

## Chapter 6

# Basic Skills and the Workplace

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## Chapter 6

# Basic Skills and the Workplace

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### OVERVIEW AND SUMMARY

Workers need good basic skills—reading, writing, arithmetic, and oral communications—to handle many of today’s jobs or to benefit from most formal and some kinds of informal training (e.g., reading manuals).<sup>1</sup> Yet, many American workers have poor basic skills. Some firms have found it necessary to first upgrade the basic skills of 20 or 30 percent of their workers before introducing new technology or work practices.

Poor basic skills in the workforce affects national productivity and the standard of living. While the costs to business of basic skills deficiencies for business performance can only be crudely estimated, anecdotal evidence suggests they are high. In some regions with tight labor markets, employers are finding it more difficult to hire entry-level workers with adequate basic skills.

Of course, firms may exercise other options than remedial training. They can use technology to replace or deskill jobs, or relocate. American companies are able to take basic skills for granted in their operations in Japan or West Germany. Production workers in these countries may be assigned tasks that only supervisors or technicians perform here. The fact that several other countries have well educated (and sometimes less costly) labor forces will continue to be a drawing card for many U.S. firms across a range of industries.

As for the use of technology, managers often have the discretion to increase or decrease skill requirements. But, as is discussed in chapter 4, firms often underestimate the skills needed to employ new technology. Moreover, international competition is forcing firms in many industries to reevaluate past strategies for using technologies. Many firms that are most successful in adopting advanced technologies fully develop their workers’ skills to make production systems more flexible.

In such organizations, workers usually need more than the traditional ‘Three-R’ basic skills. Because these workers often receive less supervision, they need to know when to seek clarification of instructions or information. More so than before, they may be expected to use their knowledge and skills to address new situations and unanticipated problems, or to use information to plan and coordinate with other work groups. These cognitive skills are important now in many jobs and could well become essential skills for a sizable portion of future workers. While some workers with limited basic education are excellent problem solvers on the job, strong basics make it easier for a worker to get and keep a job and to advance.

In discussing the basic skills issue, it is useful to distinguish between workforce basic skills and workplace basic skills. The workforce as a whole includes all people, employed or unemployed, who are in the labor market. For many years, federally supported adult basic education (ABE) has been available for people with poor basic skills, whether or not they were employed; several other programs (such as the Job Training Partnership Act and the Job Opportunities and Basic Skills program) may offer remedial education as part of training given to unemployed or economically disadvantaged people. Very recently, concern about the Three-R’s and new work requirements have led to experimentation with basic skills programs that focus on the workplace, either to prepare job seekers for work in specific industries or to improve the basic skills of employees in conjunction with their jobs. To varying degrees, and with varying levels of success, these programs are intended to reflect the context of the workplace, and, in some cases, may be customized to meet specific workplace needs. This chapter focuses primarily on the workplace basic skills

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<sup>1</sup>OTA uses the term “basic skills” in this report to refer to use of basic education *skills* (reading, writing, and basic mathematical concepts and operations) for work. The term also includes oral communications skills (speaking and listening). Except where required by the context, OTA has avoided terms like “functional illiteracy,” “occupational illiteracy,” or “innumeracy.” These terms can be misleading because they are often used interchangeably with the term, “illiteracy.” Few Americans are unable to read or write at all in any language, the definition of illiteracy, and most Americans have some ability to add and subtract.

problem and programs designed to upgrade the basic skills of employed workers.<sup>2</sup>

Primary findings are:

- The problem is large. One-fifth of young adults (those aged 21 to 25) read only as well as the average eighth grade student, according to the federally sponsored National Assessment of Educational Progress (NAEP). Yet, most job-related reading materials require a tenth or eleventh grade reading level. In a technologically sophisticated economy like the United States, it would be a mistake to assume the basic skills problem belongs solely to those who are deficient or dysfunctional. The NAEP findings suggest that an unacceptably high portion of the young adults-half or more-cannot handle even moderately complex quantitative literacy problems.
- Very few companies now make much effort to upgrade their employees' basic education. A few companies, primarily large ones, have developed internal basic education programs. Some others give employees paid release time to take classes, or provide materials, facilities, or financial contributions to leverage limited public funds. It is far more common for companies to test job applicants for basic skills and to not hire applicants who fail. This strategy worked for firms in the 1960s and 1970s as large numbers of baby boomers entered the labor market, but is less likely to work in the future if low unemployment rates continue. Most companies consider it to be government's responsibility to correct deficits in basic education.
- Several workplace-oriented programs, mostly partnerships among employers and/or unions and educational institutions, have emerged in the last decade. Some receive Federal support, largely through demonstration projects funded by the U.S. Department of Labor or the U.S. Department of Education. The total spent by employers, government agencies, and unions

on improving employee basic skills is not known precisely, but probably does not greatly exceed \$1 billion per year.<sup>3</sup> By contrast, employers spend \$30 billion to \$45 billion per year on formal training at all levels.

- The most innovative workplace programs use materials and exercises that have a connection to the workers' job. A measure of success in these projects is whether the worker can better perform tasks typically needed in work settings. An even more crucial test will be whether these projects also give employees the generic basic skills they need to adapt to changing worklife conditions and their literacy needs outside of work. In this regard, the basic skills programs offered jointly by unions and management-the cooperative programs between the United Auto Workers and the American auto companies, the Communications Workers of America and the telephone companies, and most recently by the United Steelworkers-could provide models for dissemination. At this early stage, the joint programs have put only limited resources into program evaluation.
- Basic skills programs often can be enhanced through well-designed use of computers and other forms of interactive instructional technology. Many workers like computer-assisted instruction (CAI), and the available data suggests that projects using instructional technology compare favorably with traditional classroom instruction. While the amount of courseware specifically designed for adults is increasing, there still is a shortage of high quality materials. Moreover, evaluation of materials in terms of their suitability for adult workers is seldom done.

Given the magnitude of the basic skills problem in the United States, there is a pressing need for more research on how to upgrade workplace basic skills and basic skills generally. This research could help decisionmakers determine how much workplace basic skills programs will need to depart from the

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<sup>2</sup>For discussion of basic skill needs of displaced workers, see U.S. Congress Office of Technology Assessment, *Technology and Structural Unemployment: Reemploying Displaced Adults*, OTA-ITE-250 (Washington DC: U.S. Government Printing Office, February 1986), pp. 64-66, 185-186, and pp. 271-314.

<sup>3</sup>As discussed subsequently and in table 6-C, widely varying estimates of employer involvement in basic skills programs exist, but the lower end estimates are more credible. At the Federal level, only a small amount (perhaps \$20 to \$25 million) specifically earmarked for workplace basic skills programs. However, several other Federal programs may serve employed workers in some circumstances. The overall level of Federal spending for adult basics is not known precisely; funds from several large social services or employment and training programs can be used to support basic skills training, but documentation of the amount spent is difficult. Many of these programs are targeted to specific groups of people in need.

traditional model of adult basic education. On a broader scale, greater emphasis and far more resources will need to be directed toward learning research, program evaluation, and best-practice dissemination if the Nation is to ever realize a goal of eliminating the adult basic skills problem.

