Book Review

Raizen, S. A., Sellwood, P., Todd, R., and Vickers, M. (1995). *Technology Education in the Classroom. Understanding the Designed World.* San Francisco: Jossy-Bass Publishers. $32.95, 249 pp. (ISBN 0-7879-0178-4)

Reviewed by Dennis R. Herschbach

Technology Education in the Classroom, is a timely book. Drawing from a large number of examples, the authors discuss technology education's potential contribution to the K-12 curriculum. The sweep of the text is broad, including references to technology education in other countries in addition to numerous program examples in the United States. The reader can see how technology education is used at different levels of schooling; how the subject field can be integrated with the teaching of science, math and design; how activities can be used to enhance and enrich learning; and how interest and motivation can be an instrumental part of a teaching strategy. The authors present ways to structure curricula which are rich in purpose, expansive, alive, and relevant to kids. The text is a good guide to what technology can be.

This is also a useful book. Reference is made throughout the text to how technology education concepts can be applied in the classroom setting, and the text is crammed with program examples. Although grades K-12 are covered, the main emphasis is on K through the middle school grades. There are 30 separate "classroom vignettes" tightly written descriptions of specific classroom activities used to introduce various technological concepts. These range from such diverse topics as "A Solar Hot Water Heater: Using Science in the Technology Classroom," and "Building Model Bridges: A Design and Technology Challenge," to "The 'Best' Jar Opener," an activity intended to engage students in investigating a practical problem, "Little Whizzers," the construction of a simple toy demonstrating physics concepts, "Green Gunge," a study of water treatment, and "Beyond Occupational Specificity and Gender Bias," a discussion of curriculum reorganization to eliminate gender separation.
Each vignette is designed to address a specific student group, and each has a specific instructional purpose. The vignettes are used by the authors to illustrate the instructional ideas presented.

The authors discuss why technology education is important and how it can be used in the school. Attention is given to curriculum design, teaching and learning strategies, and program planning and implementation. Throughout, the discussion is practical and useful.

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Roughly 40 percent of the volume is devoted to five useful appendices. There is something for everyone. For the reader interested in comparative education, the appendix on "Technology Education in Other Countries" provides a snapshot of concepts and practices in the United Kingdom, Germany, Japan, and the Netherlands. For elementary and middle school educators there is information on how to build instruction around a central theme. The appendix on "Technology at Merlyn High" illustrates to secondary teachers how technology education can be linked with science in a core program. The appendix on "University and School Sites" will be especially helpful to teacher educators. And, finally, there is a comprehensive "Resource List" that should be useful to almost anyone interested in pursuing ways to incorporate technology in the classroom.

The book reflects the diverse backgrounds of the authors. Senta Raizen is director of the National Center for Improving Science Education. Not surprisingly, various threads of science education are woven throughout the text. Peter Sellwood is an education consultant to schools, colleges, and industry, and has worked extensively in the United Kingdom. He brings an international perspective to the work, including a focus on science, design, and technology curricula as conceived in Europe. Ronald Todd, a research professor in the Department of Technological Education Studies at Trenton State College, has a background in industrial arts, technology education and mathematics. His most recent work involves design-related curriculum materials integrating mathematics, science, and technology. Margaret Vickers is director of the Center for Learning, Technology and Work, a Division of The NETWORK. She also brings an international perspective to the presentation, in addition to insights from her work on youth and school-to-work policy. The book is very much the product of the combined interests, professional activities and backgrounds of these four individuals. The richness of the presentation reflects the richness of the combined experience of the authors.

To the authors, technology education is best viewed as an integrative concept. Kids build a mousetrap powered vehicle in order to grasp concepts such as motion, force, and kinetic energy; they fabricate kites to study the physics of airfoils; they create designs to experience the use of different materials; they build a model glider to investigate the strength of materials in comparison to weight; and they construct an electrical device in order to see how theoretical knowledge is applied to circuitry.

However, the reader should not expect to find a technocratic approach to the teaching of technology. Technology education is not viewed as skills to learn or a subject to be mastered. Technology education is not confined to a set curriculum. It is fluid, and experiences (activities) are selected in accordance with the developing interest of students and the need to develop a deeper and fuller understanding of knowledge and its use. Technology education is conceived as the means through which students integrate knowledge and experience. In the Deweyan sense, technological activities are the vehicle through which students construct, use, and reconstruct knowledge.

The strength of the book, however, is also its weakness. It is broad-reaching, it tries to relate to a wide audience, and it is full of useful examples.

What is missing is a coherent curriculum framework. The authors recognize the problem. They observe that technology education is itself a newly emerging field of study, and that "there is a level of confusion about what technology education is," and often a "lack of coherence" in the instructional activities offered under technology education" (p. 3). While the authors set out to "provide a vision of what a coherent K-12 technology education program for America's schools might look like and what it might achieve" (p. 3), they fall short of this ambitious objective. To be sure, there are plenty of good insights and plenty of important questions to ponder. And while there is a strong case presented for the integrative power of activity-based instruction rooted in technology, one is still left wondering if technology education has some kind of defining structure itself. The authors come closest to identifying what they mean by technology education when they suggest it should "comprise a series of carefully constructed multiyear courses or course sequences; each of these would give students direct experience in designing products, structures, and systems to meet individual and social needs" (p. 3). The various abbreviated "curriculum themes" and the suggested course outlines presented are just that, however: abbreviated and suggestive.

Part of the problem is attempting to provide a coherent curricular framework for an activity-based, integrative subject. This type of curricular orientation does not necessarily have a set framework. But if technology education as presented in this book is going to be something more than a way to help teach science, math, and design concepts, it is going to need to have a clearly defined program rationale and a coherent curriculum framework. The authors are close to accomplishing this, but what they offer is simply not developed enough. Technology education has to be more than just a lot of activities.

Nevertheless, this is an important book. It shows what technology education can be in its fullest and richest instructional application. It points to one direction which can be followed by the field and the text is packed with good ideas and useful concepts and examples. Although the book is not complete in itself, it will no doubt help to develop a more complete concept of what technology education can be. For this reason alone it should be given studied consideration.