As MOST school people are well aware, American education has now entered the technological revolution. In the forefront of this revolution stands the electronic computer with all of its potential and mystique. Probably no other technological development since the invention of movable type has promised to do as much for education as has the computer. Yet, the vast majority of the educational profession is naive about the functions, capabilities, and potentialities of this calculating marvel.

Instead, only a handful of people in the profession are conversant with computers; thus, this elite few are in line for the high priesthood of the coming technological era. In fact, many of the computer specialists now working with educational data processing are not educators at all, but are from other vocational backgrounds. Hence, educational decision makers are not only on the verge of losing control of the technological advents in their profession, but are in danger of losing much of this control to personnel with non-educational backgrounds. Further, many of the data processing experts who have been trained in education are academicians who are not involved with the daily problems of schools and school districts.

Robert Howe recently wrote that "perhaps the greatest impact of data processing has been to uncover basic lacks," and he listed as the first lack, the lack of "understanding of technological capability by educators." ¹ Since this lack does exist, it may be impertinent for the technically oriented few to continue to clamor for the educational implementation of computer oriented approaches to solve the problems which confront our schools unless they undertake to educate the majority. Otherwise, this clamor cannot help but confuse and frustrate the huge numbers in the pro-


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profession whose only experience with data processing has been from watching cards flow through card sorters on television.

The professional training of most educators predates the computer revolution and even most younger members of the profession have not been given data processing training. Data processing has been introduced only recently into college curriculums, and for schools of education this has been largely at the graduate level in rather specifically oriented programs. Most educators, then, are left in the dark—they know at best of computers and not about them. The computer era in education thus appears to be headed for leadership by a chosen few, while supervisors and administrators must rely entirely on the wisdom of their data processors for guidance in this new endeavor.

Educational Uses

Most of the computer experts are highly competent in their fields, but they are not continually scanning the daily panorama of educational problems to discern where data processing applications can be put to good advantage. In fact, most of the experts never come in contact with the daily problems of education except for those to which they already apply their skills. Thus, if computer experts alone are aware of the computer's capabilities and potentialities, and if the educational leadership alone is aware of the educational problems, who will be able to extend the use of computers to new educational endeavors? Many of the educational uses of computers in the schools have been adapted directly from commercial applications developed by business and industry; other applications have frequently drifted down from colleges and universities.

Yet there are undoubtedly many untapped areas where computers could be put to good advantage, and it is the specialists in those areas who alone are familiar enough with the problems to be able to discern where computers can be used effectively. Unfortunately, the vast majority of such specialists know nothing about computers and so, of course, cannot determine where computers can be utilized. Further, such people, because of their lack of knowledge, are often not receptive to the use of computers even if someone else suggests it.

We should not expect everyone in education to become a computer expert. Each person's own specialty should remain his chief concern. However, we can expect every educator who comes in contact with data processing, or who is required to make decisions which potentially could involve data processing, to be at least literate in the use of data processing—to develop an understanding and appreciation of computers and computer applications.

Some industries, for example, have recognized a similar problem and now offer courses for their executives and policy makers in "computer appreciation." 2 These courses are not intended to make computer experts or programmers out of the students. Rather, they are intended to educate them to understand computer applications and potentialities and to develop sufficient skills to facilitate communication with computer experts. Edu-

cators need to adopt a similar approach and offer computer appreciation courses as in-service programs, as summer workshops, and as regular parts of the college curriculum at both the pre- and post-baccalaureate levels.

Occasionally such courses have been offered to acquaint educators with computers and data processing, but such offerings have been too scattered and too infrequent to make much of an impact on the profession. Also, unfortunately, such courses when offered have often been poorly planned and have not had clearly defined objectives. For example, it may be necessary, but is certainly not sufficient, to present educators with vague generalities of data processing at one extreme or detailed computer language concepts at the other extreme. Rather, the course should provide the student with answers to two basic questions. These are: (a) In what principal ways can the student (in his particular professional position) best utilize data processing facilities? (b) What specific information does the student need to utilize data processing facilities in the ways determined in the answer to the first question?

Goals of the Course

These questions define the course and provide the basis for the following three goals:

1. The student should develop an understanding of the capabilities and limitations of computers and data processing equipment
2. The student should develop the ability to communicate effectively with programmers and other data processing personnel
3. The student should acquire the specific knowledge and skills to originate meaningful tasks for the computer to perform, including the knowledge of how computers are being used to solve problems and provide innovative approaches in his special field of interest.

From these three goals, more specific instructional objectives can be developed to provide the detailed content of the course.

A course of this type might explore such core topics as the history of data processing, the binary number system, the use of unit record equipment, the basic functional units of digital computers, and should probably provide experiences for the students with a computer language such as FORTRAN or COBOL. The intent should be to tie these experiences to the interests of the particular students involved in the course. For example, if curriculum experts constitute the class, computer based instruction and related topics could be emphasized; if the students are primarily in library services, retrieval and inventory applications might be appropriate. The course should not be at a very technical level; it is not necessary for the objectives of the course. In fact, a highly technical approach would defeat the purpose of the course.

The rationale for the inclusion of a computer language is partially summed by Kahn's statement, "We cannot truly appreciate a culture unless we have some understanding of its language." In such a course, the language itself serves little purpose except as a vehicle to communicate with the computing profession and to provide a basis for understanding

3 Ibid.
that culture. Kerlinger in his book on educational research builds a similar case, stating that communication between the programmer and researcher depends upon the researcher learning enough about programming to talk knowledgeably to the programmer. It is easier and more efficient time-wise for the educator to learn about programming than it is for the programmer to learn about education. To this end, the student should not only learn about a language, but should actually have experience in writing and running programs on a computer.

Knowledge of a computer language alone is not sufficient for the development of computer appreciation. The entire course should focus on specific applications of computers which are appropriate to the particular students involved. The students should be faced with actual problems and with the challenge of finding real solutions to those problems. They should explore past solutions to similar problems and should feel the need for more sophisticated techniques than those to which they have been exposed. The students should be confronted with the false starts and dead ends of real life so that they can understand postponements and delays. In brief, the students should experience real data processing situations as much as possible within the scope of the course.

Naturally, the exact details of any course must be decided by those who are responsible for it, and the content discussed above is intended primarily to define better the nature of a computer appreciation course. If educators are to keep abreast of computer technology and if they are to utilize effectively the potentials of data processing, they must learn about computers. If they do not, they will either be delegating their authority to an elite few including many non-educationally trained personnel or abandoning the great promises of the computer era. Of course, the choice rests with educators themselves. But, time does not sit still and the choice is currently being made by default. Yet, the trend can be reversed if computer appreciation courses become an integral component in the preparation of educational professionals.
