

## THINKING AHEAD: CAN THE U.S. AVOID A SHORTAGE OF SKILLED WORKERS?

Peter Fairweather And George A. Schnell  
Institute for Development, Planning and Land Use Studies  
Department of Geography  
The College at New Paltz,  
State University of New York  
New Paltz, NY 12561

**ABSTRACT:** Technological innovation in the place of work and demographic changes in the work force may have vast implications in the ability of the United States to maintain an adequate supply of skilled workers. Several factors contributing to this potential "skills gap" are identified, including the ways in which the introduction of electronics and information processing technology to the workplace has transformed the nature of work. The nation's ability to adapt to these technological changes may be hindered by demographic shifts in the work force, especially those involving the characteristics of age, gender, and national origin. The article concludes by outlining responses the business community may make to avoid or at least forestall this problem in the labor force.

### INTRODUCTION

During the 1970s, the United States faced an unprecedented shortage of energy. Throughout the worst of the crisis, many "miracle cures" were offered, from small-scale hydroelectric plants to synthetic fuels. However, one of the most effective responses, both environmentally and economically, turned out to be conservation. That is, as long as they felt the pressure to conserve, businesses learned to use energy resources more efficiently.

Indications are that, unless we act now, the United States may be facing an energy crisis of a different sort by the year 2000—a shortage of skilled labor. Once again, conservation may be our best hope. If we wish to prevent potential disruption of the economy, the business community must act to ensure that our society fully develops and efficiently deploys its human resources.

### THE SKILLS GAP

In a recent study commissioned by the U.S. Department of Labor, the Hudson Institute projected a significant gap between the skills required by employers in 2000 and the level of skills available (Johnson and Packer 1987). Based upon a profile of 12,000 jobs, the study found that, using a scale of 1 to 6, these jobs will typically involve a skill level requiring the ability to read safety instructions, maintenance manuals and data from periodicals and, possibly, to write a business letter (rated at a middling 3.0). Using National Assessment of Educational Progress data, the authors projected that the work force in the year 2000 will have an average skill level of only 2.6 (Johnson and Packer 1987).

According to projections made by Workforce 2000, job growth from 1984 to 2000 will be concentrated in occupations requiring higher skills in language, mathematics and reading. Fifty

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percent of the job growth will be contained in seven categories: managerial and management related occupations; marketing and sales; administrative support; technicians; health diagnosing and treating occupations; teachers, librarians and counselors; and mechanics, installers and repairers. U.S. Labor Department projections indicate that even low- to medium-wage jobs will require workers to be able to "read, reason, learn new tasks on their own and deal graciously with customers and others" (Whitman, Shapiro, Taylor, Salzman & Auster 1989). In a subsequent study, Hudson Institute researchers "found that average young adults, 21 to 25 years old, are reading at a level significantly below that demanded by the average job available in 1984, and are even further below the requirements of jobs expected to be created between 1984 and the year 2000" (Fiske 1989).

Apparently, the skills gap is already being felt in the area of international trade. The Vice President and Director for Training and Development for Motorola Corporation reports that some West German and Japanese exporters no longer sell "state-of-the-art" equipment to American companies, under the assumption that our work force does not have the skills to operate it (Perini 1989).

### THE CONTINUING CRISIS IN THE CLASSROOM

The number of functionally illiterate adults in the United States is estimated to approach 30 million, with as many as an additional 40 million who are considered only marginally literate. According to information gleaned from the Educational Testing Service's 1986 National Assessment of Educational Progress, fewer than 30 percent of adults 21 to 25 were able to calculate the tip for a check as a percentage of the total restaurant bill, and fewer than 15 percent could use a schedule to identify the departure or arrival times of buses. The cost of illiteracy in terms of lost wages, productivity and profit has been estimated at \$20 billion annually (U.S. Congress 1988; Zemke 1989).

The business community long insisted that it would not provide basic skills training to its workers, since it was the responsibility of the school system to do so. However, recent studies indicate that somewhere between a quarter and a third of all American businesses now provide employees with some form of remedial education (Karr 1989, Lee 1989).

### TECHNOLOGICAL, DEMOGRAPHIC AND SOCIAL FACTORS BEHIND THE SKILLS GAP

The skills gap may not represent deteriorating performance on the part of schools as much as increasing demands on the part of business. The director of the Tenneco Automotive Training and Development Center has written: "I don't think that the educational system is doing that bad a job. But its doing the job that was needed 20 years ago" (Perini 1989).

