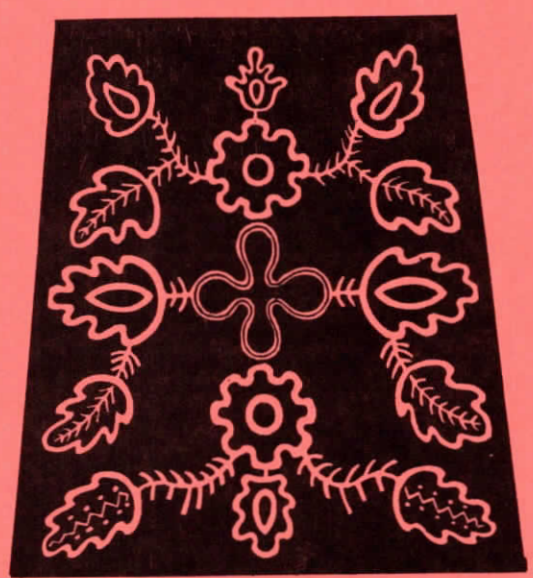
THE SCHOOL COMPUTER COORDINATOR

Microcomputer Inservice Training Guides

Level 2



Edited by

David V. Loertscher

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Microcomputer Inservice Training Guides, Level 2

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

Instructional Resources Program
College of Education
University of Arkansas
1985

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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 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 schools. 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 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,
Project IMPAC

INTRODUCTION

The Level II course guide is designed to be an inservice/college level training course which would benefit a person designated as computer leader in a school building. This person might be the library media specialist, a member of the library media staff, or another person designated by the principal or superintendent. The emphasis of this course is to prepare a person to deal with the day-to-day operation and administration of an instructional computing program in the school. The course does not prepare a person to teach computer science and advanced programming.

The guide has been divided into eight modules and nineteen lessons which build upon Level I skills. Instructors should scrutinize the Level I booklet and incorporate in Level II training any concepts which need reinforcement and extension. Copies of the Level I booklet can be obtained from the Arkansas Department of Education, Project IMPAC office. The first three modules of Level II have been labeled core modules and are essential. The last five modules are to be covered as time permits. A minimum of 72 clock hours should be provided for this instruction (includes Level I training). Participants will have to spend considerable out-of-class time preparing and practicing the skills 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 instructor is knowledgeable in the various facets of computers as instructional tools. Some attempt has been made to provide lessons useful on any popular 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 theoretical 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. Brenda Luper and Richard Bennett typed and proofed 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 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

PHILOSOPHY OF THE COMPUTER IN EDUCATION

Lesson 1

Computers as an Instructional Technology

Purpose:

To provide participants with an overview of computers as a part of instructional technology in education.

Objectives: The participants will:

1. Define the term "instructional technology" and explain how computers fit into that general category.

2. Define the term "computer science" as it might be taught in the public schools and the difference between using computers as an instructional technology and emphasizing computers as a discipline of study.

3. Trace the major developments in the history of both instructional technology and computer science.

4. Review and add to their knowledge of the research dealing with computers in education.

5. Be able to state the role of computers in education both as an instructional technology and as a discipline for study.

Prerequisite: Level I, Module B: "Instructional Uses of Computers in Education."

Required Materials for the Instructor:

1. Resources dealing with the history of instructional technology and computer science.

2. Resources dealing with research concerning computers in education.

3. Philosophical articles dealing with the role of computers in education.

Required Materials for the Participants:

1. Materials for taking notes.

2. Access to assigned reading.

Time Expectation: 1 hour.

Activities:

1. Explore the definitions, both theoretical and practical of the terms "instructional technology" and "computer science."

2. Present an overview of the history of instructional technology including media such as film, filmstrips, television, graphics, audio, and computers. Review the history of computer science (programming) as it developed in the mathematics curriculum of the public schools. Finally, show how computer literacy, computers as an instructional technology, and programming have grown and developed in the last ten years in public education.

3. Review and build upon the knowledge participants already have concerning research in the field of educational computing. Both an overview of the research and description of individual studies would be valuable.

4. Encourage participants to come to a consensus or at least be able to state their own view of the role of computers in the school both as an instructional technology and also as a discipline of study.

Bibliography:

<u>Resources on Instructional Technology:</u>

1. Heinich, Robert; Molenda, Michael; and Russell, James D. <u>Instructional Media</u>. New York: Wiley, 1982.
Chapter 1: "Media and Instruction," and Chapter 2: "Systematic Planning for the Use of Media" present an overview.

2. Locatis, Craig N. and Atkinson, Francis D. <u>Media and Technology for Education and Training</u>. Columbus, Ohio: Charles E. Merrill Publishing, 1984.
Chapter 1: "Media Applications," and Chapter 2: "Instructional Development" are useful.

3. Jonassen, David H. Nonbook Media: A Self-paced Instructional Handbook for Teachers and Library Media Personnel. Hamden, Connecticut: Library Professional Publications, 1982.
See Unit 1: "Introduction to Educational Technology."

4. Brown, James W.; Lewis, Richard B.; and Harcleroad, Fred F. AV Instruction: Technology, Media, and Methods. 6th edition, New York: McGraw-Hill, 1983.
Chapter 1: "Systematic Planning of Instruction" and Chapter 2: "Media and Individualized Learning" are valuable.

5. Voker, Roger and Simonson, Michael. Media for Teachers: An Introductory Course in Media for Students in Teacher Education. 4th edition, Dubuque, Iowa: Kendall/Hunt, 1984.
Chapter 1: "Introduction" is a brief overview of the topic.

6. Meierhenry, Wesley C. "A Brief History of Educational Technology." in: Brown, James W., editor, and Brown, Shirley N., editor. Educational Media Yearbook, 1984. Littleton, Colorado: Libraries Unlimited, 1984. pp 3-13.

7. Ingle, Henry T. "Cutting-Edge Developments in Educational Technology: Prospects for the Immediate Future." in Educational Media Yearbook, 1984. Editors James W. Brown and Shirley N. Brown. Littleton, Colorado: Libraries Unlimited, 1984. pp 14-23.

Computer Science - history and philosophy:

1. Evans, Christopher. The Micro Millennium. New York: The Viking Press, 1979.

2. Deken, Joseph. The Electronic Cottage. New York: William Morrow, 1982.

3. Capron, H.L. and Williams, Brian K. Computers & Data Processing. 2nd edition, Menlo Park, California: Benjamin/Cummings Publishing Company, 1984.

4. An Age of Innovation: The World of Electronics 1930-2000. New York: McGraw-Hill, 1981.

Computers in Education - history and philosophy:

1. Wilkinson, Alex Cherry, editor. Classroom Computers and Cognitive Science. New York, London: Academic Press, 1983.

2. Clay, Katherine, editor. Microcomputers in Education: a Handbook of Resources. Phoenix, Arizona: Oryx Press, 1982.

3. Microcomputer Index. Microcomputer Information Services. 6 year, $45.00.

4. Miller, David and Miller, Harold. Microcomputers: A Guide for Educators. Reston, Virginia: Reston Publishing Company, 1984.

5. Kleiman, Glen. Brave New Schools: How Computers Can Change Education. Reston, Virginia: Reston Publishing Company, 1984.

6. Paterson, Dale, editor. Intelligent Schoolhouse: Reading on Computers and Learning. Reston, Virginia: Reston Publishing Company, 1984.

7. O'Shea, Tim and Self, John. Learning and Teaching with Computers: Artificial Intelligence in Education. Englewood Cliffs, New Jersey: Prentice-Hall, 1983.

8. Dennis, J. Richard and Kansky, Robert J. Instructional Computing: A Guide for Educators. Glenview, Illinois: Scott, Foresman, 1984.

9. Coburn, Peter, et al. Practical Guide to Computers in Education. Reading, Massachusetts: Addison-Wesley Publishing Company, 1982.

10. Taffee, Stephen J., editor. Computers in Education 85/86. Computer Studies, No. 1. Guilford, Connecticut: The Dushkin Publishing Group, 1985.

11. Bramble, William J.; Mason, Emanuel J.; and Berg, Paul. Computers In Schools. New York: McGraw-Hill Book Company, 1985.

MODULE A

PHILOSOPHY OF THE COMPUTER IN EDUCATION

Lesson 2

District Computing Plans and Planning Documents

Purpose:

To introduce participants to the function of a district educational computing plan and how that plan would be carried out in an individual school building.

