Teaching teachers to use microcomputers

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ABSTRACT

Project MUSE (Microcomputer Use in Special Education) is a federally funded training study housed in the College of Education at Western Illinois University. Its major goals are to develop and implement innovative techniques for training teachers to use microcomputers with handicapped children, to design curriculum strategies that reflect current technological advances, and to disseminate those materials to people who train teachers. In addition, the project is establishing a resource network for microcomputer software, hardware peripherals, developers, and users.
INTRODUCTION

Within the past five years there has been increased use of computers in the community and in schools. The U.S. is rapidly becoming a computer-dependent society, and computers affect almost every aspect of our lives. It is virtually impossible to use a telephone or a toaster, pay a bill, or travel on a train, plane, or bus without using a computer. There are microchips in such entertainment products as televisions and video games; in office products, such as word processors; in vending machines, elevators, and production line machinery. It is estimated that General Motors installed more than seven million microchips in automobiles last year.

Along with this proliferation of microcomputers has come a growing awareness that ordinary people can and must learn to use them. This has in turn created pressure for the introduction of computers to schools. Groups ranging from educators to business leaders to parents have pushed for the placement of computers in elementary and secondary schools alike. In the spring of 1982 estimates of the number of microcomputers in the schools ranged from 97,000 to 131,000. Present estimates range from 325,000 to more than one million. Two-thirds of the nation’s schools now have at least one microcomputer, and half have more than one. In fact, the emergence of the microcomputer is changing and will continue to change the very fiber of American education. According to the Office of Technology Assessment:

The so-called information revolution, driven by rapid advances in communication and computer technology, is profoundly affecting American education. It is changing the nature of what needs to be learned, who needs to learn it, who will provide it, and how it will be provided and paid for.

B. F. Skinner states that computers can cure what’s wrong with American education. His premise is that computer-assisted teaching incorporates individual, interactive instruction that can give the student immediate positive feedback. Skinner believes it is this element of success that motivates students to learn. It is important to note that research findings appear to support his ideas. Several recent studies indicate that students learn more when they use computers than when they use traditional instructional materials. In a meta-analysis of 51 studies of computer-assisted instruction, secondary students who used the technology scored better on objective tests than students who received traditional instruction only. That same set of studies suggests that there may be an even greater effect on children in elementary schools.

As a result of these studies and others, and because of the general infusion of computers into our everyday lives and our schools, teachers are faced with a crisis. Many teachers, both preservice and inservice, find themselves ill-equipped to cope with the changes brought about by the new technology. Most teachers were educated in the industrial age, but now must function in the information age. This paper describes a project that is developing strategies to train teachers to use technology. It includes sections on the characteristics of teachers and trainers, the nature of training environments, and the content and competencies used in training.

PROJECT MUSE

Project MUSE (Microcomputer Use in Education) is funded by the Office of Special Education Programs, U.S. Department of Education, and housed in the College of Education at Western Illinois University. It addresses three major purposes. The first is to develop and implement an innovative university-based preservice and inservice special education curricular project to prepare personnel to use microcomputer hardware and software in the education of handicapped children and youth. The second purpose, related to the first, is to provide for the upgrading of professional knowledge and skills for practicing special educators and to update the course offerings for preservice special education personnel to reflect current technological advances. The third objective is implementation of the project’s results in procedures and activities that are more effective for teachers and children alike than were elements of previously operating programs. Therefore, widespread dissemination of materials produced and procedures developed is part of the project’s plan. In addition, the project is establishing a resource network for microcomputer software, hardware peripherals, developers, and users.

General strategies of the project include six major goals. These include the development and implementation of procedures to deliver coursework related to the use of microcomputers, software appropriate for curriculum to be used with handicapped children and youth, and techniques for teaching students to use both. Emphasis is placed on the use of existing, as well as modified versions of curricular software, for teaching the handicapped.

TEACHERS

The teachers who come to Project MUSE for training are a diverse group. They have different interests and come from different content areas (even when all are in special-educat-

* "Meta-analysis is a method of performing qualitative synthesis of diverse studies on a common topic."
tion-related jobs). There also is a wide range in terms of computer sophistication. Although some participants have solid grounding in the use of computers and frequently are self-taught, others have never seen a computer. Some are intimidated by machines. A few teach computer courses or are responsible for computer training in their schools or agencies. Teachers may teach preschool or they may teach adolescents. Some work with severely handicapped individuals; others work with the mild-to-moderately handicapped. When possible, grouping is arranged by similar level of development or grade assignment.

Teachers are enthusiastic about learning to use computers. They come to sessions early and stay late, they volunteer materials, and they help each other. Frequently, they send ideas back to the project after they have started applying the results of their training.

