created Puzzles and Tests. [Computer program, Apple Series] Sunburst, 1983. $30.00.

18. Word Search. [Computer program, Apple Series] Hi Tech of Santa Cruz, 1981. $40.00.

19. Word Scramble. [Computer program, Apple Series] Hi Tech of Santa Cruz, 1981. $40.00.

20. Word Match. [Computer program, Apple Series] Hi Tech of Santa Cruz, 1981. $40.00.

21. Wordsearch. [Computer program, Apple Series, IBM] Hartley, nd, $29.95.

22. Puzzles and Posters. [Computer program, Commodore 64, IBM, Apple Series, TRS-80, printer required] MECC, 1984. $44.00.

23. The Lesson Planner. [Computer program, Apple Series, IBM] Computations. $39.95.

MODULE F

HARDWARE

Lesson 19

Buying Your Own Computer

Purpose:

To provide participants with useful information and helpful criteria for purchasing a personal computer.

Objectives:

1. Discuss how to determine computing needs and how to match which computer components will be needed.
2. Identify a variety of systems available on the market and explain how to compare systems in terms of quality, price, and performance.
3. Name criteria for selecting a reliable computer dealer.

Prerequisite: At least Module A.

Required Materials for Instructor:

1. Several different brands of computers.
2. Comparative data on computer components and models.
3. A list of recommended computer dealers.

Required Materials for the Participants: None.

Time Expectation: 1-2 hours.

Activities:

1. Arrange demonstrations of various computer systems currently on the market. Inviting computer dealers to participate in a computer fair is one technique but it is not always very

successful. Dealers are interested in selling products, not providing objective appraisals.

2. Discuss with participants ways to compare computer systems across brand names. Identify the market which the manufacturer is aiming most of its sales. What is the manufacturer doing to encourage software development for education?

3. Outline the criteria for selecting a reputable computer dealer. Supply the participants with a list of dealers.

4. Discuss the cost of computer systems in terms of features needed. What discounts are given to schools and teachers by companies such as Apple and IBM? Outline continuing costs for supplies, maintenance, and computer software.

Bibliography:

Each year, a number of magazines are issued which are announced as buyer's guides for everything from hardware to software, to peripherals. Provide a variety of these issues to the participants. Examples are: "A+ Buyers Guide for Apple Computing, 1985," "Creative Computing 1984 Software Buyer's Guide," "Creative Computing," Dec. 1984 issue: "Top Computers of 1984: Can You Name Them?"

MODULE F

HARDWARE

Lesson 20

Peripherals and Their Applications

Purpose:

To assist participants in the uses and selection of peripheral devices for school and home use.

Objectives: The participant will:

1. Describe the different peripheral devices available.
2. Explain the uses of each peripheral device demonstrated.
3. Discuss how to select and match peripheral devices to the computer system already purchased.

Prerequisite: Lesson 19

Required Materials for the Instructor:

1. Various peripheral devices for demonstration. For example: printers, (dot matrix and letter quality), graphics tablets, OCR devices, color monitors vs. green or amber screen monitors, plotters, and a mouse.
2. Sample output from each peripheral device to be demonstrated.

Required Materials for the Participant:

1. Materials for taking notes.

Time Expectation: 1 hour

Activities:

1. Demonstrate each device. Describe and show:
   a. Sample output.

b. Type of software needed.

c. Type of computer system needed and compatability problems.

d. Applications for school and home.

e. Limitations.

f. Cost.

g. Different brands available.

MODULE G

SOFTWARE

Lesson 21

New Trends in Software

Purpose:

To introduce participants to new developments in computer software.

Objectives: The participant will:

1. Be introduced to new types and innovative computer software.
2. Know the uses of the new software in education.
3. Discover how and when such software will become available for widespread adoption.

Prerequisite: Lesson 5.

Required Materials for the Instructor:

1. One or several unique or innovative software packages.
2. Sample output from the package.

Required Materials for the Participants: None.

Time Expectation: 30 min. - 1 hour.

Activities:

1. Describe the software package to be demonstrated and why it is unique or innovative.
2. Demonstrate the package.
3. Allow participants to experiment with it.
4. Discuss how the software could be integrated into instruction in one or several content areas.

5. Describe the availability of the software, where and when it will be ready for adoption.

6. Enlist one or more participants to experiment with the software in a classroom setting. Obtain any permission necessary for the experiment. Schedule the experimentation and report the results back to all the participants.

MODULE G

SOFTWARE

Lesson 22

Sources

Purpose:

To acquaint participants with possible sources for computer software for educational use.

Objectives: The participant will:

1. Review possible sources for computer software for educational use.
2. Distinquish between producers catalogs, definitive listings, recommended lists, and critical review sources.
3. Discuss various ways to preview software before purchase.
4. List sources for public domain and inexpensive software.
5. Explain why price is not indicative of quality.
6. Review ethical and legal responsibilities to software producers.

Prerequisite: Lesson 5.

Required Materials for the Instructor:

1. A variety of sources for microcomputer software.
2. A bibliography of sources of interest to the participants.

Required Materials for the Participants:

1. Materials to take notes.

Time Expectation: 30 min. - 1 hour.

Activities:

1. Describe the rapidly growing software market for educational computer

software. Warn that any sources described in the demonstration may not exist tomorrow or may merge with other companies or change names.