Objectives: The participants will:

1. Identify what constitutes a district educational computing plan.
2. Review several sample plans.
3. Describe the various directions that a district plan can lead:
   a. Toward computer literacy.
   b. To emphasis on the computer as a tool for instruction.
   c. Toward computer science as a discipline.
   d. In the direction of management applications for teachers and administrators.
4. Enumerate the difficulties when there is no district computer plan.
   a. Lack of direction for teachers.
   b. Non-use or misuse of the technology.
   c. Disconnected efforts to incorporate the technology.
5. Outline a number of alternatives for computer plans within a school building when no district computer plan exists.

Prerequisite: Lesson 1.

Required Materials for the Instructor:

1. Guidelines for School District Planning Grades 3-8: Microcomputer Instructional Programs. Little Rock: Project IMPAC, 1985. (order from: State Department of Education, Little Rock, Arkansas 72701).

2. Access to: Planning for Educational Technology. MECC publication #611, 1983. (order from: MECC, 3490 Lexington Avenue North, St. Paul, Minnesota 55112)

3. Several sample district educational computing plans with enough copies for review by the participants.

Required Materials for the Participants:

1. Materials to take notes.

Time Expectation: 2 hours.

Activities:

1. Explore the components of a district education computing plan including:

   a. A philosophy statement of the role of computers in the education of students in the district.

   b. Goals for educational computing.

   c. Elaboration of the directions for the use of computers in the district including computer literacy, the computer as a tool for instruction, computer science as a discipline, and the role of computers in the management function for teachers and administrators.

2. Review sample district computing plans. Have participants create a categorized list of the ways computers are being used in schools. If sample plans are insufficient, have participants review the current professional literature for ideas to build the list. Categories might include:

   a. Uses for computer literacy and computer science.

   b. Uses for instruction by level (elementary, junior high, high school).

   c. Uses for instruction by discipline (social studies, science, fine arts, etc.).

   d. Uses by instructional type (supplemental media aid, remediation, CAI, uses for special students, word processing, computer literacy, etc.).

   e. Management uses (grade books, record keeping, inventory control, budgeting, scheduling, etc.)

3. Discuss realistic applications based on the number of computers owned by the district and access to computers in the home. Have participants create a sample priority applications list based on a realistic school setting.

4. Have participants prioritize the computer applications list based on a realistic goal when a school has numerous computers available for both students and teachers.

5. Discuss the problems when there is not a district computer plan. Outline the possibilities for a school building computing plan when no district computer plan exists.

Bibliography:

1. Sources for school district microcomputer plans might include:

   a. A search for the ERIC system for examples.

   b. Write or call school districts in: Alma, Arkansas; North Little Rock, Arkansas; Jonesboro, Arkansas; Garland, Texas; Houston, Texas; Albuqurque, New Mexico.

MODULE A

PHILOSOPHY OF THE COMPUTER IN EDUCATION

Lesson 3

Computers in the Individual School

Purpose:

To explore with participants both the potential and practical uses of computers in a school and the attendant management plan to carry out that plan.

Objectives: The participants will:

1. Build a comprehensive computer applications list which was begun in Lesson 2.
2. Identify the basic components which must be in place for various applications to succeed in a school setting.
3. Devise a plan to implement various computer components in a school building.

Prerequisite: Lesson 2.

Required Materials for the Instructor:

1. The list of computer applications developed in Lesson 2.
2. Other lists of computer applications from the literature.
3. Case studies from experience and from the literature of successful programs for educational computing at the school building level.

Required Materials for the Participants:

1. Case studies from personal experience and from the literature of successful programs of educational computing at the school building level. These case studies should be acquired independently from those sought by the teacher for #3 above.
2. Materials to take notes.

Time Expectation: 2 hours.

Activities:

1. Using the list of computer applications developed by the participants in Lesson 2, check the list for completeness. Add new applications discovered in the literature or from other documents not used in Lesson 2 research.

2. Explore in-depth the categories and specific applications found. Participants should understand the basic components which must be in place if an application is to succeed. Explore:

   a. Is the software available for this application in my school? In sufficient quantities?

   b. Is the proper hardware available for this application in my school? Where? How can students gain access to it?

   c. Are the teachers properly trained or skilled in the use of the software and hardware for this application?

   d. Does this application fit in with normal curricular procedures or is it totally upsetting? What special scheduling or other management problems will need to be solved for this application to succeed?

   e. Who will coordinate the program to assist teachers in implementing this application? The library media specialist? What problems were encountered? Could similar programs succeed in participant's schools?

3. Review numerous case studies of successful implementations of computer applications. What made the program successful? What problems were encountered? Could similar programs succeed in participant's schools?

4. Visit a demonstration site in Arkansas designated by Project IMPAC.

Bibliography:

1. Patterson, Jerry L. and Patterson, Janice H. Putting Computer Power in Schools: A Step-by-Step Approach. Prentice-Hall, 1983.

2. Bitter, Gary G. and Camuse, Ruth A. Using a Microcomputer in the Classroom. Reston, Virginia: Reston Publishing Company, 1983.

3. Computers in Teaching. [Computer program, Apple Series] St. Paul, Minnesota: MECC, 1985. $30.00.

MODULE B

APPLICATIONS OF COMPUTING IN LOCAL SETTINGS

Lesson 4

Instructional Applications

Purpose:

To provide participants with sufficient experience with commercial instructional software to be able to help others use these packages.

Objectives: The participants will:

1. Extend their experiences with commercial software in order to build:

   a. A repertoire of instructional software across levels and across disciplines.

   b. Expertise in running commercial packages and introducing them to other teachers.

   c. Skill in evaluating the quality of educational software.

2. Build their knowledge of commercial software companies, jobbers, and sources.

3. Discern trends in commercial software production.

Prerequisite:

Level I, Module B: "Instructional Uses of Computers in Education."
Level I, Module G: "Software."

Required Materials for the Instructor:

1. Notes and outlines for Level I, Module B.

2. A wide variety of computer software in addition to that covered in Level I, Module B and Level I, Module G. Include drill and practice programs, tutorials, simulations, problem solving programs, demonstration/concept building programs, word processors for instructional use, and other innovative or unique programs worthy of consideration.

3. A variety of computer software evaluation forms.

4. Reference books and periodicals listing computer software, and recommended software.

5. A selection of commercial software catalogs and jobber catalogs.

Required Materials for the Students:

1. Materials for taking notes.

Time Expectation: Four to five class sessions with outside preview sessions.

Activities:

1. Review the types of software available on the market, including drill and practice programs, tutorials, simulations, problem solving programs, demonstration/concept building programs, word processors for instructional use, and other unique and innovative programs.

2. Use a technique of both in-class review and outside preview sessions to become acquainted with a wide range of instructional software. Participants can be encouraged to fill out an acceptable evaluation form for each program previewed. For each type of software:

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

   b. Discuss strengths and weaknesses of the software.

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

   d. Discuss how to select this type of software to match the abilities, interests, and learning styles of the student.

   e. Describe how to incorporate this type of software into an instructional unit when there are: 1) one or several computers available; or 2) a computer laboratory available.

   f. Discuss how to evaluate the results of using this type of software with students.

   g. Explore the future for this educational application of computers.

3. Use reference tools in review sessions to compare previewed programs with what is available on the market.

4. Test participant's skill at demonstrating instructional software by giving them a new package and expecting them to demonstrate it to others in a minimal amount of time.

Bibliography:

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

2. Lathrop, Ann and Goodson, Bobby. Courseware in the Classroom: Selecting, Organizing and Using Educational Software. Reading, Massachusetts: Addison-Wesley, 1983.

3. Evaluator's Guide for Microcomputer-Based Instructional Packages. Eugene, Oregon: International Council of Computers in Education, 1982.

4. Roberts, Nancy, et. al. Introduction to Computer Simulation: A System Dynamics Modeling Approach. Reading, Massachusetts: Addison-Wesley, 1983.

5. McAffee, Michael. Apple Access. Petaluma, California: Stony Point Publications, 1985.

MODULE B

APPLICATIONS OF COMPUTING IN LOCAL SETTINGS

Lesson 5

Integration of the Computer into the Curriculum

Purpose:

To build the knowledge and skill of participants in working with teachers to integrate computer programs into regular instructional units.

