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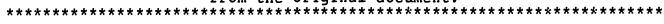   *Inservice Teacher Education; Technological
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ABSTRACT
        In order to apply technological advancements to
education, educators must devise on-going training programs for
teachers and administrators and create a national policy that gives
direction and sets priorities for the use of computer technology in
the schools. In-service training for teachers should be based on four
premises. First, each part of the curriculum should be used to
emphasize particular skills. For example, social studies could
instruct in the history of technology and the value and ethical
implications of the information revolution, and language arts could
include word processing and programming syntax. Second, training
emphasis must be on understanding curriculum needs, population
expectations, and intended learning outcomes rather than on
programming skills. Third, teachers need to be actively involved in
the selection of hardware and software components for the classroom.
Fourth, content application must be infused within instructional
objectives for particular disciplines. Also, in the consideration of
long-term educational policy on the effective use of computer
technology in the schools, educators must consider finances,
community support, and the ethics and values related to the transfer
and handling of massive amounts of information. (KC)

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Preparation for the Technological Classroom:
Can We Fulfill the Need?

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of the
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In the late 1970's, numerous predictions were made that the micro-computer and other forms of mini-technology would play a major role in education. In the years since these predictions most have already come true. Whether used as a tutor, for word processing, to simulate decision-making experiences, or to provide drill and practice, the "new technology" and especially the micro-computer has been looked at by a disparate number of publics as one way to improve instruction in an educational system seemingly in decline. In 1982, 300,000 micro-computer units were sold to elementary and secondary schools in the United States (Office of Technological Assessment, 1982); evidence enough that school decision-makers believe in the promises and premises that technology holds for schools. Teacher educators cannot ignore the fact that the public and private lives of people have accepted these machines. Computer literacy for educators has now become a necessity rather than a luxury for all segments of teacher education programs if schools are to stay abreast of the on-going technological revolution.

However, the best data we have on computer literacy (Stevens, 1979; National Assessment of Educational Programs, 1980; Baker, 1982) suggest that few students in colleges or in senior or junior high schools have opportunities for computer experience; few have algorithmic problem-solving skills; and many lack an awareness of the role and value of computers (Anderson, 1982).

These assessments of the state of national computer and technological literacy should give us cause for concern. To function effectively in the twenty-first century classroom and in a world dominated by technological innovations, our nation's youth needs to know how to use and deal with technology.

The headlong rush to embrace the "new micro-technology" has left in its wake a multitude of questions educators must cope with if the develop-

ment of these learning tools and the literacy necessary to use them have
any lasting impact on students. Not the least important of these involve
the notion of how can, and will, the average classroom teacher be trained
to master these aides and implement them within the curricular structure
of the public school.

Inquiry into the nature and scope of this type of technological training
can be subdivided into a two-step process. Step one deals with relative short
term queries and centers on the training and technological educational
needs of currently employed teachers. Step two revolves around the long
term educational policy implications that the effective use of technology
in school settings implies.

STEP ONE

Most teachers in today's public schools have not had any training or
background in computer or technological literacy, usage, or adaptation.
Although circumstances are changing as Colleges of Education and State
Certification requirements are revised to include at least a cursory dis-
cussion of these topics in pre-service education program, most currently
employed K-12 educators have not had even a semi-introduction to current
technological/educational innovations. Until an entire college aged
generation completes pre-service teacher education programs that include
computer literacy and application coursework as part of training require-
ments (in about five to seven years), on-going developmental in-service
activities must begin to help those teachers already in classrooms use
this technology in a rational, effective manner.

The type of training that these teachers need is premised on four
main ideas:

    1. Technological literacy is non-course specific

2. Training emphasis must be on curriculum development
   rather than on programming development

3. Criteria for evaluating software and hardware, by
   necessity, has to be on-going as the state-of-the-art
   changes

4. Content application, by grade and subject level,
   must be infused or imbedded within instructional
   objectives for particular disciplines

1. <u>Technological literacy is non-course specific</u>

No one single curricular area can take the responsibility for
technological literacy if it is to be accepted and developed as part
of the entire educational process. Each part of the curriculum should
be used to emphasize particular skills. For example, the social studies
should be responsible ior instruction in the history of technology,
value and ethical implications of the information revolution and problems
related to privacy infringements through information easedropping.
Language Arts might include segments on the use of word processing and
programming syntax. Career and vocational education, including prepara-
tion for changing job focuses as technology changes, would be infused
throughout the curriculum. By using all parts of the curriculum to
develop technological literacy, technological applications in these areas
would be more concrete and easier to illustrate. Students, as well as
teachers, would also understand and appreciate how technology affects
various segments of their lives.

