Computer Literacy for Teachers

Training teachers to use computers, a number one concern, can be accomplished several ways.

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Through no fault of their own, most teachers are not prepared to teach about computing or use a computer in teaching because they received their education "BC": before computers. Now they're finding they need computer literacy as part of their jobs. According to the Association for Computing Machinery, teachers should:

- Be able to read and write a simple program
- Have experience using education software and documentation
- Have a working knowledge of computer terminology
- Be able to discuss the history of computers
- Be able to discuss the moral or human impact issues (Taylor, 1980).

With federal support decreasing, the funding responsibility for training teachers falls primarily on state and local levels, and at present states differ in their degree of commitment. A recent survey in *Electronic Learning* (1981) identifies Minnesota as a leader among the states because it is committed to providing inservice training for teachers, and has carried through on that commitment. Other states—Alaska, California, Delaware, Florida, North Carolina, Pennsylvania, and Texas—have developed state policies concerning educational computing and are beginning to understand that teacher training is a number one concern.

No matter the commitment from each state, someone must coordinate funding efforts from the state level down to the "grass roots" support, such as that from PTA's and civic clubs. School systems and their administrators can show their commitment to teacher training for computer literacy by coordinating funding efforts to:

- Provide professional inservice days for computer literacy training
- Create resource centers
- Provide resource staff, especially in software and hardware areas
- Devote part of teacher meetings to computer literacy
- Designate a resource teacher within each school.

Once having made the commitment, though, administrators must also deal with questions about context and content of the teacher training programs.

Context

Contextual setting obviously helps determine content. Such factors as attitudes of teachers, availability of computer hardware, numbers of teachers to be trained, amount of time allotted for training, and location of training are important. For example:

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- Successful inservice training must meet the needs of the classroom teacher. Teachers who consider new skills relevant and useful have a vested interest in the training. If training seems to offer "empty skills," teachers typically react negatively.
- The larger the group, the less interaction for participants. If the group *has* to be large, video presentations or lectures can be effective. Smaller groups function well in workshops. If you are actually using computer equipment, a tutor or one-on-one training seems best.
- The time commitment can be as great as a full three-credit college course or as little as a quick overview. Obviously the amount of time available plays an important part in deciding the type of training.
- Location and portability of equipment determines whether a course should or can be moved from school to school or offered at a central location.

Content

What should a training program include? The material falls into two categories: (1) The awareness level—teachers have a working knowledge of computer terminology, history, and social and moral issues; (2) The functional level—teachers use computers in programming and with existing software. The awareness level can be achieved in lectures, but the functional level requires interaction with computers.

Training Models

Options for training models vary. Based on our experiences in conducting workshops for computer literacy, we can offer this information about the scope of different courses:

- *Three-credit courses*—This course (usually 45 hours) in computer literacy offers three college credits or continuing education units and should cover both awareness and functional levels of educational computing. A course of this type can provide concentrated instruction on computer history, problem solving, applications, and societal impact, as well as laboratory experience in operating a computer, learning a programming language, writing programs, and developing and evaluating courseware. Participants should also be able to form small groups to develop their own materials (Martin, Heller, and Austing, 1981).

Figure 1 shows the syllabus of a computer literacy workshop we conducted at the University of Maryland.

One of the most important topics in the workshop is problem solving—in particular, problem solving as it relates to computers. After describing the five parts of computers and their interactions, we explain how a problem is presented to a computer through a special language (programming language) and how the computer executes the program. Intensive study of problem solving includes demonstrating problems that are and are not solvable. Problem solving techniques should be applied first to a daily activity, then a mathematical problem, and so on.

Another important topic in the syllabus is computer applications. This covers not only various uses but also defines and illustrates an actual application and covers the GIGO concept (garbage in, garbage out). We study one computer application thoroughly, including purpose, working environment, cost, and impact—concluding with a field trip to see the computer in action.

In dealing with item nine, integration of computer literacy topics into existing curriculum, we attempt to provide specific examples in each subject area, such as election simulations for social studies, word processing for English, and so on. We discuss and demonstrate good and bad examples of software and assist teachers in developing checklists for evaluation or in becoming aware of existing evaluation materials.

Social impact, item 13, covers issues of privacy, data banks, automation, computer crime, depersonalization, isolation, and artificial intelligence. This can also include pros and cons of electronic funds transfer, electronic mail, and electronic polling, and a demonstration of a computerized information system.

In the area of programming, teachers leave with an understanding of how to write simple programs in a programming language, such as LOGO or BASIC—preferably the language the teachers will use in their classrooms.

The emphasis in this workshop is on demonstrating and developing classroom activities and projects so that participants will see the relevance of their own classrooms.

- *One-credit courses*—It is our experience that this 15-hour course should be user-oriented with content that covers history of computing, mathematics on the computer, integration of computing skills into the curriculum, and social implications of computing. Unfortunately, participants do not have time to create their own materials, but the course should provide resources for material development later. In the laboratory component participants should learn how to use the computer and have an opportunity to view, review, and evaluate available software.

- *Two-day workshops*—This short course requires choosing between content and hands-on experience. A content-type course presents material in overview fashion: history of computers and number systems, social implications of computers, and integration into curriculum. Frequently vendors are willing to make hardware and software available for demonstrations.

The alternate emphasis of a user-oriented or hands-on environment includes such sessions as computers in mathematics; computers in language arts; or planning, purchasing, and managing a computer laboratory. This workshop allows time for communication among the participants concerning their current and future endeavors in computer literacy.

There are, however, a few drawbacks with two-day workshops: the scope is limited; there is usually not enough time for worthwhile hands-on experience; and participants may expect a hands-on experience and find the workshop is content-oriented.

- *One-day overviews*—This type of workshop offers several options: (1) It can briefly address such issues as impact on education and society and integration into curriculum, with follow-up in small group brainstorming sessions on relevance for teachers; (2) It can include some of the same topics in-depth; or (3) It can provide hands-on experience to teach participants how to use a computer, but not how to program it.

What About Follow-Up?

Training models should include built-in mechanisms for follow-up and feedback, an important part of which should be a commitment to provide opportunities for teachers to use their newly acquired skills. Follow-up could also include a forum for continued communication, perhaps through newsletters, user groups, or central software libraries. **EL**

Figure 1. Syllabus of Computer Literacy Workshop, University of Maryland, 1981.

Day	Lecture	Lab Activities
1	Orientation Computers in fiction	Attitudes questionnaire Getting on/off the computer
2	History of computers	Computer drills, games, and packaged programs
3	Number systems activities	BASIC programming
4	Parts of a computer; problem solving	BASIC programming; problem-solving activities
5	Problem solving	BASIC programming; flowcharting
6	Problem solving	BASIC programming
7	Computer applications	Programming problems
8	Field trip to local computer installation in business and government	
9	Curriculum integration of computer literacy	Programming problems
10	Presentations by teachers of units of study	Programming problems
11	Software evaluation techniques	Courseware development
12	Social impact—speaker and activities	Courseware development
13	Possible resources	Courseware development
14	Oral reports on teacher-written courseware	Courseware development
15	Vendor demonstrations	Evaluation

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