Objectives: The participants will:

1. Have a solid theoretical background in the costs and benefits of computers as an instructional technology.
2. Have the skill needed to demonstrate effective integration of computer programs into regular instructional units.

Prerequisite:

Level I, Module B: "Instructional Uses of Computers in Education."

Required Materials for the Instructor:

1. Notes and outlines for Level I, Module B.
2. Notes from the latest reviews of research covering educational computing.
3. Produce a handout giving tips on the effective integration of computer programs into instructional units.

Required Materials for the Participants:

1. Materials for taking notes.

Time Expectation: 1 hour.

Activities:

1. Review the results of research concerning educational computing covered in Level I, Lesson 7. Add to that body of thought by reviewing any new research reviews and interesting individual research studies. Participants might assist in the gathering of a few highly selective research studies and presenting this information.

2. Review from Level I, Lesson 7 and from Level II, Lessons 2 and 3 successful techniques for using educational computing in public schools. What patterns of techniques seem to be the most successful?

3. Demonstrate computer software used as:

   a. Introductions to instructional units.

   b. Motivational tools.

   c. Major teaching components for content.

   d. Supplementary or enrichment tools.

   e. Review mechanisms.

   f. Evaluation tools.

   g. Tools for individual learners with special needs.

4. Use a tip sheet for successful integration of computer programs into instruction as a springboard to create a new and improved tip sheet containing both ideas and lists of do's and don'ts.

5. Discuss the issue of the amount of time taken in the school day to teach a subject which contains a computer component. Is the computer component adding time to the subject taught or is it being integrated into the subject so that the total teaching time is the same or less than without the computer? Since research shows that time spent on a subject will affect test scores, explore whether gains can be attributed to increased time or to the computer when the computer component is added on top of regular instruction.

6. Explore ways of working with teachers in various disciplines and grade levels to help them improve their utilization of computer programs.

7. Discuss whether satisfactory maintenance programs are in effect so that hardware and software malfunctions are at a minimum.

Bibliography:

1. See Chapter 8: "Teacher Training for K-12 Education," in Guide to Learning: Resources for Users of IBM Personal Computers. Dayton, New Jersey: IBM, 1984, pp 283-321.

2. Miller, Samuel and Caley, Mike. The Apple Computer Club's Activities Handbook. Lowell, Massachusetts: Computer Publishing Services, 1984.

MODULE B

APPLICATIONS OF COMPUTING IN LOCAL SETTINGS

Lesson 6

Management Applications

Purpose:

To teach participants various management applications of microcomputers in the school setting.

Objectives: The participants will:

1. Extend their knowledge of the various types of management applications and software available for schools.

2. Gain enough experience with several packages to implement these programs in a school setting.

Prerequisite:

Level I, Lesson 9: "Overview of Management Applications" and Level I, Module E: "Management."

Required Materials for the Instructor:

1. Numerous "one purpose" management programs over and above those shown to Level 1 participants. Examples: word processors, teacher utilities, grade books, skeleton programs, and test generators. Sample output for each program.

2. Several more extensive management packages. Examples: Management of instruction packages, equipment and furnishings inventory programs, scheduling packages, administrative reporting packages. Sample output of each program.

Required Materials for the Participants:

1. Materials to take notes.

Time Expectation: 3 - 5 hours.

Activities::

1. Review "one function" management programs covered in Level 1 classes. Extend the experience of participants to other packages of use to teachers and administrators.

2. Test participant's ability to take an unfamiliar "one function" management program and get it up and running in a minimum amount of time. In addition, test participant's ability to trouble shoot normal kinds of software and hardware difficulties.

3. Demonstrate an instructional management package. Explore the following:

   a. Hardware and software requirements.

   b. Control of assignments, lessons, and types of skills presented.

   c. Speed control of problems and reading materials.

   d. Types of management reports.

   e. Staff time and training needs.

   f. Criteria for judging the computer system vs. manual systems.

   g. Alternatives when major failures occur.

4. Demonstrate one or several extensive management packages. Explore the following:

   a. Hardware and software requirements.

   b. Theoretical advantages of the computer program vs. manual systems.

   c. How the program works: Its data capacity and output possibilities.

   d. How would the program be implemented in a school? What type of data would be necessary for input to the package? Who would be responsible for running the package? How would it affect current policies and procedures?

   e. How would the program be evaluated? Time saved? Efficiencies achieved? New information and data manipulation possible? Cost effective?

Computer Programs:

1. C-AIM [Computer Program, Grades 4-6, Commodore PET] Little Rock, Arkansas: Project IMPAC, 1983.
   A program which tests students at frequent intervals and reports on progress based on the Arkansas Basic Skills documents. Test results are accompanied with prescriptions for worksheets and other computer software. Available only for the Commodore PET with Muppet II network and a dual disk drive. Will soon be translated for the Commodore 64 and the Apple. Demonstration sites for this program will be expanded to 20-30 schools in late 1985.

2. School Records Manager. [Computer program, Apple Series, TRS-80, IBM] New York: McGraw Hill, 1985. $50.00.

3. Payroll. [Computer program, Apple Series] St. Paul, Minnesota: MECC, 1985. $600.00.

4. Finance. [Computer program, Apple Series] St. Paul, Minnesota: MECC, 1985. $900.00.

5. Student Records. [Computer program, Apple Series, IBM] St. Paul, Minnesota: MECC, 1985. $100.00.

6. Student Daily Attendance. [Computer program, Apple Series, IBM] St. Paul, Minnesota: MECC, 1985. $200.00.

7. The Facility and Equipment Scheduler. [Computer program, Apple Series] St. Paul, Minnesota: MECC, 1985. $100.00.

8. Energy Manager. [Computer program, Apple Series] St. Paul, Minnesota: MECC, 1985. $100.00.

MODULE C

ADMINISTRATION OF COMPUTER SOFTWARE AND HARDWARE IN SCHOOLS

Lesson 7

Software Acquisition and Management

Purpose:

To prepare participants to demonstrate skill in acquiring and managing computer science software for a school.

Objectives: The participants will:

1. Broaden their knowledge of commercial and public domain sources of computer software.
2. Identify ways of discerning teacher's needs for educational computer software.
3. Identify methods of acquiring software to obtain the best value for the money spent.
4. Design methods for managing software in a school building so that maximum access and protection is provided. Methods of storage and retrieval will be explored.
5. Explain the need for policies concerning copying, use of single copies of computer programs on multiple machines, and sharing of computer software among schools in a district.

Prerequisite:

Level I, Module B: "Instructional Uses of Computers in Education."
Level I, Module G: "Software," and Level II, lessons 4 - 5.

Required Materials for the Instructor:

1. Lathrop, Ann. Courseware in the Classroom: Selecting, Organizing, and Using Educational Software. Menlo Park, California: Addison-Wesley, 1983.
2. Woolls, Blanche and Loertscher, David V. Microcomputers in the School Library Media Center. Chicago, Illinois: American Library Association, 1985.

3. Numerous source tools for microcomputer software including publisher's catalogs, definitive source lists, recommended lists, review sources, and public domain software sources.

4. Prepare a bibliography of sources for purchase of computer software including producers, jobbers, discount dealers, and local sources.

Required Materials for the Participants:

Materials for note taking.

Time Expectation: 1 - 2 hours.

Activities:

1. Review the sources covered in all prerequisite lessons. Participants should have a clear understanding of each of the types of sources including publisher's catalogs, definitive sources lists, recommended lists, review sources, and public domain software sources.

2. Create a bibliography for a single school of the best sources covered in activity #1. Plan ways these tools can be purchased and located in the school library media center for easy access by all.

3. Explore the various marketing techniques used by software producers to get their products to market. Define: jobber, discount house, local retailers, user groups, consortiums. Explore avenues for purchase from each of the sources defined. Discuss warrantee of software vs. discount house price. Is cheaper always better? Who will replace defective and used software?

4. Explore ways of discerning teachers needs for educational software and matching those needs to the commercial and public domain software available. Discuss the possibility of local creation of products not available on the commercial market.

5. Discuss various methods of previewing and acquiring educational software with all the attendant difficulties of hardware requirements, preview rights and responsibilities, handling returns, problems with district business office practices, etc.

