Coping in a Technological Culture[1]

MARY-MARGARET SCOBEY*

AS IN other fields of study which are undergoing change in content and methods, the field which deals with the ways in which man produces and uses the necessities of life is also undergoing change. It used to be simple. We called this area of the curriculum either industrial arts (IA) or vocational education (VE). Because of recent change in concept, however, the study of man's material inventions in the elementary school today is not strictly "industrial arts" or "vocational education."

One stimulus to change occurred in the early sixties when the American people became increasingly aware of the apparent fate of minority groups, inner city residents, the poor, and the unemployed. At that time, the changing character of work and training for jobs became a major concern. Efforts were made to improve the present and the future of disadvantaged groups; to help them prepare for successful employment. A number of influential persons believed this preparation for economic independence should begin with the education of very young children. As a result, the U.S. Office of Education now makes a priority focus on career education (CE) and supports elementary school programs variously called "World of Work," "Occupational Versatility," "Career Orientation," "Technology for Children," and others.

What is meant by career education is not yet well conceived. We know that it is a broader concept than either IA or VE, but definition is elusive. Recognized as an ongoing process from the kindergarten through graduate school, the goal of CE is oriented to careers and career choices. But because considered career choice and success in that choice are in part dependent upon an effective general education, some leaders in the field believe that CE ideally includes the *total* educational program! Such an interpretation is encouraging because it broadens the previous limitations of both IA and VE.

There is a recognized need to provide for children a body of knowledge, skills, attitudes, and activities related to the processes and products of industry and the world of work—common concerns of both IA and VE educators. But there is more to the field than this. Since all people in our society live and work in a highly technical culture, children must learn to cope with it. Therefore CE in its broadest sense could be the study of technology, or analysis of the ways in which a social group provides for its material needs, and life patterns therein derived.

In recent years the curricular field related to technology has achieved appropriate status; it may justly be termed a "discipline" or a "field of study" in its own right, and can

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* *Mary-Margaret Scobey, Professor Emeritus, California State University, San Francisco, and Consultant, The American International School, Vienna, Austria*

be recognized as such in the elementary school curriculum. Technology, as a discrete field, deals with industrial arts, applied science, engineering—the sum of ways people produce what they need. Going beyond production alone, the study also develops familiarity with and adjustment to our technology.

Alvin Toffler, in *Future Shock*,[2] describes technology as a "great growling engine of change," and identifies it as more than factories, assembly lines, or machines. He says technology "includes ways to make chemical action occur, ways to breed fish, plant forests, light theaters, count votes, or teach history" (p. 25). It may also include ways of restoring our ecology and eliminating the various types of pollution in our environment.

Impact of Technology

The study of technology is of necessity a comprehensive, interdisciplinary approach. It focuses on the relationship of *things* to *mankind*—the ways in which things have been invented, developed, utilized by man, and also the way material objects influence man's behavior and thinking. The study of technology cannot be divorced from this human element. Man's ideas, his creative endeavor, his accomplishments in the world of productive work are important factors in the study of technology. Technology must be understood as an extension of man's capabilities.

Toffler further emphasizes the importance of things when he says: "Important new machines . . . suggest novel solutions to social, philosophical, even personal problems. They alter man's total intellectual environment—the way he thinks and looks at the world" (p. 29). On television, President Nixon in China was closer to the people of New Hampshire than Senator McCloskey, who in their midst shook thousands of hands and made hundreds of speeches in their communities.

The impact of technology on man, and the rapid current of change in human relationships, are obvious to all. Toffler's "engine of change" is growling particularly loud these days. Modern youth, economists, philosophers, and others are analyzing and criticizing our way of life.

Affluent industrial nations are now connected by instantaneous communication with undeveloped countries and, indeed, with countries of opposed political differences. For the first time in a quarter of a century, television has brought us human interest stories from inside China. Economist Kenneth E. Boulding tells us that a "revolution of rising expectations" is taking place not only among the poor within a wealthy nation, but also within poverty-stricken countries. Underdeveloped nations are not happy that the nations of the Western world are so wealthy when they are so poor. At the same time that improved communications and transportation enable people to become better acquainted with other peoples, thus presumably promoting international and intergroup understanding, the disparity in access to material things is building grounds for international conflict.

Here at home, blacks and other minorities are demanding their fair share of material wealth, while many middle class white college youth are rejecting materialism. "Work makes ants of men," the hippies say. Youth are crying for human dignity, mutual respect, and community. Philosophers such as Marcuse see technology in the hands of a powerful establishment, controlling the lives of modern men. And Marshall McLuhan claims that it is the media, the machine, not the message, that controls our lives. Charles Reich sees a faceless corporate state in which people are controlled by the machine.

Although the dangers of a post-industrial automated economy are very real, Abraham Maslow and other humanistic psychologists hold the optimistic view that man can achieve self-actualization only after his material and safety needs are realized. Though youth today tend to devalue materialism, it is only through man's work and creative endeavors that we can support so many young people in our colleges. Only because their labors are not needed for subsistence can they devote their time to ecological causes and crusades for human rights!

[2] Alvin Toffler. *Future Shock*. New York: Random House, Inc., 1970.

Technology's impact on life patterns is discernible in other ways. Two hundred years ago, in the producer society of farm life, children were an asset. Today our consumer families are smaller, but our schools are larger because of improved transportation and sprawling urbanization. The one-room school is gone; today we design educational parks that care for children and youth of all ages on one campus. And don't believe that the current movement for women's liberation isn't influenced by technology! The typewriter, Margaret Mead says, emancipated women; but modern appliances and easily accessible, commercially prepared products have also freed women to work for equality.