## WORKPLACE BASIC SKILLS DEMANDS

Most workers need basic educational skills to perform their jobs. One study of a cross section of occupations, ranging from forklift operators to executives, found that only 2 percent had no reading or writing requirements whatever; other surveys have found that reading tasks consume more than 1 hour of the average employee's workday.<sup>4</sup> Some surveys of job-related reading materials conclude that a majority require 10th to 12th grade reading ability.

What is more, academic skills and the skills needed to apply the basics on the job are not necessarily the same.<sup>5</sup> To avoid delays, workers often need to act quickly on written instructions—and to exercise judgment to recognize, question, or correct erroneous information. In short, they need to be confident about their ability to understand what they read.

In the area of mathematics, basic arithmetic will suffice for most jobs; more advanced mathematics is not necessary. However, using arithmetic in practical applications on the job may require work skills that require choosing, organizing and applying quantitative information—skills that are very different from the mechanical skills needed to solve arithmetic problems in a textbook.<sup>6</sup> Moreover, the vocabulary, manuals, forms, charts, and other kinds of written materials encountered at work seldom resemble classroom texts. While some reading materials can be simplified to help workers who are poor readers, this is expensive and cumbersome. Also, it is difficult to convey technical information

and complex concepts in written materials tied at poor readers.

Some poorly educated workers do learn to cope quite well. Studies have shown that poor readers who know their business are much better at reading job-related material than they are at reading other things. Similarly, workers may learn how to develop solutions to work problems in practice that would stump them when written or described on an academic test. An example comes from Scribners study of workers at a dairy processing plant who fill orders by loading different-sized milk containers into uniform-sized cases. The more experienced loaders consistently filled the cases quickly and accurately, using the fewest number of moves and handling the fewest number of cases. Asked to reconstruct their reasoning, the loaders said they visualized the best combination to fit in a case. Probably, none of the workers understood the mathematical principles involved, yet they still came up with practical solutions to the task. Their better educated supervisors, when substituting for an absent loader, did not do as well.<sup>7</sup>

### *Job Skills and Education Levels*

Changing workplace practices (such as statistical process control) and related demand for technical training are elevating the level of basic skills needed for many jobs. Some industries with workforces with many low-skill workers are confronting a need to upgrade their workers' basic skills as they adopt new technology and work practices. For example, the textile industry increasingly encourages employees to take advantage of workplace literacy programs offered by State and local agencies. Far from deskilling work, the industry's investment in automated equipment has created a demand for more maintenance and repair people. In 1985, textile firms had 3.5 laborers, operators, and service workers for every craft and technical worker—compared to 4.2 a decade earlier. While some low-skill jobs were eliminated by automation, many of the new jobs

<sup>4</sup>As cited in Larry Mikulecky, "Job Literacy: The Relationship Between School Preparation and Workplace Actuality," *Reading Research Quarterly*, vol. 17, 1982, pp. 400-419.

<sup>5</sup>For an extensive discussion of this contrast, see Paul V. Delker, *Basic Skills Education in Business and Industry: Factors for Success or Failure*, report prepared for the Office of Technology Assessment under contract L3-1765, May 1990, pp. 3-6.

<sup>6</sup>As discussed in Paul E. Barton, "Skills Employers Need: Time to Measure Them?" *A Policy Information Proposal*, Educational Testing Service, Princeton, NJ, June 1990, p. 5.

<sup>7</sup>As discussed in Stephen F. Hamilton and Mary Agnes Hamilton, "Teaching and Learning on the Job: A Framework for Assessing Workplaces as Learning Environments," paper prepared for the Bureau of Apprenticeship and Training, U.S. Department of Labor, March 1989, pp. 22-24.

required greater skill. (See box 3-A in ch. 3 for further discussion.<sup>8</sup>)

Firms in several industries (e.g., apparel) are reevaluating past assumptions that automation and deskilling of jobs work well together. According to the Southern Growth Policies Board, 80 percent of southern factory managers found that advanced manufacturing technologies increased skill levels. Many of these firms faced impediments to effective use of the new technology because their workers lacked the basic skills for more advanced training.<sup>9</sup>

Some jobs are being restructured to require more formal education. For example, Texas Instruments (TI), a major producer of semiconductors, now requires its clean-room production workers in some U.S. plants to have 2-year technical degrees; previously, the company only required a high school diploma.<sup>10</sup> The change could reflect both more complex job responsibilities and uncertainty about the competence of job applicants for entry-level positions. TI uses high school graduates at its Japanese facility. Interestingly, new technology for this operation is introduced in Japan before being put into production in the United States. Of course, there could be many reasons why Japan is used to launch the technology. But, part of the explanation has to do with the confidence the company has in the educational background of workers in the two countries.

Of course, not all jobs are changing in ways that require more skill of workers. Some jobs continue to be deskilled or eliminated by automation, just as others are upgraded. There is disagreement about the overall direction of skill change, and how fast and pervasive the change is likely to be in the years to come. A recent study by the Economic Policy Institute, for example, concluded that skills upgrad-

ing was limited primarily to best-practice firms. The study found no evidence to support the notion that there would be explosive growth in skill requirements in this decade. It concluded that, while occupational upgrading is occurring, the overall rate is slowing down compared to the 1960s and 1970s.<sup>11</sup>

The Hudson Institute, by contrast, reached the conclusion that there will be a major increase in occupational skill and education requirements by the year 2000.<sup>12</sup> Its *Workforce 2000* study found that more than half of the new jobs created between 1984 and 2000 would require people with some education past high school, and 30 percent of the new jobs would require a college degree.<sup>13</sup> (The comparable figures for 1984 were, respectively, 42 and 22 percent of all jobs.) But it's easy to overstate the implications of the *Workforce 2000* projections. It is not clear how much of the projected increase in education would reflect skills needed by workers to perform their jobs versus other factors. For example, some employers use educational background as a way to screen job applicants. Moreover, the projected growth in education requirements only pertains to the one in six jobs that will be new in the year 2000; the educational background needed for all jobs will not change as dramatically.<sup>14</sup> Also, there are jobs in well-paid occupations (e.g., several construction trades, mechanics, repairers, and many sales and marketing jobs) that do not require college degrees that are projected to grow faster than average, although some of these may entail post-secondary education or apprenticeship.