6. Propose methods for handling computer software in the individual school through the library media center. Include:

   a. Acquisition procedures.

   b. Registration, licensing and first testing.

c. Provision for backups of software and documentation.

d. Cataloging and indexing.

e. Storage and protection.

f. Access and circulation policies.

g. Repair and maintenance including commercial support for disk replacement and technical assistance.

Bibliography:

1. Whole Earth Software Catalog. New York: Doubleday, 1984.

2. McGhee, Bard M., editor, 1984 Programmer's Market. Cincinnati, Ohio: Writer's Digest Books, 1983.

3. Popence, Cris. Book Bytes: the User's Guide to 1200 Microcomputer Books. New York: Pantheon Books, 1984.

4. Courseware Report Card: Evaluation of Microcomputer Programs for Education. Educational Insights, 1983. $49.50 year.

5. Digest of Software Reviews. School & Home CourseWare. $43.95 year.

6. Directory of Discount Computer Suppliers. Discount American Guide, 1983. $3.95.

7. The Educational Software Selector. (TESS) EPIE Institute. $49.00.

8. A Manual of AACR2 Examples for Microcomputer Software and Video Games. Soldier Creek Press, 1983. $10.00.

9. Micro Software Report. 2nd edition. Nolan Information Management Services, 1983. $49.95.

10. Microcomputer Software/Hardware Evaluation and Selection. [Computer program, Apple Series] ERIC Clearinghouse on Information Resources, 1983. $6.00.

11. Micro-Courseware PRO/FILES. EPIE Institute. $180.00, second year renewal $50.00.

12. Micro-Hardware PRO/FILES. EPIE Institute. $80.00, second year renewal $50.00.

13. Holznagel, Donald C., editor, MicroSIFT Courseware Evaluations (1-87). [Microfiche] $.97.

14. MicroSIFT Reviews. MicroSIFT. Northwest Regional Educational Laboratory, 1983.

15. Haven, Robert N., editor, School Microware Directory. Dresden Associates. 2 year. $25.00.

16. Haven, Robert N., editor, School Microware Reviews. Dresden Associates. 3 year. $45.00.

17. Balkan, Eric, editor, The Directory of Software Publishers: How and Where to Sell Your Program. New York: Van Nostrand Reinhold, 1983.

18. The Book of Apple Software: 1983. The Book Company, 1983. $19.95.

19. Evaluator's Guide for Microcomputer-Based Instructional Packages. Eugene, Oregon: International Council for Computers in Education, 1982.

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MODULE C

ADMINISTRATION OF COMPUTER SOFTWARE AND HARDWARE IN SCHOOLS

Lesson 8

Management and Purchase of Hardware

Purpose:

To extend participant's knowledge of computer hardware and build skill in managing hardware for an entire school.

Objectives: The participants will:

1. Be able to operate several brands of microcomputers and their component parts.
2. Be able to write specifications for purchase of computer hardware.
3. Utilize information about the hardware market in sufficient detail to be able to make wise purchase decisions.
4. State the needs in terms of facilities for the installation of microcomputers in a classroom, a library media center, or in a computer laboratory.
5. Perform single maintenance and preventive maintenance procedures for computer hardware.
6. Be able to set up policies dealing with care and repair of computer hardware for an entire school.

Prerequisite:

Level I, Lesson 3: "Basic Computer Components, Terms, and Operations."
Level I, Lesson 4: "What To Do When It Doesn't Work."
Level I, Module F: "Hardware."

Required Materials for the Instructor:

1. Prepare teaching materials to review and cover in depth the component parts of several brands of microcomputers. Apple IIe & c, Commodore 64, Radio Shack, and IBM PC are recommended.
2. Collect sample specifications for purchase documents for several brands of microcomputers.

3. Prepare a handout of do's and don'ts in the installation of microcomputers in a classroom, a library media center, or in a computer library.

4. Prepare a preventive maintenance handout.

5. Prepare a sample policy statement dealing with the care and repair of computer hardware for a school.

Required Materials for the Participants:

1. Book and journal chapters/articles dealing with the management and purchase of computer hardware.

Time Expectation: 4 - 5 hours.

Activities:

1. Do a review and extend the knowledge of the participants concerning the components of a computer system. For each of several brands chosen to study, cover the following items:

   a. Keyboards (standard typewriter style and variations, Qwerty vs. Dvorak, other types of keys, connected and detachable keyboards).

   b. Other input devices (Joysticks, numeric keypads, light pens, mouse, graphic tablets, and optical character readers).

   c. Monitors (TV sets vs. monitors, Composite color, RGB color, and blue/green/amber monochrome monitors).

   d. Disk drives (5 1/4 inch, 3 1/4 inch, 8 inch, hard disk).

   e. Modems (300 bps, 1200 bps, software for various applications).

   f. Printers (dot matrix, letter quality, thermal, ink jet, laser, color, and proper interfacing).

   g. Operating systems (Apple DOS/Prodos, CP/M, and MS-DOS).

   h. Memory requirements matched to software requirements.

   i. Expansion capabilities.

2. Discuss the compatibility of hardware and software and which should be considered first-the type of hardware to buy or the type of software application desired. Discuss what happens if the types of applications become broader than originally planned. What impact does that have on hardware purchasing?

3. Show sample specification sheets for purchasing a microcomputer system. Demonstrate how to write specifications which are too tight and too loose and the likely results of each. Discuss the bidding process needed by the participants' school districts.

4. Discuss the actual purchasing process. Explore legal requirements, selection and rejection of bids or offers, relationships with dealers and jobbers.

5. Teach the participants how to deal with normal school facilities in terms of installing computers systems in classrooms, library media centers and computer laboratories. Explore electrical problems, furniture problems, placement, heating and cooling requirements, security, and safety. Survey the professional literature for ideas.

6. Demonstrate simple maintenance and preventive maintenance procedures for compute hardware. Teach adjustment of disk drive speed, connector maintenance, dust protection, and cleaning of components. Have participants look for articles and book chapters dealing with simple maintenance problems.

7. Explore various policies dealing with the care and repair of computer hardware. Cover preventive maintenance, selection of repair service, service contracts, diagnosis of failure, transportation to and from the repair service, backup equipment for down time, retesting newly repaired equipment, and resolving conflicts with repair services. Explore other policies including home-use, moving computers about the school, and usage procedures.

Bibliography:

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4. Williams, Gene B. How to Repair and Maintain Your IBM PC. Radnor, Pennsylvania: Chilton Book Company, 1985.

5. Beechhold, Henry F. The Plain English Repair and Maintenance Guide for Home Computers, Simon & Schuster, 1984. $14.95.

6. Williams, Gene B. How to Repair and Maintain Your Apple Computer: Apple II Series Models, Including the IIc. Radnor, Pennsylvania: Chilton Book Company, 1985.

7. Sefton, Bill. The Inspector: Apple Disk & Memory Utility. [Computer program, Apple Series] Omega Microware, 1981. $56.96.

8. Brenner, Robert C. The Apple II Plus/IIe Troubleshooting and Repair Guide. Indianapolis, Indiana: Howard W. Sams & Company, 1984. $19.95.

MODULE D

SOFTWARE

Lesson 9

In-Depth Study of Software Packages for a Specific Subject Area

Purpose:

To allow participants to build expertise in a certain subject area, grade level or discipline of the computer software market.

Objectives: The participants will:

1. Build a repertoire of computer software in a chosen subject area, grade level or discipline.
2. Identify the trends in software for the chosen subject area, grade level or discipline.

Prerequisite:

Level I, Module B: "Instructional Uses of Computers in Education."
Level I, Module G: "Software."
Level II, Modules A, B, and C.

Required Materials for the Instructor:

1. Access to computer software in participant's chosen area of study.
2. Access to bibliographies, exhaustive lists, review sources, and other information concerning computer software.

Required Materials for the Participants:

1. Materials to take notes and keep card files.

Time Expectation: 1 hour plus out-of-class work.

Activities:

Note: This lesson may be assigned at the beginning of the in-service course and may not be reported until the end of the course.

1. Have participants select a subject area, a grade level, or a discipline for study.

2. Supply materials and have participants search for materials dealing with computer software in their chosen area.

3. Require the participant to do a great deal of out-of-class previewing and analysis.

4. Have participants prepare a paper or a presentation which addresses the state of the art in computer software for the chosen topic.

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2. Goldenburg, E. Paul; Russell, Susan Jo; and Carter, Cynthia J. Computers, Education & Special Needs. Reading, Massachusettes: Addison-Wesley, 1984.