According to a Motorola official, the highest level required by that corporation involves advanced skills in statistical process control, problem solving and an understanding of entire manufacturing processes. As we move into the 21st Century, he believes, "We're probably talking about 40 percent, maybe more, of the entire population that need to be brought to [this level]. . . . But a lot of our foreign competitors already have the majority of their work force [at that level]. So all our training up to that point will be catch-up" (Perini 1989). A Boston University professor attributes Japan's economic success to the fact that its average blue collar workers can "interpret advanced mathematics, read complex engineering blueprints, and

perform sophisticated tasks on the factory floor far better than blue collar workers in the U.S." (Nussbaum 1988). So, while the quality of American education may not be declining compared to years past, schools are being pressured to improve the level of skills provided to their students. A review of recent studies and reports suggests that two factors exacerbate the problem: the changing nature of work and demographic change in the labor force.

#### **The Changing Nature of Work**

In many sectors of the economy, the introduction of electronics and information processing technology has transformed the nature of work. In the modern firm, mechanical systems, whose inner workings can be directly observed by the worker, have given way to electronic systems, which cannot be directly observed. A researcher at Columbia University explained the effect this had on the textile industry: "Semiliterate textile workers used to be able to function [on the job] because they saw how their machines worked . . . Now, new machines have invisible microprocessors and other electronic components. Technicians have to repair by decoding complicated manuals, diagrams and updates from manufacturers" (Fiske 1989).

This transition from mechanical to electronic operation often requires companies to redefine the skills needed by their workers. For example, in the 1970s, R. J. Reynolds realized that a change to electronic machinery would require all operators to have at least a sixth-grade reading level. Twenty percent of its existing workers failed to test at or above that level, causing the company to institute on-site classes in adult basic education ("Training Today" 1989).

The American experience in international markets has suggested that, contrary to popular belief, electronic automation increases the need for skilled workers. When American firms tried to use automation to lower the level of skills required by their workers, they were often easily undercut by foreign firms, particularly in the Far East, where unskilled workers were paid a fraction of the wages earned by unskilled American workers. The alternative response is to upgrade the skills of the employees so that they can use this powerful technology more effectively than the competition (Cohen and Zysman 1987). For example, when General Motors retooled its North Tarrytown, NY plant, it trained the entire work force in the concepts of teamwork needed to take full advantage of the new production technology (Yu 1989).

This leads to the second dimension of the electronic transformation: technological innovation often requires companies to increase the responsibilities of entry-level workers. Moreover, the basic skills that employers will want from their workers in the future include those that have been formerly required only of supervisors and managers, according to the American Society for Training and Development. These include problem-solving, an aptitude for teamwork and the ability to learn (McKenna 1989). As a Harvard Business School professor puts it: "The distinction between managers and those managed is diminishing, especially in terms of information, control over assignments and access to external relationships" (Kanter 1989). Clearly, technological change in the workplace is contributing to the skills gap by requiring greater abilities in abstract thought and computation and by requiring workers to assume increased responsibility for self-management.

#### **The Increase of Nontraditional Workers**

Several current demographic trends suggest that, in the years ahead, the United States may

fall short in its supply of skilled labor. Indeed, Workforce 2000 projects that the population and the work force will grow more slowly than at any time since the Great Depression. Moreover, the average age of the population and work force is anticipated to rise, and the pool of young entrants into the work force is expected to shrink. According to various sources, the so-called "middle-aging" of the work force is expected to be accompanied by an absolute and relative decline in the number of younger, entry-level workers. Workforce 2000 projects that the shortages of entry-level workers (age 16 to 24) will be particularly acute in the Midwest and Northeast, given the dramatic rates of out-migration experienced by those regions since the 1970s.

By contrast, the report projects growth in other segments of the labor force. For example, more women are projected to enter the work force, although the rate of increase will slow toward the end of the period. Nevertheless, it is estimated that women will comprise almost two-thirds of all new entrants into the labor force between 1985 and 2000 (Johnson & Packer 1987). In addition, minorities will constitute a larger share of new entrants into the labor force, and immigrants will represent the largest share of the increase in the work force and the population since the first World War. The Bureau of Labor Statistics projects the share of blacks in the work force will increase from 9.2 percent in 1970 to 11.8 percent in 2000. The Bureau also projects that the share of the work force of Spanish origin will rise from 7 percent in 1985 to more than 10 percent by 2000 (U.S. Congress 1988).