Both studies rely on data and projections made by the Bureau of Labor Statistics (BLS). BLS projects that occupations now filled by people with the most formal schooling are expected to grow at the fastest

<sup>8</sup>Lauren Benton, Thomas Bailey, Thierry Noyelle, and Thomas M. Standback, Jr., "Training and Competitiveness in U.S. Manufacturing and Services: Training 'Needs and Practices of Lead Firms in Textile, Banking, Retailing and Business Services,'" report prepared for the office of Technology Assessment under contract No. L3-3560, February 1990, p. 69.

<sup>9</sup>Southern Growth Policies Board, *Looking Forward: The Report of the 1989 Committee on Southern Trends*, Research Triangle Park, NC, 1989, pp. 16-17.

<sup>10</sup>As discussed in Robert R. Miller, Corporate Strategy and Industrial Training, report prepared for the Office of Technology Assessment under contract L3-5240, March 1990.

<sup>11</sup>Lawrence Mishel and Ruy A. Teixeira, *The Myth of the Coming Labor Shortage: Jobs, Skills and Incomes of America's Workforce 2000* (Washington, DC: Economic Policy Institute, 1990), pp. 65-67.

<sup>12</sup>William B. Johnston and Arnold H. Packer, *Workforce 2000: Work and Workers for the 21st Century* (Indianapolis, IN: The Hudson Institute, June 1987) p. 97.

<sup>13</sup>*Ibid.*, p. 97.

<sup>14</sup>See Russell W. Rumberger and Henry M. Levin, "Schooling for the Modern Workplace," *Investing in People: A Strategy to Address America's Workforce Crisis*, background papers, vol. 1, prepared for the Secretary of Labor's Commission on Workforce Quality and Labor Market Efficiency, pp. 95-98 for a discussion of the difficulties involved in estimating educational requirements in association with occupational projections.

**Table 6-1—Projected Change in Employment by Occupation, 1988-2000, and Distribution of Total Employment by Years of School Completed, March 1988**

Occupation	Percent change 1988-2000	Percent of total employment for occupation held by workers with:			
		Less than high school	High school	1-3 years of college	4 or more of college
<b>Total</b> . . . . .	15	16	40	21	23
Executive, administrative, and managerial . . . . .	22	5	27	24	44
Professional specialty . . . . .	24	2	9	15	74
Technicians and support occupation . . . . .	32	3	29	36	32
Marketing and sales . . . . .	20	13	39	24	23
Administrative support, clerical . . . . .	12	7	51	30	12
Service occupations, e.g., household, security, food service, custodial . . . . .	23	31	45	18	6
Precision production, craft and repair . . . . .	10	23	53	18	5
Agriculture, forestry fishing . . . . .	-5	36	44	12	7

SOURCE: George Silvestri and Volm Lukasiewicz, "Projections of Occupational Employment, 1988-2000," *Monthly Labor Review*, vol. 112, No. 11, November 1989, p. 62.

rate through the year 2000.<sup>15</sup> There are exceptions, however. What BLS calls service occupations (which includes housekeepers, custodians, and other occupations not requiring much education) will grow at a faster than average rate. (See table 6-1.) Moreover, the U.S. economy will continue to create large numbers of low-skill or medium-skill jobs. (See table 3A-3 and discussion in the appendix to ch. 3.) Of the occupations projected to add the most number of new jobs by 2000, just two—nurses and managers—ordinarily require much postsecondary education. Others are in the midrange of education requirements (secretaries), or at the lower end (custodial workers).

In the end, there are several points that have come out of the debate about upskilling and deskilling:

1. The economy will continue to create many lower skill jobs. It seems unlikely that skill requirements for these jobs will change greatly over the next decade; some may be deskilled, a few may be upskilled. These jobs also will not require much formal education beyond high school.
2. Some jobs in some industries that have traditionally been defined as low- or medium-skilled will be upgraded as companies adopt new technologies and work practices. Current workers in these jobs will need retraining to develop new job skills; outside applicants will find the hiring process more demanding than in the past.

3. The fastest rate of job growth will be in high-skill professional, technical, and managerial jobs—jobs that traditionally have required post-secondary education or that are most likely to be filled by people with college degrees.
4. In many industries it has become more difficult for people without post-secondary education to progress from lower level positions within firms to higher level positions.
5. Many of the workers who will join the labor force between now and the year 2000 will not be well matched to the better jobs created by the economy. Roughly one-third of the new entrants will come from minority groups that have traditionally received less and poorer quality education. Immigrants, many of whom need to develop English language skills, also will be a more important source of labor force growth. (See box 6-A).

Moreover, workers at many levels need effective strategies for learning new ways of doing things when companies undergo rapid technological and organizational change, bring new processes online, or market new products. Many American employers see deficiencies in oral communications (giving and receiving verbal instructions effectively) as a major basic skills problem in the workplace. Other emerging skills, according to the American Society of Training and Development, include problem solving skills and effectiveness in group interactions<sup>16</sup>—

<sup>15</sup>George Silvestri and John Lukasiewicz, "Projections of Occupational Employment, 1988-2000," *Monthly Labor Review*, vol. 112, No. 11, November 1989, p. 62.

<sup>16</sup>Anthony P. Carnevale, Leila J. Gainer, and Ann S. Meltzer, *Workplace Basics: The Essential Skills Employers Want*, ASTD Best Practices Series: Training for a Changing Work Force (San Francisco, CA: Jossey-Bass, 1990).

**Box 6-A—Immigration and Basic Skills**

There is a growing need to give workplace basic education to immigrants—especially courses in English language proficiency. Immigrants accounted for 22 percent of labor force growth between 1980 and 1987—more than twice their contribution during the 1970s when baby boomers and women entered the labor market in large numbers. Immigrants are projected to account for an even higher portion of labor force growth over the next decade.

On average, immigrants have roughly the same amount of formal schooling as do U.S. natives. However, there are differences at the extremes: a higher proportion of foreign born immigrants attend college than people born here; roughly one third of immigrants have only an elementary school education, and 13 percent had not progressed beyond the fourth grade (compared to 3 percent of people born in the United States.)<sup>1</sup> Many foreign-born immigrants who arrived in the United States between 1970 and 1980 spoke no English at all (this probably continues to be the case for new arrivals today). The fraction of non-English speakers varied by region: 17 percent in the West, 15 percent in the South, 11 percent in the Northeast and about 9 percent in the North Central region. This influx helps to explain why English as a Second Language is the fastest growing component of Federal Adult Education Act assistance.<sup>2</sup>

<sup>1</sup>U.S. Department of Labor, *The Effects of Immigration on the U.S. Economy and Labor Market* (Washington, D.C.: U.S. Government Printing Office, 1989), p. 36-38.