2. Describe and explore the following sources:

   a. Publisher's and jobber's catalog. Distinguish between publisher's flyers which are non-evaluative, and jobbers (wholesalers) who try to select the best of the market for inclusion in their catalogs.

   b. Definitive source lists. Show sources which attempt to list all computer software available and are non-evaluative.

   c. Recommended lists. Describe lists emanating from governmental units, learned societies, school district preview centers, and from trusted journals.

   d. Review sources. Show professional journals and periodicals which regularly and critically review software.

   e. Public domain software. Provide sample lists and a bibliography of sources. Describe a public domain consortium and how one operates. Discuss methods of obtaining and copying this type of software. Review selection criteria and point out the difficulty of finding quality materials in the public domain category.

Bibliography:

References

1. Bowker/Bantam 1984 Complete Sourcebook of Personal Computing. New York: R.R. Bowker, 1983. $24.95.

2. Orwig, Gary W. and Hodges, William S. The Computer Tutor: Learning Activities for Homes and Schools. Cambridge, Massachusetts: Winthrop Publishing, 1982.

Public Domain Software

1. Heller, David and Heller, Dorothy. Free Software for Your Apple. San Jose, California: Enrich/Ohaus, 1984. Also: Free Software for Your Commodore 64, Vic 20/PET CBM.

2. Apple public domain software: PM Enterprises, 1910 Summerhill Dr., Charlotte, North Carolina 28212, 7-4-535-1579.

3. Apple public domain software: 3A Computer Products, 2111 Central Ave., Cheyenne, Wyoming 82001.

4. Apple, Atari, PET, and TRS-80 public software: SOFTSWAP, Microcomputer Center, San Mateo County Office of Education, 333 Main Street, Redwood City, California 94063, 415-363-5470.

5. Commodore public domain software: Educational Software, 1923 Caldwell, Conway, Arkansas 72032, 501-329-3415.

6. Commodore public domain software: Commodore Computer Club, P.O. Box 6000, South Station, Ft. Smith, Arkansas 72906.

7. TI public domain software: Unisource Electronics, Inc. P.O. Box 64240, Lubuck, Texas 79464. 1-800-858-4580.

8. TI public domain software: John J. Volk, Route 1 Box 69, Van Buren, Arkansas 72956, 501-474-5981.

9. Computer programs from periodicals: Friedman, Paul. Computer Programs in Basic. Englewood Cliffs, New Jersey: Prentice-Hall, 1981.

10. Apple public domain software: Apple Puget Sound Program Library Exchange, 304 Main Avenue South, Suite 300 Renton, Washington 98055.

Recommended Lists

1. Stanton, Jeffery; Well, Robert P. and Rochowansky, Sandra (eds.). The Addison-Wesley Book of Apple Computer Software. Addison-Wesley, Annual. $19.95. Also: The Addison-Wesley Book of Atari Software, Annual. $19.95.

2. Recommended Instructional Courseware. Little Rock, Arkansas: Project IMPAC, State Department of Education, 1984.

3. Brown, Steven; Grossman, George C. and Polson, Nicola. "Educational Software Reviews: Where Are They?" The Computing Teacher, August/ September, 1984, pp 33-37.

Definitive Source Lists

1. Swift's Educational Software Directory. Apple II Edition. Sterling Swift Publishers, Annual. $18.95.

2. Vanloves Apple Software Directory. Fairfax, Virginia: PC Telemart, Annual.

3. Commodore Software Encyclopedia. 4th edition. West Chester, Pennsylvania, 1984.

4. Bowker's Microcomputer Software in Print. New York: R.R. Bowker, Annual.

5. Computer Books and Serials in Print 1985. New York: R.R. Bowker, Annual.

6. Educational Software Directory for IBM Personal Computers. Tallahassee, Florida: Laura Motisi Electronic Communication, Inc., Quarterly. (Suite 220, 1311 Executive Center Drive, Tallahassee, Florida 32301)

Review Sources

See almost any current educational journal. Examples include: "School Library Journal," "Booklist," "The Computer Teacher," "The Arithmetic Teacher," "Electronic Learning," and "The Journal of Computers in Mathematics and Science Teaching."

1. MicroSIFT Courseware Reviews. MicroSIFT Project, Northwest Regional Educational Laboratory. Access from: BRS, Incorporated 1200 Route 7, Latham, New York 12110. (available at any academic library or other library supporting computer searches on BRS)

MODULE H

ISSUES AND THE FUTURE

Lesson 23

Issues and the Future

Purpose:

To make participants aware of one or several current issues in computer education and peer into the future of this instructional technology.

Objectives: The participant will:

1. Be conversant with the issue(s) presented.
2. Be able to deal with or recommend a course of action concerning the issue(s) presented.
3. Gain some insight into the possible future of computer education.

Prerequisite: Completion of numerous lessons.

Required Materials for the Instructor:

1. Materials dealing with the issue(s) and future trends.

Required Materials for the Participants:

1. Materials to take notes.

Time Expectation: 30 min.- 1 hour.

Activities:

1. Select an issue from the current professional literature or an issue of local importance. For each issue:
   a. Explore the various ramifications of the issue with the participants.
   b. Recommend some ways of dealing with that issue.
2. Sample issues for discussion might include:

a. Can the computer testing and prescription program (C-AIM) developed by Project IMPAC help fill the new state requirement to track the progress of every student in the basic skills?

b. Should schools create computer laboratories or place computers in classrooms? Should both strategies be used simultaneously?

c. Should there be a strong state plan for computing or should the state rely on local leadership and provide special grants?

d. How can local boards of education accept the concept of obscelescence of computers and cost effectiveness? Is it cost effective and acceptable to spend $150 per student on computing which is linked to substantial gains in math, reading, and language arts?

3. Present a look into the future of educational computing.

4. Challenge participants to use educational computing wisely in order to achieve the potential benefits of this technology.