#### **CLOSING THE SKILLS GAP: SUGGESTIONS FOR A PUBLIC POLICY AGENDA FOR THE BUSINESS COMMUNITY**

The evidence clearly suggests that the quality of education will have a major effect on the skills gap. Schools must seek to broaden general literacy while adding new, technology-related courses. They must accomplish all of this while serving a generation of children, many of whom are besieged with personal, social, and economic problems. However, it also suggests that changes in the school system alone will not solve this multi-faceted problem, in part because many of those deficient in basic skills are beyond school age.

Success as a skilled worker in the modern economy requires much more than manual dexterity. It involves all aspects of the personality: intelligence, imagination, and the balancing of family responsibilities to name just a few. Response to the skills gap must go beyond training simple skills to embrace an approach which develops each individual's capabilities for reasoning, creative thought and responsible behavior both in the workplace and in private life. While altruism is involved in this approach, we must also realize that to fail may deny business and industry the work force they need to remain competitive.

In this context, a serious response to the skills gap should involve the following interrelated initiatives:

1. Adequate funding must be provided for school systems and training programs. According to a U. S. Department of Labor study, federal funds devoted to human resources have declined from 0.9 percent of the Gross National Product in 1978 to 0.4 percent in 1988 (U.S. Department of Labor 1989). As the Business Council for Effective Literacy has said: "We need major increases in government funding for good services . . . You look at the budgets of good programs that are held up as national models and they can't pay a decent salary to their employees. They have next to no opportunity to get any kind of professional training for

their staffs, and they tend to operate in terrible facilities" (Perini 1989). Further, if efforts to place those in need of training or retraining are successful, additional funds will be required to provide expanded programs.

2. The fragmented efforts at work force preparation and job training must be consolidated into a comprehensive human resources development system. It has been estimated that Americans attending college typically receive a \$5,000 annual subsidy from public and private sources (Whitman et al. 1989). This is in addition to the elaborate system of guidance and recruitment that helps students make the transition from high school to college. According to a former Secretary of Labor, "While many schools diligently try to place students in higher education, very few offer similar support to students seeking jobs" (McLaughlin 1989). Integrating existing training and work force preparation programs will help establish a system of support and guidance for students and adults interested in skills training to rival the generally effective system currently available to high school students interested in attending college.

At the federal level, the departments of Education, Health and Human Services and Labor are each responsible for its own set of work-force preparation and job-training programs. Currently it is possible to integrate existing programs into a comprehensive human resource development package only if local agencies have the creativity, time and tenacity to coordinate these entirely separate sources. Federal-work-force-related programs should be consolidated into an office of human resources development so that the services they offer can provide a comprehensive support system that will enable clients to make a long-term, permanent transition into the world of work.

3. As the work force changes, the "social infrastructure" supporting it must be reshaped. In the immediate post-war era, the work force was comprised largely of white males supported by two major subsidies: the unpaid work of female housekeepers and federal funds for housing in the form of low interest loans and actual home construction. As the characteristics of the work force change, the social infrastructure supporting it must also change. The increase in female participation in the labor force must be accompanied by increased availability of affordable, high-quality childcare. Workers with limited proficiency in English must be given training in English as a second language. Social Security and private pension systems must be revised to allow capable, willing older workers to remain active in the work force.

4. Opportunities and incentives must be provided for every individual to engage in lifelong training and retraining. Workforce 2000 pointed out that American society offers few incentives for workers to invest in their own retraining and professional development. The report called for changes in the tax code that would encourage individuals to save money for their own lifelong education.

The IRS tax code currently prohibits deductions for educational costs which prepare individuals for a new field. This should be replaced with a tax credit to encourage retraining. In addition, students, workers and managers must be encouraged to accept education and training as lifelong endeavors.

#### CONCLUDING REMARKS: BUSINESSES AS PARTNERS IN PUBLIC LIFE

The response to the skills gap outlined here may seem ambitious and expensive. Indeed, some of the approaches are reminiscent of the Great Society programs of the 1960s. However,

it is worth noting that the demands for action are not emanating from the halls of academe or politically motivated think tanks. They are largely an expression of increasing concern from the business community. As such, these recommendations are not a call to create an ideal society. Rather, they represent practical steps needed to provide American businesses with the human resources they need to compete in the global economy.