<sup>2</sup>*Ibid.*, pp. 59-60. The information on English speaking is from the 1980 Census.

skills in the past ordinarily only associated with management. 'As skill requirements shift, the skills workers need will continue to evolve. (See box 6-B)

**How Big is the Problem?**

Estimates of basic skills levels among employed workers are usually based on data from only a few companies. In one study, about 20 percent of a manufacturing firm's hourly workers were unable to cope with technical training because of deficient basic skills; most of these employees were high school graduates who did not think they had a basic skills problem.<sup>17</sup> Some companies are discovering that half or more of their workers in some units need basic skills upgrading before they can train for some new technologies or processes.<sup>18</sup> OTA's earlier analysis of displaced workers found that 20 to 30 percent of adult workers entering displaced worker programs in the mid- 1980s needed to upgrade their basic skills.

National surveys of the adult population as a whole are either dated or make arbitrary breakpoints to define adequate performance. Estimates of 'functional illiteracy' made in the 1970s range from 15 percent to over half the U.S. population.<sup>19</sup> The still-used claim that America has 27 million functionally illiterate adults is based on extrapolation of a 1974 survey to the U.S. population in 1982.<sup>20</sup> In the next few years a better estimate of the nature and magnitude of the literacy problem among U.S. adults could be forthcoming. In its 1988 Amendments to the Adult Education Act, Congress directed the Secretary of Education to develop criteria to define literacy and to identify basic educational skills needed for "literate functioning."<sup>21</sup> The Education Department is to estimate the size of the illiteracy problem, reporting the results to Congress in 1993.<sup>22</sup>

<sup>17</sup>Larry Mikulecky, "Second Chance Basic Skills Education," *Investing in People: A Strategy to Address Americans Workforce Crisis*, background papers, vol. 1, op. cit., footnote 14, p. 236.

<sup>18</sup>Cindy Skrzycki, "The Company as Educator: Firms Teach Workers to Read, Write," *Washington Post*, Sept. 22, 1989, p. G1.

<sup>19</sup>As discussed in Richard L. Venezky, Carl F. Kaestle, and Andrew M. Sum, *The Subtle Danger: Reflections on the Literacy Abilities of America's Young Adult*, (Princeton, NJ: Educational Testing Service, 1987) p. 14.

<sup>20</sup>The survey referred to was the Adult Performance Level Study (APL), undertaken by the University of Texas in 1973 and 1974 and funded by the U.S. Department of Education. APL concluded that 20 percent of American adults had such serious basic skills deficiencies as to be functionally incompetent; it characterized another 30 percent as marginally competent. By applying APL percentages to the 1982 population, the Education Department concluded that up to 74 million adult Americans had some need for further basic education.

<sup>21</sup>Section 383(b) of public Law 100-297.

<sup>22</sup>The Department of Education has contracted with the Educational Testing Service (ETS) to undertake the survey. ETS expects to use the same definition and scales for literacy as it used in the National Assessment of Educational Progress 1985 young adult literacy profiles. The definition: "using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential." ETS expects to survey 13,000 adults 16- to 64-years of age in 1992. For further details, see "National Adult Literacy Survey," Education Testing Service, Princeton, NJ, (brochure).

### Box 6-B—Evolving Concepts of Basic Skills

Employees who quickly learn new ways of doing things can make a big difference when companies undertake major changes in technology, work organization, or business strategies. Such skills are especially in demand when companies seek to implement workteam approaches. Thus, more companies are looking at ways to help their employees strengthen their interpersonal communications skills, their ability to learn, and their facility with problem solving.

Many consultants and vendors now offer programs aimed at developing these skills. Often, these programs were developed for nonindustrial settings. For example, while over 100 “learning to learn” programs have been developed, many have objectives (such as improving standardized test scores) of little use in the workplace. According to American Society for Training and Development (ASTD), most also are not grounded explicitly in learning theory and the results are unpredictable.<sup>1</sup> Learning-to-learn programs differ from conventional instruction in that the learning process itself is under scrutiny, and different strategies for learning are explicitly discussed and applied.

Workplace applications of learning-to-learn approaches are still in their infancy. Some companies find it helpful to teach employees learning strategies when major change is planned, but specific training needs are hard to identify. Planters Life Savers Co., for example, made use of a learning management program before new technology was introduced at an Illinois plant. The training began before job task analysis could be done, when the manufacturing system for the new technology was still under design.<sup>2</sup>

More than likely, the concept of workplace basic skills will continue to evolve as the workplace itself changes. A Stanford University study, based on studies at several worksites, identified 13 competencies—e.g., cooperation, establishing goals, obtaining and using information—that are often needed by workers to function effectively in new work settings.<sup>3</sup> These competencies are seldom stressed in U.S. primary and secondary schools. Thus, companies that stress “new model” work organization (see ch. 4) may find developing these skills to be a growing training requirement. According to ASTD, the full list of workplace basics could be enlarged to encompass 16 skills in 7 broad skill groups (ranging from the Three-Rs to organizational effectiveness and leadership). Of course, not all workers need such a broad spectrum of skills in the future. Nevertheless, the demand for such skills will grow if employers continue to reorganize work in ways that require workers to exercise more responsibility.

<sup>1</sup>Anthony P. Carnevale, Leila J. Gainer, and Ann S. Meltzer, *Workplace Basics: The Essential Skills Employers Want*, ASTD Best Practices Series: Training for a Changing Work Force (San Francisco, CA: Jossey-Bass, 1990), p. 42.

<sup>2</sup>*Ibid.* p.60.

<sup>3</sup>As discussed in Russell W. Rumberger and Henry M. Levin, “Schooling for the Modern Workplace,” *Investing in People: A Strategy to Address America’s Workforce Crisis*, Commission on Workforce Quality and Labor Market Efficiency (U.S. Department of Labor: Washington DC, September 1989), p. 103.

In the meantime, the most authoritative survey of basic skills is limited to young adults (those aged 21 to 25).<sup>23</sup> Completed in 1986 by the federally sponsored National Assessment of Educational Progress (NAEP), the survey profiles literacy skills (including the ability to perform arithmetic operations to solve problems) among 3,600 young American adults. NAEP found that 94 percent of the young adults read as well or better than the typical fourth grader; about 80 percent equaled or surpassed the average level for an eighth grader, and 62 percent equaled or did better than the typical eleventh grade student.<sup>24</sup> While the NAEP findings show that the

more extreme characterizations of the illiteracy problem in the United States are unfounded, it is not reassuring that one-fifth of young American adults read no better than a typical eighth grader. (The sports page of most newspapers is written at about an eighth grade level.)

Perhaps even more disturbing, the NAEP profiles show that very few young adults are proficient in moderately complex tasks—as was apparent in the exercises involving arithmetic. Nearly all (93 percent) of the young adults got the right answer when the quantities and arithmetic operations were explicit and obvious (such as adding two entries on a

<sup>23</sup>Irwin S. Kirsch and Ann Jungeblut, *Literacy: Profiles of America’s Young Adults Final Report* (Princeton, NJ: National Assessment Of Educational Progress at Educational Testing Service, September 1986).