3. Computers in Teaching Mathematics. Reading, Massachusettes: Addison-Wesley, 1983.

4. Geoffrion, Leo D. and Geoffrion, Olfa P. Computers & Reading Instruction. Reading Massachusettes: Addison-Wesley, 1983.

5. Hasan, Delores. Microcomputer Resource Book for Special Education: How to Use the Microcomputer with Handicapped Children. Reston, Virginia: Reston Publishing Company, 1984.

6. Dickson, Wayne and Raymond, Mike. Language Arts Computer Book: A How-To Guide for Teachers. Reston, Virginia: Reston Publishing Company, 1983.

Computers and the Curriculum:

1. Mason, George E., et al. Computer Applications in Reading. Newark, Deleware: International Reading Association, 1983.

2. Metzyer, Merrianne, et al. Learning Disabled Students and Computers: A Teacher's Guide Book. Eugene, Oregon: International Council for Computers in Education, 1983.

3. Taber, Florence M. Microcomputers in Special Education: Selection & Decision Making Process. Reston, Virginia: ERIC Clearinghouse on Handicapped and Gifted Children and the Council for Exceptional Children, 1983.

4. Williams, Frederick. Microcomputers in Elementary Education: Perspectives in Implementation. Los Angeles, California: The Annenberg School of Communications, University of Southern California, 1983.

5. Grady, M. Tim and Gawronski, Olga P. Computers in Curriculum and and Instruction. Alerandria, Virginia: Association for Supervision and Curriculum Development, 1983.

6. Geoffrion, Leo D. and Geoffrion, Olga P. Computers and Reading Instruction. Reading, Massachusetts: Addison-Wesley, 1983.

7. Kelman, Peter, et. al. Computers in Teaching Mathematics. Reading, Massachusetts: Addison-Wesley, 1983.

8. Behrmann, Michael M. Handbook of Microcomputers in Special Education. Reston, Virginia: ERIC/CEC Publishers, 1985.

9. Hagen, Dolores. Microcomputer Resource Book for Special Education. Reston, Virginia: ERIC/CEC Publishers, 1985.

10. See Chapter 8: "Teacher Training for K-12 Education" in: Guide to Learning: Resources for Users of IBM Personal Computers. IBM, 1984, pp 289-342.

11. Computers in the Mathematics Curriculum. St. Paul, Minnesota:

MODULE E

OTHER CURRICULAR COMPONENTS

Lesson 10

Computers and Commuications Technology Curriculums

Purpose:

To prepare participants to teach students about computers and communications technology.

Objectives: The participants will:

1. Be aware of preliminary plans for computer/communications technology curriculums for Arkansas.
2. Identify the components needed in a curriculum concerning computers and communications technology.
3. Be able to serve as a leader for an adopted curriculum in a school.

Prerequisite: Level 1 plus Level 2, Modules A, B, and C.

Required Materials for the Instructor:

1. Obtain from the Arkansas Department of Education the plans for a computer/communications technology curriculum.
2. Obtain other curricular outlines for computer literacy.

Required Materials for the Participants:

1. Materials to take notes.

Time Expectation: 1 - 3 hours.

Activities:

1. Examine the Arkansas state plan for computer/communications technology. That plan in preliminary form at the writing of this manual included:

   a. Emphasis on the computer used for instructional purposes in grades 3 - 8.

   b. One 12-week unity in grades 5, 6, and 7 dealing with:

      i. Compute technology and society (grade 6, 36 1-hour lessons).

      ii. Applications of computers and other communications technology (grade 6, 36 1-hour lessons).

      iii. Computer programming (grade 7, 36 1-hour lessons).

   c. A computer science/business education component in grades 9-10.

      i. A computer science course.

      ii. A business education course dealing with computers.

      iii. A computer programming course.

   d. Advanced coursework in grades 11 and 12 (College preparatory).

2. Explore other computer literacy courses published nationally.

3. Discuss ways of implementing these courses in a single school. Deal with issues such as:

   a. Is it necessary to have a computer/communications technology component in the public school curriculum?

   b. Who will teach the computer courses and units?

   c. What equipment will be used?

   d. Will the computers a school owns be unused as in instructional tool if a computer/communications technology course is adopted?

   e. How would plans be laid to actually implement parts or all of a computer/communications technology curriculum?

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2. Stern, Nancy B. and Stern, Robert A. Computers in Society. Prentice-Hall, 1983. $23.95.

3. Luehrmann, Arthur and Peckman, Herbert. Computer Literacy: A Hands-On Approach. Available in editions for Apple and TRS-80. New York: McGraw-Hill, 1983.

4. 101 Activities for Computer Classes. [Computer program, Apple series] St. Paul, Minnesota: MECC, 1983.

5. Hunter, Beverly. My Students Use Computers: Learning Activities for Computer Literacy. Reston,Virginia: Reston Publishing Company, 1983.

6. Horn, Carin E. and Carroll L. Collins. COM-LIT: Computer Literacy for Kids. Austin, Texas: Sterling Swift, 1984.

7. Horn, Carin E. and James L. Poirot. Computer Literacy: Problem Solving with Computers. 2nd edition. Sterling Swift, 1985.

8. Bitter, Gary and Craighead, D. Teaching Computer Literacy: Lesson Plans and Activities for Your Classroom (K-4). Austin, Texas: Sterling Swift, 1985.

9. Camuse, Ruth A. (editor). Fourth Annual Computers in Education Conference: Literacy Plus. Rockville, Maryland: Computer Science Press, 1984.

10. Computers in the Curriculum: A Computer Literacy Guide. St. Paul, Minnesota: Minnesota Educational Computing Consortium, 1984.

11. Sanders, Billy and Edge, Sam. Kids to Kids on the Apple Computer. Chatsworth, California: DATAMOST, 1984. $9.95.

12. Earhart, Caroline and DeJonghe, Marty. Power Up! Kids' Guide to the Apple IIe/IIc. Berkeley, California: SYBEX, 1984. $14.95.

13. Luehrmann, Arthur and Peckham, Herbert. Computer Literacy Survival Kit: For the Apple II, IIe Family of Computers. [Computer literacy diskette included with book, Apple Series] New York: McGraw Hill Book Company, 1984. $29.95.

14. Shneiderman, Ben. Let's Learn BASIC: A Kids' Introduction to BASIC Programming on the Apple II Series. Boston, Toronto: Little, Brown and Company, 1984. $8.95.

MODULE E

OTHER CURRICULAR COMPONENTS

Lesson 11

Computer Science Curriculums

Purpose:

To allow participants to explore several possible computer science curriculums for the senior high school.

Objectives: The participants will:

1. Identify several possible computer science curriculums for the senior high school.
2. Be able to plan for the adoption of a computer science curriculum in the senior high school.

Prerequisite: Level I and Level II, modules A, B, and C.

Required Materials for the Instructor:

1. Several proposed computer science curriculums for the senior high school.
2. Sample textbooks for computer science courses.

Required Materials for the Participants:

1. Materials for taking notes.

Time Expectation: 1 hour.

Activities:

1. Examine several proposed curriculums for teaching computer science in the senior high school. What are the common elements? Which are the unique elements? What college preparatory function would the course fill? Would there be any emphasis on technical vocations in the course? Which students would be encouraged to take the course?

Sample #1: Programming Text For High School.

The following chapter titles are from Applied Structured BASIC by Roy Ageloff and Richard Mojena. Belmont, California: Wadsworth Publishing Company, 1985:

Chapter 1 - Orientation: What Is a Computer?; Organization of a Computer; Communicating With the Computer; Computer Systems; Software Development Cycle; Before You Leap.

Chapter 2 - Fundamentals of BASIC: Elements of BASIC; Constants; Variables; End and REM Statements; LET Statements; PRINT Statement; INPUT Statement; READ, DATA, and RESTORE Statements; Pointers.

Chapter 3 - Control Structures and the FOR/NEXT Loop: Sequence Structure; Decision Structures; Loop Structures; Structured Programming; FOR/NEXT Loops; Initializations and Sums; Nested FOR/NEXT Loops; Pointers.

Chapter 4 - Simple Decisions: Variations of the IF-THEN-ELSE Decision Structure; Simple Conditions Based on Relational Operators; Specific Implementations; Compound Conditions Based On Logical Operators; Top-Down Design and Stepwise Refinement.