The worker, whose hours of work have been shortened by automation and cybernation, has more time for a variety of leisure activities. Just drive through a city suburb on a Sunday and see how people occupy their free time. Boats, campers, cycles are being repaired, cleaned, and readied for use. People sit about enjoying patios. Garage doors are open to do-it-yourself workshops. Libraries are crowded. Parks, beaches, and other open spaces are crowded with campers, picnickers, and ball players, many of whom are inner city residents.

There is evidence that man is learning to use technology to his advantage rather than to his disadvantage. The scholar, who saves innumerable hours when a library computer researches his topic, has more time to think. The physician who uses a computer to maintain complete records of his patients provides better medical care. The astronomer, through computerized data, can ascertain stars not yet discovered.

The citizen, then, and the learner, who is seeking to cope with his environment, must understand how technological developments can affect his life by changing his physical and psychological environment. Content provided in the elementary school, then, goes beyond traditional IA and VE programs. Career education, if we call it that, must include content related to the social sciences, to a broad consideration of the impact of technology on mankind, and how to use that technology for human welfare.

Teaching about technology must include both *training* and *education*. *Training* is the development of skills which are replicative and applicative, including the psychomotor skills. Examples of such skills are the multiplication tables, or the use of a saw or hammer. The concrete, manipulative, experimental activities which help children develop skills in the use of tools and materials are, of course, the heart of the technology program. But teaching children about technology adequately and completely will also necessitate the associative and interpretive components of *education*. That is, concrete experiences are extended through observation and analysis of the technological processes and products. Insights into the processes of technological production are developed; interpretation of the materialistic components of our lives leads to more complete social and personal utility.

Too often IA and VE skills have been taught without consideration of the cognitive and affective domains of education. There are some children who have learned to construct a tie rack or mold plastic without understanding the social and economic implications of the products.

Herein is one of the advantages of a broad concept of CE. During the process of making a tie rack, the learner considers the sources of the raw materials, all the aspects of lumbering, tree farming, conservation, and even related leisure activities available within our forest regions. He becomes familiar with the great variety of workers who made it possible for him to construct the tie rack. He considers the economic implications of cost, and of supply and demand. He explores the many objects of similar construction and their particular use to modern man. If, in fact, the learner considers all the interdisciplinary approaches to understanding his tie rack, he will utilize not only language and mathematical skills, but economic, political, historical, and social insights. The experience will also influence his attitudes toward the contributions of workers and the uses of products.

Can we help children cope in a technological culture? Can we help children find

a satisfactory, productive life in this changing technology? Can we educate children to appreciate work for the satisfaction derived from it? Can we help individuals explore many handcraft skills to find those that are intriguing and of special individual interest? Can children learn to appreciate material inventions in our culture and be conscious of both the positive and the negative influences they create? Can we provide a significant orientation to the world of work so that young people have an adequate basis for occupational choice, occupational versatility, occupational success?

To answer these questions positively, the curriculum must be carefully developed. Recent years have brought curriculum reform in language, mathematics, science, and social studies. In these subjects, an attempt has been made to improve the learning process, and content has been modified. Teachers have become facilitators who help the learner understand principles, observe relationships, make personal applications. The curriculum related to technology and the world of work should follow this same pattern. In the elementary school, children need to:

1. Understand, appreciate, and interpret our rapidly changing technology, the ways in which it influences our culture, our society, and the world; consider the ways that man can master the machine rather than letting the machine master the man. Learners should investigate such questions as:

- How has man learned to utilize his natural environment, cope with it, and in some ways, control it?
- What machines have been invented as extensions of man: his eyes, his ears, his muscles, his memory?
- How have the products of man's inventiveness changed his way of life, for better or for worse?

2. Become aware of and curious about the complexity and interdependencies of the world of work, including production and distribution of goods, and the many services necessary to our way of life. Questions such as these are appropriate:

- What is the nature of specialization, and why is it necessary?
- Upon what services do we most depend?
- How many people are needed to produce a pair of shoes?

3. Appreciate and develop positive attitudes about the dignity of man and his work; recognize the interrelatedness of all occupational endeavors—their contribution to mankind, and the resulting human relationships within our society and between cultures. Learners seek answers to:

- What happens when the garbage men go on strike?
- Upon whom does the milkman depend?
- How do technical experts help developing nations?

4. Build effective consumer skills of selection and use, posing such questions as:

- How is the price of the product related to the quality of the product?
- How do manufacturers know what items will sell?
- What are the contributing factors to prices in a grocery store?

5. Develop some knowledge and personal skills which will help the learner understand his own talents, capabilities, and interests, and how these may mature and change. The children may ask:

- Are my strengths verbal?
- Do I prefer to work with and for people?
- In what ways do I prefer to spend my leisure time?

Technology, as a field of study in the elementary school, focuses on a broad, interdisciplinary range of content. The heart of the program can and should be manipulative, concrete experiences. Yet any study of technology must also include experiences in the cognitive and affective domains. We have gone beyond the concepts of "manual training" and "woodworking." We provide experiences that will develop the skills of research, observation, analysis, summarization, interpretation, problem solving, and the like. We help children develop attitudes and ideas that will facilitate their human relations, their ability to cope with change, and their insight into the future of mankind. We strive, in fact, to prepare young people to successfully encounter "future shock." And this is indeed a challenge. □