<sup>24</sup>*Ibid.*, p. 40.

bank deposit slip). The respondents had far greater difficulty when numbers had to be extracted from printed forms or text, or when the arithmetic operation was not immediately obvious.<sup>25</sup> For example, less than two-thirds were able to reach the correct answer when the addition was part of a problem in which judgment had to be exercised to determine which numbers were superfluous.

Those with more years of formal schooling did better than those with less education; however, poor problem solving abilities were evident even among the more educated respondents. Only 52 percent of those whose education ended with high school graduation and 70 percent of those with 2- or 4-year college degrees or more could examine a menu, compute the cost of a specified meal and, then, determine the correct change from a specified amount. Only 38 percent of those high school completers with no higher degree could then calculate the tip from the bill or estimate the price of an item from a grocery unit-price label. Among those with a 2- or 4-year degree or more, 31 percent were not able to calculate a price from a unit price label, and 39 percent were unable to calculate the tip after first identifying menu items and calculating change. Figure 6-1 shows sample questions and success level for high school graduates without a post-secondary college degree.<sup>26</sup>

The NAEP survey also gives some benchmark information about how literacy levels varied among young adults by occupation.<sup>27</sup> The data given in figure 6-2 applies to 21- to 25-year-old people who were out of school and who had worked full time for at least 1 year. Not surprisingly, professionals scored highest on the NAEP proficiency scale, followed by young adults in technical and managerial occupations. What is surprising is the generally low proficiency in occupational groups generally thought to be the most able. Of course, the study only shows the literacy level of people in these occupa-

tions, not the literacy level actually needed to perform these jobs.

The NAEP profiles show that many high school graduates do not bring to their jobs the caliber of basic academic skills that employers could reasonably expect. Why these deficiencies exist is poorly understood. Perhaps these poor readers have not learned to actively seek out the meaning of what they read. By contrast, good readers may employ strategies that allow them to extract what they need from written materials.<sup>28</sup> As has been mentioned, occupational requirements require active involvement of the reader-e.g., to follow written instructions, to remember information, to solve problems.

Studies that profile workplace requirements, at least at the same level of detail as the NAEP young adult profiles, are badly needed but have never been conducted. The Educational Testing Service (ETS) is now conducting a literacy profile of unemployed people for the U.S. Department of Labor, due to be completed in late 1990. ETS, which developed the NAEP young adult profiles, will inventory literacy levels for people enrolled in Job Training Partnership Act programs, people using the Employment Service system, and people receiving unemployment insurance. However, the inventory will not focus on the basic skills that employees need on the job.

### *The International Context*

Very little information exists that allows comparison of basic skills levels among workforces of different countries. Thus, comparisons of educational levels are often used instead. Differences in national educational systems complicate analysis. However, the United States has one of the highest levels of participation in secondary and post-secondary education in terms of the number of years of schooling.<sup>29</sup> (See box 6-C.) But, as suggested by the several comparative studies discussed in chapter 3, the American primary and secondary education

<sup>25</sup>See Venezky, *et al.*, op. cit., footnote 19, p. 28

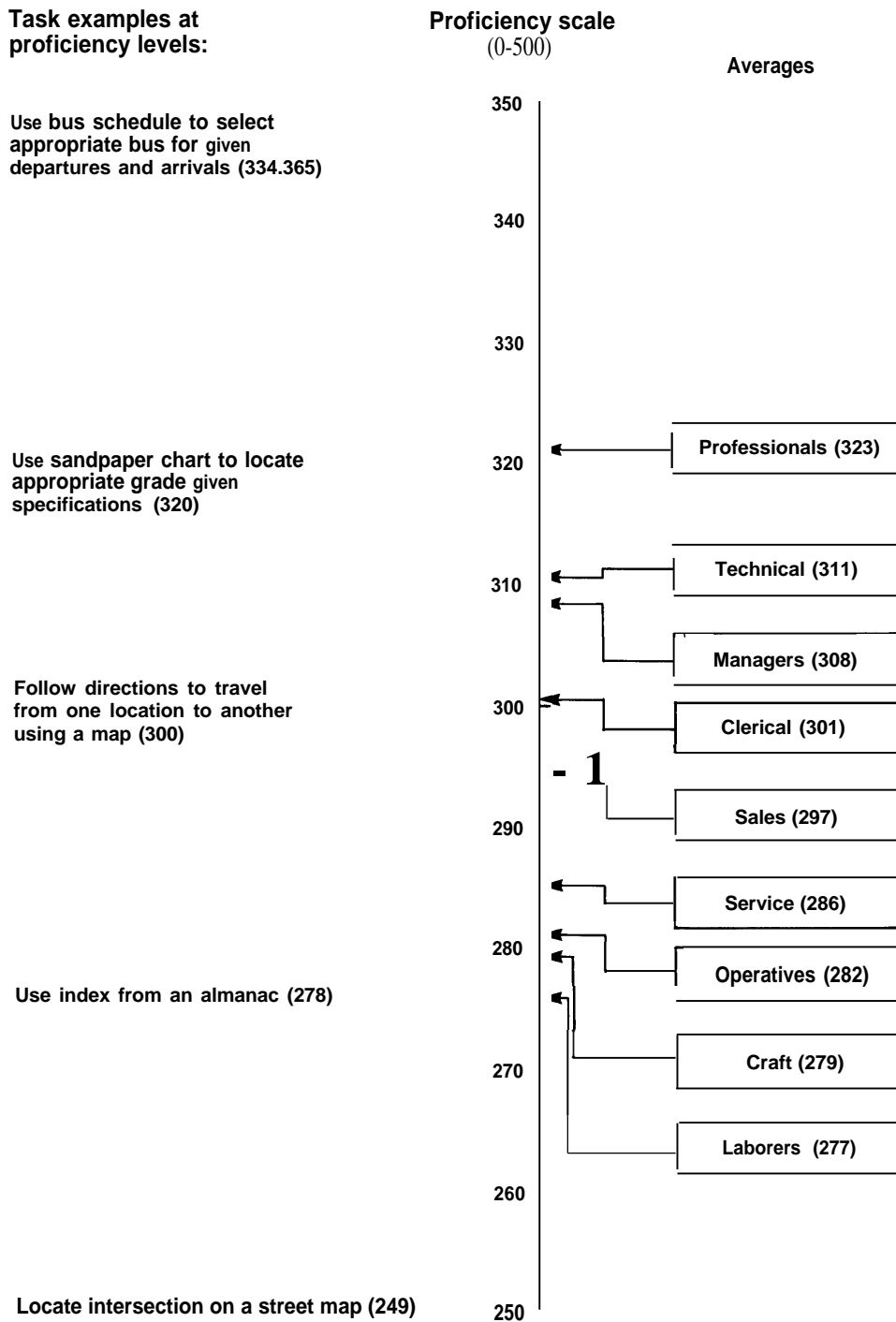
<sup>26</sup>The percentage figures cited above are based on the actual number of correct and incorrect responses to the survey questions. This unpublished data was provided to OTAB by the Education Testing Service. These figures may differ from estimates based on the probability that a person showing a certain level of proficiency would get a correct answer on a specific question.