Chapter 5 - More Loops: Pre-test Loops; Post-test Loops; End-Of-File (EOF) Loops.

Chapter 6 - Advanced Decisions: Nested Decision Structures; Multiple-Block Decision Structure; Case Structure; Illustrations.

Chapter 7 - Modular Programming: Subroutines; Hierarchy Charts; External Functions; Other External Modules.

Chapter 8 - One-Dimensional Arrays: Motivation; Array Names and Subscripts; Array Declaration; READ, INPUT, and OUTPUT; Manipulating Arrays; Selected Applications.

Chapter 9 - Two-Dimensional Arrays: Motivation; Array Names and Subscripts; Array Declaration; READ, INPUT, and OUTPUT, Manipulating Arrays; Selected Applications.

Module A - Running BASIC Programs: System Commands; Workspace Versus Library; Illustrations.

Module B - Debugging Programs: Error Detection and Correction.

Module C - Built-In and User-Defined Functions

Module D - Print Using Statement and Formatted Output: Print Using Statement and Format Strings; Format Fields and Symbols; Building a Complete Report.

Module E - External Data Files and Transaction Processing: Motivation; Fields, Records, and Files; Sequential Files; Relative Files; Transaction Processing Applications.

Module F - String Functions and Text Processing: Concatenation; Built-In String Functions; User-Defined String Functions.

Module G - Matrix Operations: MAT, READ, INPUT, and PRINT Statements; Matrix Functions; Algebraic Operations.

Sample #2: literacy for junior high school.

The following chapter titles are from Scholastic Computing: An Introduction to Computers by Jack L. Roberts. New York: Scholastic, 1984:

Chapter 1 - Introduction to Computers: What a Computer Is and How It Works; Computers in Our Lives; Getting the Computer to Do What You Want.

Chapter 2 - Computer Systems: Computer Hardware; Computer Software.

Chapter 3 - Programming a Computer: Solving Problems with Computers; Introduction to BASIC.

Chapter 4 - General Application Software: Introduction to Word Processing; Data Bases and Computer Communications; Electronic Spreadsheets and Graphics Programs.

Chapter 5 - Computers In Society: The Benefits of Computers; Computer Crime and Abuse.

Chapter 6 - Computers In Your Future: Computers and Careers; Supercomputers of the Future.

Sample #3: literacy for college freshmen

The following chapter titles are from: Computers Today by Donald H. Sanders. New York: McGraw-Hill, 1985.

Chapter 1 - Background: Hardware, Systems, Software Concepts; Computers at Work; Putting the Computer to Work; The Impact of Computers at Work.

Chapter 2 - Hardware: Central Processor; Data Entry; Secondary Storage and Output; Personal Computers; Minis, Mainframes, and "Monsters."

Chapter 3 - Systems and Software: Data Communications Systems and Distributed Data Processing Networks; Word Processing and Electronic Mail/Message Systems/ System Analysis, Design, and Implementation Considerations; System Software Packages: Operating Systems and Data Base Management Systems; Management Information Systems.

Chapter 4 - Social Impact: The Impact of Computers on People; The Impact of Computers on Organizations; Computers Tomorrow.

Chapter 5 - Programming: Programming Analysis; Preparing Computer Programs: An Overview; Programming in BASIC; More about BASIC.

2. Discuss who should teach a computer science course in the senior high school. What background and training is needed by the teacher of a computer science course?

3. Discuss what languages should be learned by high school students:

   a. BASIC.

   b. LOGO leading to a study of true BASIC.

   c. PASCAL.

4. Examine several textbooks designed to be used in computer science courses in the senior high school/freshman year of college.

5. Explore ways of implementing such a course in the participant's schools.

Bibliography:

1. Bitter, Gary G. Computers in Today's World. New York: Wiley, 1984.

2. Gore, Marvin R. and Stubbe, John W. Computers and Information Systems. 2nd edition. New York: McGraw-Hill, 1984.

3. Shelly, Gray B. and Cashman, Thomas J. Introduction to Computers and Processing. Brea, California: Anaheim Publishing Company, 1980.

4. O'Brien, Linda. Computers. Franklin Watts, New York, London, 1978.

5. Berstein, Jeremy. The Analytical Engine: Computers Past, Present and Future. Revised edition. New York: Morrow, 1981.

6. West's Computer Education Series. Mountain View, California: West Publishing, 1984-85.
   An integrated computer science curriculum K-12 containing the following titles (as of 1985):

   a. Computer Fun (K),

   b. Computer Time (1-3),

   c. More Computer Time (1-3),

   d. Apple Logo Time (1-3),

   e. Building Computer Awareness (4-6),

   f. Building Basic Skills (4-6),

   g. Building Terrapin Logo Skills (4-6),

   h. Building Apple Logo Skills (4-6),

   i. Computers in Our World (7-9),

   j. Fundamentals of Basic Programming (7-9),

   k. Exploring Computers (10-12),

   l. Introduction to Computers and Basic Programming (10-12),

   m. Understanding Basic (10-12),

   n. Understanding Pascal (10-12),

   o. Computer Science With Pascal for Advanced Placement (10-12).

7. Harrison, William. Computers and Information Processing: An Introduction. Mountain View, California: West Publishing, 1985.

8. Graham, Neill. Introduction to Computer Science. 3rd edition. Mountain View, California: West Publishing, 1985.

9. Godman, Arthur. Barnes & Noble Thesaurus of Computer Science. New York: Barnes & Noble Books, 1984. $6.95.

10. Sanders, Donald H. Computers Today. 2nd edition. New York: McGraw Hill Book Company, 1985. $23.95.

MODULE F

PROGRAMMING AND LANGUAGES

Lesson 12

BASIC Programming

Purpose:

To provide participants an introductory module in BASIC programming and build sufficient skill to enable them to create an educational program useful in a classroom setting.

Objectives: The participants will:

1. Use BASIC programming commands to create educational computer programs.
2. Use modular programming techniques designed to help structure educational computer products.
3. Use graphic techniques in enough detail to incorporate needed graphics as a part of an educational program.
4. Produce a computer program designed to be used in an actual educational unit of instruction.

Prerequisite: Level I, Module A: "Meeting the Computer"

Required Materials for the Instructor:

1. Select a programming textbook.
2. Prepare a BASIC programming module outline.
3. Prepare handouts and assignment sheets.
4. Prepare demonstration computer programs.

Required Materials for the Participants:

1. Materials to take notes.
2. Blank computer disks.
3. A textbook.

4. A "Systems Master" or other initialized disk.

Time Expectation: 9 hours. Participants will have 3-5 hours of homework per hour of class work.

Activities:

Note: The following abbreviated outline has been created for the Apple computer and uses the following texts:

a. Tebbe, Paul. Programming the Apple II in BASIC. Prentice-Hall, 1983.

b. Roper, P.M. and Loertscher, D.V. Modular Computer Lesson Design. 2nd edition. Hi Willow Research and Publishing, 1985.

Those teaching with computers other than Apples will have to modify the outline and the assignments to match the hardware. Teachers should also be warned that this module is not intended to prepare a building-level computer leader to deal with many of the programming skills that might be needed in a school. The programming component of Level 3 training would be the minimum programming skill required in addition to other programming courses in college or university computer science departments.

1. Make the participants comfortable with handling disks, monitors, keyboards, and in basic program input and output. Teach LOAD, LIST, RUN, NEW.

2. Teach basic DOS (Prodos) procedures such as initializing disks, loading and saving programs, and copying programs. Define programs, languages, using the computer as a calculator, assignment of values, and letters to variables.

3. Teach formatting on the text screen for educational programs. Use PRINT, HTAB, VTAB, TAB (X), SPC (X), and HOME. Participants should be able to create any text screen properly formatted and uncrowded. FLASH, INVERSE and NORMAL can be taught.

4. Participants should be able to SAVE their programs on disk and print them out on the printer.

5. Teach very simple low resolution and high resolution graphics. Participants should produce simple boxes and line drawings in various colors using PLOT, HPLOT GR, HGR, HGR2, VLIN, HLIN, and TEXT.

6. Review and teach the components of the computer such as RAM, ROM, DOS, Prodos, BIT, BYTE, K, CPU, SECTOR, TRACK, etc. Participants should know what is happening inside the computer when they create their simple programs.

