Technology Education: Prospectus for Curriculum Change

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Starr (1988) documents the United States as being in an ever weakening global position. For example, he reports on the demand for an increasingly educated and technical work force and contrasts this with the supply of high school graduates ill equipped for either college or the work force. Many Americans find today's rapidly changing world a bewildering and alien place to live and to work as they intentionally, or unintentionally, recoil from the technical means upon which they must rely and try to cope and adapt (Bensen, 1991).

This editorial examines how the United States is failing in its attempt to educate and professionally prepare our youth. The critique is followed with a proposed technology education teacher preparation curriculum that attempts to reflect today's global, technological society.

United States Society Based on Globalization

A recurring theme in contemporary society is globalization. The expanding growth of world output crossing national boundaries, because of dramatic advances in transportation and information services, has advanced the concept of a one-world economy. Somewhere in the world, markets are open. Products are commonly produced in one country utilizing materials from a second country and exported for sale to still others.

No American firm can afford to assume that it is impervious to foreign competition. In addition, an increasingly larger number of United States firms are looking overseas for opportunities. A technology education teacher preparation curriculum should include the concept of globalization.

United States Society Based on Technology

Technology may be defined as the systems and objects or artifacts that are created using knowledge from the physical and social worlds (Friedman, 1980). Key descriptors of a definition for technology, according to Barnes' (1990) study include: a) innovation; b) invention; c) creativity; d) extension of human capabilities; e) system of tools, knowledge, and behaviors associated

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with the exploitation of the environment; and f) social, economic, political, and environmental impacts. A technology education teacher preparation curriculum should include the latest advances in technology.

United States Education: A Failing Grade

While globalization and technological changes are taken for granted in today's business and industrial arena, education seems to be much more inwardly-focused. The United States public educational system is not only supplying unprepared entrants for college and for the technical work place, but even worse, it is misleading them into believing they are qualified to compete successfully in a modern and demanding technologically global society (Meriam, 1991).

Most of the United States population is not being properly educated to function in the everyday world of the next century--a time in which technologically literate citizens must make critical decisions affecting the global community. For example, when asked in a Gallup poll what kind of work engineers perform, 35 percent of "average Americans" surveyed stated they run trains, manage boiler rooms, or simply do not know (Lohman, 1991). Over 3,000 students drop out of high school each day in the United States and 75 percent of American high school youth never graduate from college (Thomas, 1987).

Professional Preparation and Education

Japan's manufacturing is, for the most part, highly robotized, yet the educated human element is still a high priority. The Japan Productivity Center, established in 1950, contends that the basic view of productivity is a respect for people in order to promote human welfare (Orr, 1990).

Professional preparation programs in the United States tend to place less emphasis on general education (liberal arts) courses and a much greater emphasis on subject specialty courses. However, the Stanford Institute for Research on Educational Significance on High Technology has stated: "Everyone should have strong analytic, expressive, communicative, and computational skills as well as extensive knowledge of political, economic, social and cultural institutions" (National Advisory Council on Continuing Education, 1984, p. 8). A technology education teacher preparation program should include professional preparation and a liberal arts education.

Technology Education Program Development

Any technology education program development effort should take place within the concept of a defined totality. The human adaptive systems (ideological, sociological, technological), are a totality as identified by White (1959). Human adaptive systems are open systems which are dynamic, tend towards growth and differentiation, and stress a continued renewal process. Ideological systems are those that comprise basic belief systems such as values and social norms. Sociological systems refer to structured relationships among people. Technological systems pertain to the manipulation of the physical world to meet basic needs of survival and to extend human potential (Lauda & McCrory, 1986).

Major Concerns

Determining the appropriate distribution of professional preparation and liberal arts courses should be a major concern in a technology education teacher preparation curriculum. Zuga (1989) stresses that program development should be based on intellectual processes that also make critical thinking, problem solving, creativity, and self-confidence major concerns.

Public school instructors, by virtue of the fact that they are in daily contact with today's youth and tomorrow's possible leaders, must themselves be educated in the liberal arts, appreciate the globalization of society, and be professionally prepared to understand the concept of constant technological change.

Recent writers seem to stress this general approach to the study of technology. Kozak and Robb (1988) wrote that technology education emphasizes technology as a part of the humanities, the arts and the sciences, and can acquaint all persons with their technological environment so they can make rational decisions about their own lives and control their own destiny. Zuga (1989) stated: "The evolution of technology education goals has reflected a drift towards more liberal education ideals" (p. 34). According to Wright (1988), the technology educator should adopt the social/cultural approach for improving the awareness of how humankind interacts with technology. Perhaps at no other time in history is there a greater need for university technology education teacher preparation programs to be pro-active rather than reactive.

Suggested Program in Technology Teacher Education

The technology education teacher preparation curriculum should include, in addition to the latest technological advances, the following: a) state and university mandated requirements (these cannot be ignored), b) core curriculum courses, c) globalization concepts, and d) professional preparation courses. (see Table 1)

Table 1

Proposed Technology Education Teacher Preparation Program

	State/University Mandated Courses		
History	6 s.h.	Political Science	6 s.h.

English	12 s.h.	Physical Education	4 s.h.
		Core Curriculum	
Art	3 s.h.	Music	3 s.h.
Chemistry	4 s.h.	Philosophy	3 s.h.
Computer Science	3 s.h.	Physics	4 s.h.
Dance/Drama	3 s.h.	Psychology	3 s.h.
Economics	3 s.h.	Sociology	3 s.h.
Mathematics	6 s.h.		
		Globalization Concept	
Foreign Language	12 s.h.	Cultural Diversity	6 s.h.
International Internship	6 s.h.		
		Professional Preparation	
Technology: Materials	9 s.h.	Technology: Energy	9 s.h.
Technology: Information	9 s.h.	Technology: Control	9 s.h.
Education Methods (Including Student Teaching)			18 s.h.
		Total	144 s.h.

If a liberal arts education is to be a major concern, then a core curriculum should be considered with courses, if possible, in every department in every college and/or school in a university.

To address "globalization": a) communication skills in a second language such as Spanish, German, Japanese, or Russian; b) cultural diversity; plus c) an international internship would be possibilities.

Today's typical technology education program includes approximately 130 semester hours. However, a full-time student at a university could take 18 semester hours per semester for four years, a total of 144 semester hours. Therefore, Table 1 is an example of a proposed 144 semester hour technology education teacher preparation program that includes: a) state/ university mandated courses, b) a core curriculum, c) globalization concepts, d) professional preparation in technology and e) professional preparation for teaching.

Conclusion

An old story concerns giving a starving person a fish so that the individual will live for another day, or teaching the person to fish so as not to starve ever again. In today's world, with constantly changing technology, teaching a person to fish is no longer sufficient; the individual must be educated so that as fishing methods change, the individual will know how to learn to stay competitive and survive in the technological fishing industry of the future. In addition, with the technological advances in the fishing industry, the individual will have more free time and should also be educated to appreciate what the world has to offer.

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