<sup>27</sup>Paul E. Barton and Irwin Kirsch, *Workplace Literacy Proficiencies: The Need to Improve Literacy and Employment Readiness*, forthcoming, as cited in *Information for National Performance Goals for Education: A Workbook*, (Educational Testing Service Policy Information Center, Nov. 30, 1989) p. 47.

<sup>28</sup>George A. Miller, "The Challenge of Universal Literacy," *Science*, vol. 241, no. 4871, Sept. 9, 1988, p. 12%

<sup>29</sup>Richard M. Cyert and David C. Mowery, eds., *Technology and Employment: Innovation and Growth in the U.S. Economy* (Washington, DC: National Academy Press, 1988).

Figure 6-I—Document Literacy of 21 to 25-Year-Olds Who Work Full-Time for a Full Year, by Occupation



SOURCE: Paul E. Barton and Irwin S. Kirsch, *Workplace Competencies: The Need to Improve Literacy and Employment Readiness*, prepared for the Department of Education, Office of Educational Research and Improvement (Washington, DC: U.S. Government Printing Office, July 1990), figs. 1-3, table 2.



**Box 6-C—Formal Education and the American Workforce**

Despite basic skills problems at all levels, the years of schooling the typical American worker receives continues to increase. Roughly one-fourth of all adults (those between 25 and 64) in the civilian labor force are now college graduates; another 20 percent have some college, so that over 45 percent have at least some college. This compares to 37 percent with at least some college in 1978. Those in the adult labor force with less than a high school education declined from 24 to 15 percent. The remaining portion—those whose education ended with high school—has remained the same at 40 percent.<sup>1</sup>

Despite a narrowing gap, major racial and ethnic variations persist in years of formal education. Between 1978 and 1988, the proportion of both white and black workers with 4 or more years of college increased by 5 percentage points; similarly, there was also a 4 percentage point increase for Hispanic-origin workers. The net result was that by 1988, 26 percent of white, 15 percent of black, and 13 percent of Hispanic workers attended 4 or more years of college.

The proportion of the adult labor force without a high school diploma also declined dramatically for all groups over the decade. However, 40 percent of the Hispanic labor force still had less than 4 years of high school in 1988, as did 23 percent of blacks, and 14 percent of whites.

Formal education is a major indicator of a person's likely employment history; nearly 90 percent of college graduates between 25 and 64 were in the labor force in 1988, compared with only 61 percent for those who had not completed 4 years of high school. Over the 1978-88 period, the labor force participation rates for men in all educational groups declined with the largest reductions occurring among those who had not attended college. In contrast, the participation rates for women were higher across the educational spectrum, especially among those with the highest educational attainment—from 62 to 75 percent for those who had completed 1 to 3 years of college and from 71 to 81 percent for college graduates. Of course, the amount of schooling by itself says little about educational quality or proficiency.

Groups with the most formal schooling have the lowest unemployment. The 1988 jobless rate for college graduates aged 25-64 was only 1.7 percent, compared with 3.7 percent for those with 1 to 3 years of college, 5.4 percent for high school graduates, and 9.4 percent for high school dropouts. Black college graduates still have more than twice the unemployment rate as white college graduates—3.3 percent compared to 1.5 percent.

There has been a trend toward reduced employment opportunities for the less educated, especially high school dropouts.<sup>2</sup> In some cities and States with large minority populations, 40 or 50 percent of students do not finish high school.

There are also significant regional differences. In 1980, for example, roughly 1 out of 4 Southern adults over age 25 had less than 8 years of school, compared with 1 in 6 adults nationally. Approximately 36 percent of adult Southerners lack high school diplomas. Within the South, rural residents have higher rates of functional illiteracy than urban residents.

Educational background is also important in determining whether a worker will qualify for a job requiring specific training or get upgrade training once employed. In 1983, the only year for which nationwide data is available, 55 percent of workers said they needed qualifying training to obtain their current job. The figure was just 42 percent for those with a high school diploma or less. Some 62 percent of those with some college, and 84 percent of college graduates, said they needed qualifying training for their job.<sup>4</sup>

<sup>1</sup>All figures on years of schooling are from U.S. Department of Labor, Bureau of Labor Statistics, "Educational Level of U.S. Labor Force Continues to Rise," *News*, Aug. 29, 1988.

<sup>2</sup>Richard L. Venezky et al., *The Subtle Danger: Reflections on the Literacy Abilities of America's Young Adults* (Princeton, NJ: National Assessment of Educational Progress, Educational Testing Service, 1987). See, also The William T. Grant Foundation Commission on Work, Family and Citizenship, *The Forgotten Half: Pathways to Successor America's Youth and Young Families* Final Report (Washington DC: William T. Grant Foundation, 1988).

<sup>3</sup>National Center for Education Statistics, *The Condition of Education: 1988*, vol. 1 (Washington, DC: U.S. Government Printing Office, 1990), p. 90. The figure falls to 13.5 percent for those between the age of 25 to 34.

<sup>4</sup>The proportions also varied by race and age. Fifty-seven percent of whites said they needed qualifying training to get their job, compared with 44 percent of blacks and 54 percent of other minorities. Only 25 percent of the youngest workers (those 16 to 19) and 47 percent of those 20-24 reported that they needed qualifying training. See Max L. Carey, *How Workers Get Their Training*, Bulletin 2226, U.S. Department of Labor, Bureau of Labor Statistics, February 1985.

system is no longer a leader in quality. In fact, the quality of K-12 education in the United States is lower than several of our major trading partners.

One popular explanation is that the United States has such a heterogeneous population. However, even U.S. elementary students in a relatively homogeneous middle class suburb of Minneapolis scored far lower on standardized tests than comparable students in Japan and Taiwan.<sup>30</sup> Thus, while total U.S. education costs per pupil (measured in constant dollars) have nearly quadrupled since the early 1950s, there has been no evidence of a proportional improvement in scholastic performance.<sup>31</sup>

Even so, American school students have improved marginally in the basics since the early 1970s. The jury is still out as to whether these recent gains will continue. The most recent reading assessment shows that students read better in 1988 than they did in 1971.<sup>32</sup> However, some age groups did better in the early 1980s than in 1988. The most hopeful news in the 1988 assessment was the progress in reading levels made by black and Hispanic students.