7. Teach techniques of editing, renumbering, use of FID and regular DOS (Prodos) commands. Participants should create short graphics programs using the techniques taught. Teach participants to use REM statements to create blocks of code which perform a single function.

8. Teach the FOR, NEXT, and GOSUB commands. Demonstrate how these two techniques can cut down the amount of code needed to create a HIRES and LORES graphic. Have participants create a more complex graphic using counted cross-stich patterns and incorporating both the FOR, NEXT commands and GOSUB properly. Have participants label each block of code clearly with REM statements.

9. Review and extend participant's knowledge of FOR, NEXT and more complex subroutines. Demonstrate simple animation techniques. Review editing techniques incorporating automatic line numbers. Let student's create a complex educational graphic using every technique which they know.

10. Teach string variables, INPUT, IF, THEN, AND, and OR. Demonstrate how these commands can be used in educational lessons to accept student answers and test those answers. Participants can create a very simple tutorial at this point which presents some text, shows a graphic, asks a question, and checks the answer. Be sure that each block of code is properly identified with REM statements. VAL, STR$, LEN, LEFT$, RIGHT$, MID$ can be taught.

11. Introduce graphic techniques which eliminate the need for writing code. Use of graphic tablets and software assist programs should be demonstrated. Incorporating these pictures into programs should be taught.

12. Teach modular construction, i.e., blocks of code which serve as puzzle pieces and link together to form a whole. Demonstrate what a modular program looks like on paper (create a VTOC - a visual table of contents) and in listed form.

13. Teach READ, DATA, and arrays only as needed by a participant's program.

14. Demonstrate a variety of student-created educational products and analyze how they were constructed. Assign the participants to create a defensible educational program. Review their work during construction for modular technique, sound programming strategies, proper screen formatting, correct spelling and grammar, adequate teacher and student guides. Demonstrate good error trapping.

Bibliography:

1. Campbell, John. Inside Apple's Prodos. Reston, Virginia: Reston Publishing Company, 1984.

2. Poole, Lon. Apple II User's Guide. Berkley, California: Osborn/ McGraw-Hill, 1981.

3. Orwig, Gary, W. Creating Computer Programs for Learning: A Guide for Trainers, Parents and Teachers. Reston, Virginia: Reston Publishing Company, 1983.

4. Mowe, Richard. The Academic Apple. Reston, Virginia: Reston Publishing Company, 1983.

5. Barnett, Michael P. and Barnett, Graham, K. Personal Graphics: for Profit and Pleasure on the Apple II Plus Computer. Boston, Toronto: Little, Brown, 1983.

6. Myers, Roy E. Microcomputer Graphics. Mathematics Department, Pennsylvania State University. Reading, Massachusetts: Addison-Wesley, 1982.

7. Nevison, John M. The Little Book of Basic Style: How to Write a Program You Can Read. Reding, Massachusetts: Addison-Wesley, 1978.

8. Lien, David, A. The BASIC Handbook: Encyclopedia of the BASIC Computer. San Diego, California: Compusoft Publishers, 1981.

9. The New Step by Step. [Computer program, Apple Series] Program Design, Inc., 1982. $99.95.

10. Util. [Computer program, Apple Series] Microcomputer Workshops Courseware, 1984. $29.95.

11. Stone, M.J. How to Copyright Software. Berkeley, California: Nolo Press, 1985.

MODULE F

PROGRAMMING AND LANGUAGES

Lesson 13

Logo

Purpose:

To allow participants to gain an understanding of Logo as a tool for developing children's higher level thinking abilities as they are introduced to Logo as a computer language.

Objectives: The participants will:

1. Be able to explain the educational philosophy of Logo as envisioned by Papert and his colleagues.
2. Demonstrate skill in using common Logo programming commands to create two master procedures with at least five subprocedures within the listings of each.
3. Be able to describe ways to facilitate learning Logo so that students develop problem-solving methods that strengthen their higher level cognitive skills of analyzing and evaluating.
4. Be able to explain the "building block" approach to thinking and programming.

Prerequisite: Level 1, Module A: "Meeting the Computer"

Required Materials for the Instructor:

1. A Logo language disk appropriate to your computer. Examples: Krell Logo, Apple Logo, etc.
2. Prepare demonstration disks which include procedures that can be analyzed to show Logo's interactive, recursive, graphic, and text capabilities.
3. Create handout sheets which explain and give examples of graphic, text, editing, and control commands.
4. Prepare assignment sheets which clarify expectations that the instructor has of the students.
5. The book: Mindstorms by Papert.
6. The book: Apple Logo by Abelson.

Required Materials for the Participants:

1. Notebook in which handouts and assignment sheets will be organized along with notes taken.

2. A blank computer disk.

Time Expectation: 3 - 5 hours. Participants will have two hours of homework per hour of class work.

Activities:

1. View the video tape: "Talking Turtle," to introduce Papert's Logo as a "learner-controlled environment" and the cursur as an "object to think with." Instructor must emphasize that the point of programming in Logo is to "enhance intellectual functioning." If the videotape or other introductory media is unavailable, then use appropriate material form Papert's Mindstorms.

2. Demonstrate and have students practice the simple graphic commands listed on their handout and assignment sheets. The interactive nature of the language should be stressed.

3. Explore how procedures are built and how they become parts of a master procedure. This is known as the "building-block" approach. Be able to edit and control commands such as how to "SAVE" and "READ" files must be understood.

4. Provide opportunities for students to debug or analyze faulty procedures and then make corrections followed by an evaluation of what the procedure should do.

5. Challenge students to develop a problem solving approach as they build a master procedure to recreate a fairly simple graphic design.

6. Explain the recursive nature of Logo through demonstration of "To Poly" (page 33 of Abelson). Have students construct a recursive procedure that will produce a five-point star.

7. Demonstrate briefly text commands with the "To Boast" (page 86 of Abelson).

8. Assign students to develop a master procedure with at least five subprocedures to demonstrate their basic understanding of how to control the computer using Logo.

9. Have participants critique how the instructor has presented Logo in terms of how their intellectual functioning has been challenged. Explore ways to facilitate the process further.

Bibliography:

1. Abelson, Harold. Apple Logo. Peterborough, New Hampshire: BYTE/ McGray-Hill, 1982.

2. Abelson, Harold. Logo for the Apple II. Peterborough, New Hampshire: BYTE/McGraw-Hill, 1982.

3. Carl, David L. "You Can Go Beyond Turtle Graphics", Instructional Innovator. Vol. 29, No. 1, January, 1984, pp 34-35.

4. Odom, Marsha L. "The Effects of Learning the Computer Programming Language Logo on Fifth and Sixth Grade Student's Skills of Analysis, Synthesis, and Evaluation." (unpublished doctoral dissertation, University of Arkansas, 1984).

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MODULE G

MANAGEMENT SOFTWARE

Lesson 14

Word Processing Applications

Purpose:

To build skill in using word processing programs for management applications.

Objectives: The participants will:

1. Demonstrate proficiency at using a word processor.
2. Be able to perform variety of management tasks utilizing a word processor.

Prerequisite: Level 1, Lesson 13: "Word Processing"

Required Materials for the Instructor:

1. One or several word processing programs.
2. Samples and output from a variety of management tasks done on a word processor.
3. Reference manuals and guides to the word processors selected.
4. A word processing template disk which contains a number of generic forms (teachers can fill in the blanks).

Required Materials for the Participants:

1. Materials for taking notes.
2. Blank disks for file storage.
3. Materials that need to be word processed.

Time Expectation: 2 hours. Participants will need to have 2 hours homework for each class hour.

Activities:

1. Choose some easy management applications such as letters and memos to review basic word processing features and commands. Participants should practice enough with the basic commands until

they become second nature. These skills include:

a. Handling disks and files.

b. Word wraparound.

c. Writing paragraphs and correcting simple mistakes.

d. Inserting new words and deleting others.

e. Printing out in normal printing format.

2. Demonstrate the idea of a template disk which has a number of generic type management forms which allow the teacher to fill in the blanks. Examples include memos for different purposes, field trip letters to parents, and attendance reports to the office on different topics.

3. Demonstrate more difficult tasks for management applications including:

a. Moving paragraphs.

b. Find and replace.

c. Handling indentions of various kinds.

d. Printing out in various formats.

e. Underlining, super, and sub-scripting.