2. <u>Training emphasis must be on curric ium development rather than on
programming development</u>

Not every teacher, or even every other teacher, needs to become
a computer programmer. Many in-service and graduate training programs

currently emphasize programming skills while neglecting curriculum development skills. To effectively use computer technology, teachers must learn not only how to technically use and program machines but where to use them. This involves understanding curriculum needs, population expectations, and intended learning outcomes. In essence, the teachers must learn how to use the computer as an effective learning tool and not as an end to itself. As the curriculum evolves, or changes, the use of technology must also evolve and change. Training in this manner must become developmental in nature and stay attuned to societal and cultural changes.

3. <u>Criteria for evaluating software and hardware, by necessity, has to be on-going as the state-of-the-art changes</u>

Teachers need to be actively involved in the selection of software and hardware components for the technology they will be using in their classrooms. The selection process is a five-fold activity, identifying: <u>a. The program users.</u> Is the software or hardware for individual, large group or small group instruction? What grades and cognitive ability levels are to be served?; <u>b. Program usage.</u> Will the software and hardware be used for drill and practice, tutorial, problem-solving activities, informational activities, recreational activities, simulation exercises, or a combination of any of the preceding?; <u>c. Hardware requirements.</u> What operating system, language, random access memory, input mode and output modes are required to run the various software programs?; <u>d. The quality of software.</u> Are the software program purposes defined and relevant to learner needs? Is the level of difficulty appropriate? Is the program software content accurate and logically organized? Does the content support the overall school instructional program scope and sequence? Is there documentation on program

use?; e. Costs. How much does the hardware and software cost? Is

it necessary to the school district's overall technological learning

programs? What are the maintenance or upkeep costs for the software

and equipment?

4. Content application, by grade and subject level, must be infused or
   imbedded within instructional objectives for particular disciplines

Each academic department must become responsible for teaching

those technological skills and objectives relevant to that area. By

doing this, students and teachers will develop an appreciation of

how technology affects all aspects of the curriculum and that these

skills need not be relegated to one or two academic disciplines.

This will require training in curriculum and content development.

STEP TWO

There is a feeling among many that an essential outcome of contemporary

education should include development of skills that will enable students to

understand the nature of the new technology and the roles that this techno-

logy will play in our society. The technological training and implementa-

tion patterns that emerge over the next five years will set a pattern, either

good or bad, that the next generation of school aged youngsters follow.

The paths that are open vary and can be influenced by factors such as

world and national economic conditions, political philosophies, and cultural

acceptance of technology in the schools and in the workplace. With the

decline of Federal assistance and the drying up of State government revenues,

the onus of financing technological innovation will probably fall on local

schools. What will happen to students in those districts that cannot afford

to purchase equipment? Instead of narrowing the gap between the haves and

the have nots, technology may exacerbate the problem of school equity. As

robots take their place in factories and on assembly lines, will displaced workers be willing to support the same kind of technology that took away their jobs in the public schools. Finally, as computer and technologically related white collar crimes begin to increase, how will society punish the transgressors. Should they be treated any differently than "hardcore criminals?" How can we impress upon students the ethics and values related to the transfer and handling of massive amounts of information, some of which may be highly personal?

Clearly, educators need to be at the forefront in the development of a national policy related to the implementation and training involved in the uses of technology in our schools. Currently, there is no such definitive policy. Instead we have sets of statements from the U.S. Office of Education and various State Departments of Education that provide various directions. While State priorities will, by necessity vary, there still needs to be some type of broad umbrella philosophy about educational technology that includes statements on the usage and type of training that all segments of the educational community can live with. Until this happens, all of the prescriptions for training teachers mentioned in Step One in this paper will be for naught as they will be like oars on a rudderless ship.

This statement need not be all encompassing and cover every grade level and every segment of the curriculum. It should, however, give direction and set priorities. Emphasis on proper use and abuse of information generating systems needs to be covered. Educators, public officials and parents need to be part of the group that drafts such a statement so that various populations can discuss their needs and fears the proliferation of technology brings.

In the past few years high tech has become high style. Computers have adorned the covers of major news magazines. Newspapers devote segments of business sections to technology. Parts of amusement parks, such as Epcot

Center in Disney World and Sesame Street Place, are devoted to interactive computer usage. Politicians have added slogans bemoaning "the growing computer literacy gap in our schools" to their repertoire. Some forty States require or are considering requirements in computer literacy for high school graduation. Several colleges and universities now include the cost of a micro-computer as part of their book and school supply fees. Despite the gloss and publicity, the reality is that teachers and schools still have not fully utilized the fall out of this revolution. Until adequate on-going training and a consistent national policy in this area emerges this may not occur for ten or fifteen years; with another generation's technological potential lost because of neglect.

NOTES

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