American students also made progress in math and science, compared with their predecessors in the 1970s.<sup>33</sup> While encouraging, most of the gain was from routine exercises—such as elementary arithmetic or recitation of scientific facts—not in using knowledge effectively to think and reason.<sup>34</sup> The students did no better in inferring relationships or drawing conclusions from scientific information. Moreover, the students stayed even or did worse than their predecessors in computing with decimals,

fractions and percents, solving multiple-step problems, or using basic algebra.<sup>35</sup>

As discussed in chapter 3, U.S. students do not measure up to students in South Korea, Japan, or West Germany. A recent international mathematics assessment found American 13-year-olds in last place among five other countries and several Canadian provinces.<sup>36</sup>

The poor performance of U.S. students has prompted great concern about the future science and engineering workforce.<sup>37</sup> But it is also worrisome that U.S. students in the two middle quadrants—students who will fill many of tomorrow's factory and office jobs—did poorly.<sup>38</sup> South Korean youngsters scored best; only 40 percent of U.S. students were at or above the mean, compared to 78 percent of the South Korean students. (A typical problem at the mean required the student to select the correct average age of five students, given their individual ages.) Of course, educational performance at any age is not necessarily a predictor of individual performance on the job. However, it is clear that, without improvement in basic skills, the students who will comprise the future U.S. workforce are poorly equipped to keep up with the highly educated (and in many cases lower paid) workforces of our competitors.

### Employer Views of Basic Skills

What skills and education do employers want most in their workers? What is the connection between these desires and job performance? The answers from the research are fragmentary. Most of the studies focus on what employers think are

<sup>30</sup>Ibid.

<sup>31</sup>Lewis J. Perelman, "Restructuring the System Is the Solution," *Phi Delta Kappan*, September 1988, pp. 20-24.

<sup>32</sup>Ina V.S. Mullis and Lynn B. Jenkins, *The Reading Report Card 1971-88: Trends from the Nation's Report Card*, (Princeton: NJ: National Assessment of Educational Progress, January 1990)

<sup>33</sup>Arthur N. Applebee, Judith A. Langer, and Ina V.S. Mullis, *Crossroads in American Education: A Summary of Findings* (Princeton, NJ: Educational Testing Service, February 1989), pp. 7-11.

<sup>34</sup>Ibid, p. 29.

<sup>35</sup>Ibid, p. 27.

<sup>36</sup>Archie E. Lapointe, Nancy A. Mead, and Gary W. Phillips, *A World of Differences: An International Assessment of Mathematics and Science*, (Princeton, NJ: Educational Testing Service, 1989) p. 13

<sup>37</sup>Several OTA reports have discussed education and training issues related to the scientific and engineering workforce. See, especially: *Making Things Better: Competing in Manufacturing*, OTA-ITE-443 (Washington, DC: U.S. Government Printing Office, February 1990), pp. 115-126, and *Educating Scientists and Engineers: Grade School to Grad School*, OTA-SET-373 (Washington, DC: U.S. Government Printing office, June 1988).

<sup>38</sup>Basic skills problems are by no means limited to those who don't go on to college. In 1983-84, one-fourth of all students entering colleges and universities took remedial math courses, one-fifth took remedial writing, and 16 percent took remedial reading; 82 percent of all colleges and universities saw the need to offer such courses. U.S. Congress, Office of Technology Assessment, *Technology and the American Economic Transition: Choices for the Future*, OTA-TET-283 (Washington, DC: U.S. Government Printing Office, May 1988).

attractive attributes in entry-level workers, not the actual job requirements or the skills that successful employees need. Also, the surveys typically poll corporate-level executives or personnel officers who may view skill needs differently than, say, shopfloor supervisors or plant managers.

There are also problems in definitions. For example, employers often have a different concept of basic skills than the training or education community. A banking industry survey, for instance, asked employers for specific examples of basic skills problems in specific jobs (e.g., teller, customer service representative).<sup>39</sup> Many examples offered by the banking industry respondents—such as “not properly following procedures on opening accounts or cashing checks” —could reflect carelessness, inattention, or, indeed, inadequate coaching by supervisors.

A review of 13 surveys found that employers generally view a positive attitude toward work as the most desirable characteristic in entry-level workers.<sup>40</sup> These employers also placed more importance on basic skills (including communications skills and problem solving skills) than specific occupational skills and also wanted entry-level workers to understand the business environment.

Several factors are contributing to employers’ sharpened awareness of basic skills problems among their own workers. Employers are aware of the heightened attention the news media and government reports give this issue, and are also becoming aware of the implications of changing demography for the educational qualifications of entry-level workers.

According to a 1989 survey by the Omega Group, Philadelphia area executives saw basic education deficiencies reflected by problems in hiring qualified employees, higher wages for qualified entry-level workers, or the need to restructure work or downgrade job descriptions.<sup>41</sup> One employer found that some new hires, while able to learn the skills needed to perform a specific task, were unable to

transfer those skills to different but closely related tasks.

Some of the executives said that literacy had a substantial impact on marketing and customer services—especially in telecommunications, banking, and retailing. In particular, as more companies use computer-based systems, they need entry-level employees who are able to respond to customer requests and process orders quickly.

For the most part, the executives did not consider literacy training to be a corporate responsibility. Their firms dealt with basic skills problems in several ways, including screening of job applicants, accepting higher rates of turnover, living with service problems or, in some cases, relocating. One insurance company executive noted that, when low-skilled workers became an issue, new technology could be employed to do the work, so that the firm could hire less-able people.

While they worry about basic skills deficiencies in future workers, employers are less worried about *current* workers. Three-quarters of employers responding to a recent survey by the Society for Human Resource Management said they had yet to experience a need for remedial training of their employees; these respondents either did not hire employees with basic skills problems or found little need for remedial training among their current employees.<sup>42</sup> But, employers often do not become aware that their workers have basic skills problems until they attempt to make a major change that requires training. (See box 4-C inch. 4 for discussion of Plumley Companies, an auto parts supplier that launched an employee education program on finding that most of its workers did not have the basic skills needed to train for or implement statistical process control.)

Recruiting and retaining skilled workers is a growing concern of small business. According to a 1989 Dun and Bradstreet survey, small business chief executive officers (those heading firms with less than \$12 million in sales) who responded put finding qualified, motivated employees at the top of

<sup>39</sup>American Bankers Association, *Executive Summary: The American Banker's Association's Survey on Basic Skills in Banking*, Spring 1989, p. A2.

<sup>40</sup>Gary Natriello, “What do Employers Want in Entry-level Workers? An Assessment of the Evidence,” occasional paper No.7, National Center on Education and Employment, Teacher's College, Columbia University, April 1989.

<sup>41</sup>Omega Group Inc, *Literacy i, the Workplace: The Executive Perspective*, A Qualitative Research Study, Bryn Mawr, PA, 1989. Twenty-eight top-level executives in manufacturing and service industry firms were interviewed.