4. Provide challenging word processing applications to participants and have them build skill for these applications. Examples: charts and boxed-in reports, bibliographies and footnotes, columns for news articles/yearbooks.

5. Build the participant's repertoire of management applications with word processors. Examples: Course outlines, handouts (printed on ditto or mimeo masters), tests, bibliographies, lists, inventories, reports, mass mailings, address lists, mailing labels, and rosters.

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2. See "Introduction to Word Processing Programs," in: Guide to Learning: Resources for Users of IBM Personal Computers. IBM, 1984, pp 242-250.

Time Expectation: 2 - 3 hours. Participants will need to spend two hours on homework for each class hour.

Activities:

1. Define what is meant by a data base manager. Demonstrate a pre-data base manager program ("Secret Filer" is recommended). Distinguish between a single-purpose data base manager and a generic one.

2. Demonstrate one or several single-purpose data base managers (Examples: "Bookends" and "Bibliographic Writer") and allow participants to become comfortable in using at least one. Discuss availability of such programs, their cost, features, problems, and training needed to use these programs in a normal school setting.

3. Demonstrate one or several generic data base management programs. Cover topics such as:

   a. Start-up procedures and disk preparation.

   b. Template creation and modification.

   c. Storing data.

   d. Searching records and files.

   e. Sorting and printing data.

   f. Back ups.

   g. Changing and correcting data.

   h. Adding and deleting data.

4. Allow participants to use ready-made templates with generic data base management programs. Then have them design their own template. Have them store and retrieve sample data.

5. Discuss what types of applications in a school lend themselves to the use of a data base management program. Discuss criteria for the selection of a task to automate, the program to accomplish the task, and how to deal with both successful applications and failure.

6. Explore ways of implementing a data base management program in a school. For example, discuss cost, who would input and retrieve data, quality control of data, security of information, and evaluation of the result.

MODULE G

MANAGEMENT SOFTWARE

Lesson 15

Data Base Applications

Purpose:

To build the participant's skill in storing and retrieving information through the use of both single-purpose and generic data base programs.

Objectives: The participants will:

1. Describe the future of data base management programs and differentiate between a single-purpose and generic data base programs.
2. Become proficient in using several single purpose data base programs and will be able to evaluate their usefulness in a school setting.
3. Be able to design a template for a generic data base management program and be able to store and retrieve information.
4. Demonstrate enough skill with data base management programs to be able to judge what types of applications are appropriate for a school and how to implement such an application.

Prerequisite: Level 1, Module E: "Management."

Required Materials for the Instructor:

1. A pre-data base with sample output. Example: "Secret Filer."
2. Several single-purpose data base management programs with sample output. Examples: "Bibliographic Writer," "Bookends," and an equipment inventory program.
3. Several generic data base management programs with sample output. Examples: "Apple Works," "PFS File and Report," "DB Master."

Required Materials for the Participants:

1. Materials for taking notes.
2. Blank disks.
3. Data for storage and retrieval.

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2. Bibliographic Writer. [Computer program, Apple Series] The Library Software Company, 1983. $70.00.

3. PFS File. [Computer Software, Apple Series, IBM] Software Publishing Company, 1982. $125.00.

4. Bookends. [Computer program, Apple Series] Sensible Software, 1983. $125.00.

5. DB Master. [Computer program, Apple Series] Stoneware Corporation, 1982. $250.00.

6. Personal Bibliographic System. [Computer program, Apple Series] Personal Bibliographic Software, 1984. $250.00.

7. Secret Files. [Computer program, Apple Series] Scholastic, 1983. $39.95.

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9. Desktop Bibliography. [Computer program, TRS 80] dist. by K-12 Micromedia. $29.95.

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

11. Data Base Jr. [Computer program, Apple Series, TRS-80, Commodore 64, IBM] Intellectual Software. $49.95.

12. DBase II. [Computer program, Apple Series, IBM] Ashton-Tate. $700.00.

MODULE G

MANAGEMENT SOFTWARE

Lesson 16

Spread Sheet Applications

Purpose:

To introduce participants to spread sheet-type programs and to explore their usefulness in managing a school.

Objectives: The participants will:

1. Define "spread sheet" and list the types that are available on the market.
2. Demonstrate the rudiments of using a spreadsheet with a pre-prepared template.
3. Create a simple template.
4. Be able to use a spread sheet for a simple school management application.

Prerequisite: Level 1, Module E: "Management"

Required Materials for the Instructor:

1. A spread sheet program. Examples: Appleworks, VisiCalc, Multiplan, SuperCalc.
2. Create several sample templates that demonstrate applications in a normal school setting.
3. Create a handout which includes the template and sample output for each application selected for demonstration.
4. Prepare a plan to create a template from scratch with the class.

Required Materials for the Participants:

1. Materials for taking notes.
2. Blank disks.
3. Sample realistic financial data for a school management application.

Time Expectation: 3 hours.

Activities:

1. Define what a spread sheet is and discuss the various types and brand names available on the market.

2. Demonstrate on a selected spread sheet program (VisiCalc, Multiplan, SuperCalc, etc.) the use of a simple template for storage and manipulation of financial or numerical data. Allow participants to work with the template demonstrated and prepare a printed report.

3. Provide a variety of templates and allow students to gain experience in using and manipulating financial or numerical data.

4. Demonstrate the creation of a simple template.

5. Work with the participants to create a template from scratch and then enter and manipulate data. Prepare written reports from the data.

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Programs

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3. SuperCalc. [Computer program, CP/M machines and IBM] Sorcim Corporation, 1982. $195.00.

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MODULE G

MANAGEMENT SOFTWARE

Lesson 17

Integrated Program Applications

Purpose:

To introduce participants to integrated programs and to explore their usefulness in managing a school.

Objectives: The participants will:

1. Define "integrated program" and list the types that are available on the market.
2. Be able to use sample data already stored in a word processor, a data base, and a spread sheet to create a simple report.
3. Be able to create and manipulate simple files in one, two or three sections of an integrated program.

Prerequisite: Level 1, Module E: "Management," and Level 2, Lessons 14 - 16.

Required Materials for the Instructor:

1. An integrated program such as Appleworks is recommended.
2. Sample data which can be manipulated by participants. Example: Appleworks Sample Files.
3. A plan for the creating of a data base and a spread sheet for a typical school management application.

Required Materials for the Participants:

1. Materials for taking notes.
2. Blank disks.
3. Sample realistic data for a spread sheet and data base program.

Time Expectation: 2 hours.

Activities:

1. Define what an integrated program is and discuss the various types and brand names on the market. (Examples: Appleworks, Symphony, Jazz, FrameWork, and Incredible Jack.) Explain their component parts as possibly including a word processor, a data base manager, a spread sheet, a communications package, a graphics package, and outline processing. Explain windowing and transfer of data from one part of the program to another.

2. Using sample data disks, demonstrate an application where data from the word processor, the data base, and the spread sheet are combined to create a report. The Appleworks Sample Files disk is recommended for this demonstration in addition to the Appleworks Tutorial which demonstrates the integration. Allow students to manipulate the data and combine data from at least two sections of an integrated program.

3. Work with participants to create a template and a sample data disk for a typical school management application. Allow students to manipulate the data and combine data from at least two sections of the program.

4. Explore other possibilities for the use of integrated programs in the management of a school.

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Programs

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2. Symphony. Now titled: "Jazz" for the MacIntosh. [Computer program, IBM] Lotus Development Corporation, 1983. $265.00.

3. Framework. [Computer program, IBM] Ashton-Tate, 1984. $695.00.

4. Incredible Jack. [Computer program, Apple Series] Business Solutions, 1983.

MODULE H

ISSUES AND TRENDS

Lesson 18

Self-Selected Issues

Purpose:

To make participants aware of current issues in educational computing and peer into the future of this instructional technology.

Objectives: The participants 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 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 minutes - 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. Evaluate the issue critically.
   c. Recommend some ways of dealing with that issue.
2. Present a look into the future of educational computing.

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

4. Sample issues to consider might include:

   a. What should be the role of regional cooperatives in the development of computing in Arkansas schools?

   b. How should inservice education be handled? Through local inservice programs? Regional cooperatives? Colleges and Universities? A combination of these?

   c. What is the role of computers in meeting the higher educational standards for the public schools of Arkansas?

   d. Where can and should the funds for educational computing be sought? Local sources? State Funding? National support? A combination?

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