

The question is not how humane can technology be, but rather how humane must technology be . . .

Educational Technology: How Humane Can It Be?

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"I HAD a problem. My problem was that I didn't like being for sale." These were the words of ten-year-old Barry Rudd in *The Child Buyer* as his potential purchaser explained that he had developed an interest in Barry because, "I buy brains. When a commodity that you need falls in short supply you have to get out and hustle."¹

Will Barry's statement of his problem represent the problems of all coming generations of students? Will educational technology inexorably dehumanize education?

What factors have combined to focus attention on this currently challenging question?

First: The past decade has brought unprecedented pressures to bear upon our schools. These pressures include the population expansion, advances in science and technology, the knowledge explosion, competition in space, and urbanization.

Second: In order to attempt to meet these current pressures on the schools, cataclysmic changes are being implemented in school curriculum, in school organization, in teacher education, and in educational materials and media.

Third: At the same time, developments in technology have emerged which hopefully may possess the potential of meeting many of the needs of the changing American education program.

In the past, superior teachers were faced with the constant problem of attempting to acquire a diversity of instructional materials to meet the needs, interests, and abilities of individual students. Today, advances in technology have made the following available to most teachers: film projectors, 8mm single concept projectors, filmstrip projectors, slide projectors, overhead projectors, opaque projectors, television cameras and receivers, micro-projectors, record players, tape recorders, video-tape recorders, radio, 8mm and 35mm cameras, dial access consoles, electronically equipped carrels, teaching machines, and computer assisted

¹ John Hersey. *The Child Buyer*. New York: Alfred A. Knopf, Inc., 1960. pp. 216, 33.

instruction equipment. Each type of hardware comes with its appropriate software, the viewing and/or listening materials.

Dimensions of Quality

Ostensibly it would seem that technology should be the answer to the prayers of every educator. What, then, are the fears—and what are the potential blessings inherent in educational technology?

The universal claim of the supporters of technology appears to be that through this multitudinous collection of materials and media it is possible to teach every child according to his own ability. If this is true, why should there be any concern about extensive and continuous utilization of all technology in education to a maximum degree?

The concern is twofold: First, will this utilization of technology in education mean that the control of education will pass from the hands of educators to the hands of programmers, and to giant industrial concerns which manufacture the materials and the media? Second, what is meant by quality in education? Can it be achieved through technology alone?

Current research is being done by William S. Vincent of Teachers College, Columbia University, on determining the dimensions of quality in education. His research has identified four categories of educational procedures exemplifying school quality as follows:

Individualization: procedures that reflect an attempt to deal with individual differences among pupils according to rate of growth, capacities, background, goals, requirements, and the like.

Interpersonal regard: behavior that reflects warmth and respect among pupils and between pupils and teachers.

Creative expression and divergency of thinking: opportunity for the expression of intelligence in many different ways, for the realization of varieties of talent, and the encouragement of intellectual pioneering.

Group activity: group interaction and interpersonal facilitation as instruments to aid learning and the accomplishment of social goals.^a

If research identifies these four categories of procedure as indicators of quality education in schools, it is obvious that educational technology meets the demands of only one of these categories. Presumably educators would agree that, if used judiciously, educational technology can be utilized to meet the need of individualizing the learning procedure. However, the integral feature of three of these factors, other than individualization, is dependent on the human regard for the student and interpersonal relationships. This cannot depend on technology; it can be achieved only through the human factor, the involvement of people. The major concern must be that the learning-teaching processes involving interpersonal regard, creative expression, divergency of thinking, and group activity will not be neglected or completely disregarded.

Thus far, consideration has been given to the general, overall advantages and

^a William S. Vincent. "Indicators of Quality." *IAR Research Bulletin* 7(3):2; May 1967.

concerns with respect to educational technology. Let us give brief consideration to the more specific problems and questions they raise.

Of the developments in educational technology, the computer is undoubtedly the most arcane, yet most viable, and has the greatest potential for encouraging egalitarianism in education. Computers offer unequaled potential in the field of programmed instruction. The advantages over teaching machines or programmed textbooks are that the computers can accept and evaluate responses constructed by the student, can provide almost unlimited branching capabilities, and can branch based on a variety of criteria. The computer can do what amounts to continuous testing to determine student progress, and the program can be changed readily in accordance with student needs. All of these factors increase the capacity for providing individualization of instruction.

Computer assisted instruction appears to be invaluable in the area of educational research. Because the learning process is so complex, researchers are confronted with a dilemma. Experiments can be carefully controlled only if they are restricted to minute portions of the learning process. When studies are made in schools, there is insufficient control of experimental conditions. Computer assisted instruction may provide a means of presenting material under controlled conditions, with a means of including records and analysis. Such data collected under actual learning conditions may lead to enlightenment regarding the learning process.

In addition, the myriads of ways in which the computer can be utilized in solving educational problems stagger the imagination. The computer handles information by collecting, communicating, storing, and retrieving. Each of the pressures and problems of change in education involves analysis through these processes which the computer can provide.

For such purposes as gathering data on the effectiveness of curriculum changes, for providing information for making decisions on organizational patterns, for organizing data collected in research on student characteristics, the computer is limited only by the ingeniousness of the designer of the program.

Field for Research

A basic factor to be considered in the field of technology is the financing of research for development. Endless numbers of philosophical questions arise related to this aspect of the field. One personal experience will serve as an illustration. The writer served on a panel for the federal government for the purpose of determining the funding of proposals submitted by universities which were involved in training and research in the area of educational technology. Much careful consideration was given to the problem of the relative amounts of grants to be appropriated to the so-called deprived areas for training personnel in basic media programs contrasted with the possibility of awarding grants to universities extremely well equipped with computers and having staffs of skilled personnel which were requesting grants for developing highly sophisticated programs of computer assisted instruction. This question arose: How can a fair balance in federal assist-

ance and foundation support be maintained between the needs of the disadvantaged and the equally pressing need for advanced research? The plea is that consideration constantly be given to both needs and that some balance be achieved in providing assistance to both.

Another matter of concern is that provision be made for coordinating the findings of "far-out" research in technology with everyday on-the-job application of the findings. For example, optical scanners are already in common use for the scoring of tests in order to get results back to teachers with extreme rapidity. An overall plan for the training of teachers must be developed which would encompass preservice and in-service training. Teachers must be trained to utilize this vast amount of vital information obtained through computers and be able to translate it into meaningful data which will affect student behavior.

Another aspect of technology closely related to teacher training is that there must be an involvement of more educators in developing materials and programs. Computer technicians must be involved because of their technical knowledge, but educators must be trained in order to develop meaningful curricula. There must be an overlapping and interweaving of the skills of the educators and the technicians in order to achieve acceptable goals. Computers can provide the information; educators must provide the wisdom.³

All persons involved in developing educational technology must constantly realize that even complete mastery of technology can in no way guarantee the understanding of the complex human organism. Along with the technological developments there must be a continuous evaluation of the effects of this method of learning on the whole child. Students must first and always be considered as human beings and treated with sensitivity and a maximum of personal attention and understanding.

Thus, if we are to move forward in education let us strive for a considered balance between the following:

Research and intelligent application

Financial support of both fundamental media programs and sophisticated technological research

Maximum utilization of the computer for educational development with maximum translation through training of educational personnel

Utilization of educational technology and humanistic consideration of individual students.

All of these factors must be combined to provide optimum opportunity for developing each child's finest potentials.

When these factors have been considered, the question is not how humane can educational technology be, but rather how humane *must* technology be. ❧

³John I. Goodlad and others. *Application of Electronic Processing Methods in Education*. Los Angeles: University of California, 1965. p. 10.



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