

Foreword

In the late 1950s, under the leadership of Dean William Kimball, the Thayer School faculty reorganized its curriculum to emphasize the *engineering sciences*. As a prerequisite to the study of engineering, students were required to take a very stiff dose of mathematics, physics, chemistry, and courses in field theory after which they would be introduced to engineering practice. Dean Kimball then recruited me to be his successor in implementing the program. On my arrival in 1961, I met Professors James Browning and Robert C. Dean, who told me of their concern that, while the strengthening of mathematics and science was necessary, they feared a steady diet of abstract theory would discourage and drive away those students of a creative bent who would be most likely to become strong contributors to the engineering profession.

I agreed with their analysis and supported their development of a new course, “Engineering Sciences 21: An Introduction to Engineering.” The idea was simple. Before undertaking the abstract theoretical courses required for advanced practice, the students were to experience the hands-on fun of actually doing something creative and useful.

In the ensuing 35-plus years, the course succeeded beyond our expectations. Many Thayer School alumni have told me what ES 21 did for them, how it inspired them and gave them a vision for life. Many have established their own companies, a few based on projects initiated at Thayer School. Some of their names will be found in the Acknowledgments section.

This book is based on that experience.

In 1991, the U.S. Department of Labor issued a report* describing five competencies students should acquire to be successful in the world of work:

- Ability to manage resources—allocating time, money, materials, space and staff
- Interpersonal skills—working on teams, teaching others, serving customers, leading, negotiating, and working well with people from culturally diverse backgrounds
- Managing information—acquiring and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information
- Working in and on systems—understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving systems
- Technology—selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies

Faced with this list of competencies and the existing educational system, most teachers have not known where and how to begin. Fortunately, this book presents a well developed and tested approach. The book goes far beyond a simple description of what to do. Based on nearly a decade of experience teaching high school teachers how to do it, the book is replete with examples of successes, a discussion of barriers and how to overcome them, and suggestions for how to adapt the general principles to your unique situation.

I am delighted to endorse this book, to commend it to serious educators at all levels, and to have had a small hand in its beginnings.

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**What Work Requires of Schools: A SCANS Report for America 2000*. Secretary’s Commission on Achieving Necessary Skills, U. S. Department of Labor (1991).