TRAINERS

The best trainers not only have thorough knowledge of hardware, firmware, and software, but they have one absolutely essential ingredient, a sense of humor. They are reassuring, calm, and patient and are able to communicate on a level compatible with the teachers. They explain things in simple terms and answer questions at the level on which they are asked.

Computer experts have not met with much success in training teachers to use computers. Often they go too quickly and give too much detail. Experts frequently assume that beginners know as much as they do. They sometimes teach content out of sequence; they usually start with programming in BASIC. The MUSE project does not teach beginners programming with the exception of LOGO.

Good trainers function as members of a team; each has different skills and responsibilities. Although all trainers need to be competent with the use of hardware, firmware, and software, diverse skills relating to training adults also are important. Having an expert computer technologist on a training team is useful when working with more sophisticated teachers, but a person who is knowledgeable about handicapping conditions and educational programming for the handicapped is essential on a training team.

An understanding of adult learners’ needs is critical to the success of a training team. Establishing a comfortable, non-threatening environment is essential when training adults. Teachers who are learning to use computers frequently are apprehensive about the speed at which they learn and often worry about their ability to catch up. Some of the MUSE Project staff members have taken an intensive, two-week course designed to help them develop electronic devices, determine locations where the devices interface with computers, and master techniques for programming that use the logic of the computer with switches and an interface. After the experience of dealing with new terminology and learning to set up circuits with relays, potentiometers, and various timers, staff members are able to empathize with teachers who are fearful of computers and their accompanying unfamiliar vocabulary.

PHYSICAL ENVIRONMENT

Training environments are both physical and psychological. Physical necessities include proper equipment; adequate power supply including electrical outlets, heavy-duty power cords, and power strips; tables that place the computers at a comfortable height; availability of software, documentation, and related materials; tables and comfortable chairs where teachers can get away from the machines to read or write; a place for group discussions; and a place for snacks and informal interchanges.

Training sessions for beginners seem to work best when two people are paired on each computer. Even if there are enough machines for each person to work alone, it appears essential to have people work together initially. Pairing individuals with similar abilities works well. It is important to note that there should not be more than two persons to a machine. In that instance, one person seems not to have enough time on the computer.

Access to a large software library, with a wide range of programs, is necessary for effective training. Teachers must have the opportunity to look at content, determine program intent, and develop a sense of program capabilities.

Computer training, whether it takes place in a college course or an inservice course, should be scheduled to allow for large blocks of time. Inservice programs should begin with at least two full days with computers, followed by half-day sessions for review and acquisition of new skills. Formats that allow for a two- or four-week course, with blocks of four to five hours of scheduled class time in addition to open lab time, seem to work best. One hour a day after school once a week is not conducive to acquisition of computer skills. Administrative support for the project must be strong enough to allow teachers time for training during school hours.

CONTENT AND COMPETENCIES

Although the project’s goal for special educators is to have them use computers in teaching handicapped children, MUSE Project training begins with computer literacy. The curriculum includes software use and evaluation, word processing, and use of LOGO and a wide range of peripherals. Training procedures are designed to help develop competencies that will make computer users out of teachers. Those teachers will have the skills and interest to use computer applications with children. Videotapes of applications in educating handicapped children are shown, but the focus is on helping teachers develop self-confidence with hardware, firmware, and software.

The MUSE Project has produced a number of written materials including microdictionaries, guides for machine use, software catalogs and evaluation forms, curriculum suggestions, lists of resource materials, and LOGO curriculum materials. A set of competencies for use of hardware, software, and peripherals also has been developed. The competencies covered range from beginning skills to more complex skills for higher level language programming and for
interface and system design. They are arranged in sequence beginning with turning the computer on to diagnosing software problems, customizing programs, and interfacing non-computer devices with computers. Equipment purchase is included, as is information on purchasing and evaluating software. Adaptation and modification requirements also are included.

CONCLUSION

The MUSE Project emphasizes a team approach to training. The need to establish trust and communication among a group of people with differing skills appears to be important in integrating computers into educational programs.

Training special educators to use hardware, firmware, and software is essential, but it is also important to recognize the human element. Teachers are still wary of computers, and trainers who attempt to start with complex programming skills, use jargon, present too much content in too few hours, fail to relate real situations to computer use, and fail to help teachers understand the full potential of the computer will only compound the problem. It is essential that we not underestimate the negative effects of this wariness and fear because it can prevent the use of the computer in education of handicapped children as effectively as the lack of electricity would.

Teachers must be eased comfortably, carefully, and with empathy from the industrial age into the information age.

ACKNOWLEDGMENT

This work was developed with funds provided by a grant from the Office of Special Education Programs, Department of Education. The content of this paper does not reflect the position or policy of the U.S. Department of Education, and no official endorsement of this paper should be inferred.

REFERENCES