Meeting this challenge will require new responses from the business community. Many companies have become very adroit at making their concerns known to government in areas in which government action directly affects business--environmental regulation, product safety standards, and the like. Problems of the skilled work force require business to assume a new role in the public arena, becoming an active partner with parents, teachers and others in local school systems. It is in the interest of every business to work with the schools to ensure that they produce reliable, high-quality graduates. In communities across the nation, businesses must become the champions of educational excellence and efficiency.

Many discussions of the skills crisis in the United States conclude with a recommendation for broadly-based school-business educational compacts. However, such highly touted compacts as those operating in Boston and Detroit have had little measurable effect to date on student performance. School-business partnerships seem to succeed when they concentrate on equipping students with the particular sets of skills needed in specific jobs in particular industries. For example, American Express started a series of Finance academies in the New York City School system in which it provides summer jobs for students passing requisite academic coursework related to finance and workplace orientation. The Academies now involve 150 other finance-related companies (Berger 1989). It seems conceivable that other firms would do well to engage schools in partnerships with goals at least partly specific to their particular operations.

Finally, the business community must develop a strong voice in the area of human-services policy despite businesses having long been wary of the costs of such programs. Their concern must now be extended to include the effectiveness of these programs. If these programs remain a mere "safety net" for the chronically unemployed, vast quantities of badly needed human resources will be squandered. However, by intervening to see that such programs actually enable their clients to enter the skilled work force, the business community will have reinvigorated a factor critical to the health of the American private enterprise system--human creativity and initiative.

#### LITERATURE CITED

Berger, Joseph. (1989) "Companies Step in Where Schools Fail." New York Times. September 26, pp. A1; B6.

Cohen, Stephen S., John Zysman. (1987) Manufacturing Matters: The Myth of the Post-Industrial Economy. New York: Basic Books, Inc.

Fiske, Edward B. (1989) "Impending Jobs 'Disaster': Work force Unqualified to Work." New York Times. September 24, pp. A1;B6.

PROCEEDINGS - AAG MIDDLE STATES DIVISION - VOL. 24, 1991

Johnson, William B., Arnold Packer. (1987) Workforce 2000: Work & Workers for The Twenty-first Century. Executive Summary Indianapolis, IN: Hudson Institute.

Kanter, Rosabeth Moss. (1989) "The New Managerial Work." Harvard Business Review. November, December, no. 6, pp. 85-92.

Karr, Albert R. (1989) "Labor Letter." Wall Street Journal. November 7, p. 1.

Lee, Chris. (1989) "The 3R's 1989." Training. October, pp. 67-76.

McKenna, Barbara. (1989) "Workplace Literacy." On Campus. November, vol. 9, no. 3 pp. 8-9.

McLaughlin, Ann. (1989) "Education and Work: The Missing Link." New York Times. September 25, p. A19.

Nussbaum, Bruce. (1988) "Needed: Human Capital." Businessweek. September 19, pp. 100-103.

Perini, Cathy, ed. (1989) "Four by Four: How can Business Fight Workplace Illiteracy?" Training & Development Journal. January, pp. 18-25.

"Training Today." (1989) Training. October, pp 12-18.

U.S. Congress Office of Technology Assessment. (1988) Technology and the American Economic Transition: Choices for the Future. OTA-TET-283. Washington DC: U.S. Government Printing Office.

U.S. Department of Labor. (1989) Commission on Workforce Quality and Labor Market Efficiency. Investing in People: A Strategy to Address America's Workforce Crisis. Washington, DC: U.S. Government Printing Office.

Whitman, David, Joseph P. Shapiro, Ronald A. Taylor, Amy Salzman and Bruce B. Auster. (1989) "The Forgotten Half." U. S. News and World Report. June 26, pp. 45-53.

Yu, Jun H. (1989) "Business Builds Bridges: Facing shortage, firms woo hires in high schools." Middletown [NY] Times Herald Record, Business Monday. December 11, pp. 1B; 4B.

Zemke, Ron. (1989) "Workplace Illiteracy: Shall We Overcome?" Training. June, pp. 33-39.