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## THE CHANGING FACE OF TECHNOLOGY EDUCATION IN THE UNITED STATES

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The movement during the 1980s in the United States to implement technology education was preceded by three or more decades of discussion and work of concerned professionals. Some discussions, sometimes more appropriately called fights, argued whether the profession should teach about industry or technology. It was not until the 1980s that the profession seriously considered technology as its content base. At the same time national attention was focused upon the quality of education. Several national boards and commissions, responding to the need for such quality, considered technology, for the first time, as an essential part of the curriculum. (1) (2) (3) Perhaps equally important, technology was considered as more than computers and computer literacy.

These influential reports have been important in helping those outside our field become more aware of the importance of technology and technological understanding. This growing public awareness is providing something of a "fulcrum" for change and the redirected profession of technology education could help provide some of the "leverage" for that change. Only recently, however, has the profession discovered the political power and leverage that resides in using technology and technological literacy as slogans.

Part of the political leverage accrued when people began to use the term "technology education" to replace "industrial arts". Nearly all state organisations have now changed their names to include technology. Approximately forty of these states use the general term "technology" while approximately ten have taken the more restricted term "industrial technology". Name changing can be like name calling, however, and a new name can become a powerful slogan (or battle cry) and can elicit emotion and support. Substantive changes in curriculum and instruction are needed before the programmes reflect that new name. Studies on the changing nature of course offerings in the United States indicate a marked shift from a craft to an industrial orientation and on to more of a technology orientation. (4) (5)

The studies further indicate a growing interest in technology and expanding implementation of technology-oriented courses. Considerable confusion and inertia remains, however, because technology as a useful slogan has not been supplemented with a generally accepted and useful definition. Like other countries, the United States is blessed, or cursed, with a surplus of definitions for technology.

.... the operational definitions of technology differ tremendously and range from (a) tools and hardware, (b) production of goods and services, (c) systems construction transportation, communication and production, (d) a body of knowledge of practical value, to (e) a philosophy of thinking and doing. (6)

The definition that appears to be emerging as most accepted by the profession would read generally as, "the use of our knowledge, tools and skills to solve practical problems and extend human capabilities." (7) In the same vein, technology education is defined as "the comprehensive curriculum area which has an action based instructional program concerned with technology, its evolution, utilization, and significance ....its organisation, personnel, systems, techniques, resources and products; and their combined social and cultural impacts." (8)

Definitions alone are inadequate in that they often ignore significant dimensions that make technology worthy of study. Technology education must give attention to the underlying conceptual structure, function and results of technology. Building such "conceptual models" can help to (a) clarify what is to be taught, (b) improve how that content might be learned and organised, and (c) provide these "models" as "tools" for transferring what has been learned to new and different circumstances. Such a perspective can add to the educational and political power of technology by making it important in all

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subject fields as a "process" for teaching, as "content" for study, as a "vehicle for integrated learning", as an "agent for change:" and as a "commodity of value".

This richness of meaning and potential of technology creates a real paradox for the technology education profession in the United States. How can teachers make the kind of commitment needed to teach a demanding technical subject and yet be able to move on to something new when required? Perhaps an approach to this problem for teachers could be similar to an approach being implemented with students in some emerging technology programmes. Both teachers and students need to learn specific skills within a sound conceptual framework. An important key to the problem, however, resides in the concept of "transfer of learning". Transferring learning, if achieved, means that students and teachers can apply their knowledge to help them understand what they currently don't know. Teaching for transfer must become a major concern for those in the profession who will train the future teachers of technology.

The current circumstances in the United States are encouraging, frightening and exciting. More and more teachers are accepting that technology should be the content base of what students are to be taught. A smaller but growing number are also accepting that a problem solving approach is essential in teaching technology. The frightening aspect of this paradox is whether those of us in technology education can muster the resources and support to make the systematic changes that are needed to support the growing acceptance in the field and to nurture the necessary reshaping of a profession. Most exciting is the possibility of seeing design and technology emerge as the next generation of curricular change in our schools.

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