<sup>42</sup>Society for Human Resource Management, *1989 Training/Retraining Survey*, Alexandria, VA, 1989, p. 19.

their problem list—followed by solving cash flow difficulties, containing costs, dealing with government regulations, and meeting increased competition.<sup>43</sup> Most of the respondents stressed in-house training, rather than more aggressive recruitment.

In similar vein, small manufacturers responding to a National Association of Manufacturers survey cited lack of skilled labor and lack of basic education skills as two of their major problems. Half of the responding employers said their employees had trouble solving problems on their own; 37 percent said math concepts were a problem; 30 percent said English fluency was a problem; and one-fourth said their employees had trouble training in operations. Nearly three-fourths of the responding firms said they found it fairly or very difficult to fill openings for skilled workers.<sup>44</sup>

### *Impact on Company Performance*

*While* documentation is sparse, anecdotal evidence suggests that poor basic skills cost American companies quite a bit. One small Illinois company turned to a community college to teach English skills to its largely Hispanic workforce when an Hispanic employee ruined an \$8,000 part through a language misunderstanding.<sup>45</sup> Inability to measure also can be costly. A Florida company that manufactures bel-lows estimates that it loses \$1.2 million per year because its workers do not read blueprints correctly or incorrectly calculate the material needed to make products.<sup>46</sup>

Companies that must give workers remedial courses as a prelude to technical training face delays in implementing new technologies and work practices. Motorola expects to spend over \$10 million per year for the next 3 years to bring its U.S. workforce up to sixth or seventh grade reading and math levels.<sup>47</sup> Basic skills problems can also hamper

employee participation in productivity and quality improvement efforts: for example, one major manufacturing firm found that one-fourth of its quality circles (which met without management to encourage free discussion) were unable to pass on written suggestions because no one could take notes well enough.<sup>48</sup> Basic skills deficiencies obviously add to company costs in screening job applicants and in hiring new employees.

Although imprecise and subject to great uncertainty, there have been some efforts to estimate the overall cost to companies of basic skills deficiencies. A study of the Atlanta metropolitan statistical area concluded that employed workers with educational limitations cost employers \$840 million annually (or about \$3,700 per employee) in lost time, inadequate performance, and higher personnel costs (e.g., health and safety, training). The study estimated that the total social and economic cost of functional illiteracy among all Atlanta area adults to be \$2.6 billion annually.<sup>49</sup>

At the regional level, according to the U.S. Department of Labor, the costs of functional illiteracy among 3.6 million employed but undereducated workers in the eight Southeastern States amounted to \$24.8 billion annually (or nearly \$6,900 per worker) because of time lost, poor performance, and other employment related problems. It is not clear from the 2 studies why the regional costs per worker would be so much higher than those for Atlanta. (Total costs of functional illiteracy, including the unemployed, within the region were estimated to be over \$57 billion).<sup>50</sup>

Canada, too, has a basic skills problem. A Canadian business task force estimated that the costs of functional illiteracy to Canadian business was \$4 billion annually. This figure could be used to

<sup>43</sup>James S. Howard, "Small Business CEOs: No Shortage Of Worries," *D&B Reports*, November/December 1989, p. 17.

<sup>44</sup>'Job Skills, Education of Workers Big Problems for Small Manufacturers, NAM Survey Shows,' *NAM News*, June 2\*, 1989. The NAM Small Manufacturers Operating Survey was mailed to over 9,500 small firms in the spring of 1989. Responses were received from 2,228 firms, for a 25.4 percent response rate. About 40 percent of the responding employers had tuition reimbursement programs.

<sup>45</sup>Jeanne Sadler, "Small Companies are Target of Efforts to Improve the Literacy of Employees," *Wall Street Journal*, Nov. 3, 1988, p. B2.

<sup>46</sup>"Business Teaching 3 R's to Employees in Effort to Compete," *New York Times*, May 1, 1988.

<sup>47</sup>"Four b, Four: How Can Businesses Fight Workplace Illiteracy?," *Training and Development Journal*, vol. 43, No. 1, January 1989, pp. 21-22.

<sup>48</sup>As cited in Larry Mikulecky, "Second Chance Basic Skills Education," *Commission on Workforce Quality and Labor Market Efficiency, Investing in People: A Strategy to Address America's Workforce Crisis*, Background Papers Vol. 1, op. cit., footnote 14, p. 237.

<sup>49</sup>William A. Dealy, *Atlanta 2000: Its Changing Job Market and the Employment Readiness of its Workforce*, A Special Metropolitan Area Study Conducted for the Southeast Regional Office of the National Alliance of Business, 1987, pp. 46-48.

<sup>50</sup>Richard A. Mendel, *Meeting the Economic Challenge of the 1990s: Workforce Literacy in the South*, A Report for the Sunbelt Institute (Chapel Hill, NC: MDC, Inc., September 1988), p. 15.

**guesstimate** U.S. costs. If a 10-to-1 conversion ratio (the approximate difference in the economies and populations of the two countries) were used, the cost in the United States would be \$40 billion annually.<sup>51</sup> Total costs to Canadian society were estimated to be \$10 billion per year—the equivalent of \$100 billion for the United States.

## WORKPLACE-ORIENTED PROGRAMS<sup>52</sup>

Since the early 1980s, a number of workplace basic skills programs have been launched. These usually involve cooperative efforts by employers, unions, educational institutions, and government. The terms “workforce” and “workplace” are sometimes used interchangeably in describing basic skills programs; in this report, however, OTA distinguishes between the two terms. “Workforce” programs are for people not currently employed who need improved basic skills or work readiness skills to enter the workworld, while “workplace” basic skills programs are for employees. The discussion below focuses mostly on workplace programs.

### *Company-run Programs*

There are many individual examples of arrangements among companies, unions, and local adult basic education programs to provide services to adults. Most, however, are not workplace programs *per se*. For example, the Business Council for Effective Literacy, which works to foster corporate awareness of adult literacy issues, identified more than 800 corporate literacy actions of all kinds between 1984 and 1987. However, only 9 percent had to do with employee basic skills programs.<sup>53</sup>

Unfortunately, surveys of employer involvement in basic skills programs have been far from comprehensive. Most surveys have very low response rates. The surveys probably overstate employer involvement because they do not define such terms as “basic skills” or “remedial education.” For example, firms may consider remedial courses in blue-

print reading, accounting principles, or statistics to be basic for specific jobs. Also, few surveys ask firms whether their basic education activities are companywide in scope. One common failing in all surveys is that small firms—those with fewer than 100 employees—are absent as a category or in proportion to their importance to the economy. Another shortcoming is the dearth of survey information about the features of the firms’ activities (e.g., whether government funds are used, role of local educational providers, etc.).

Table 6-2 compares findings from four of the more inclusive employer surveys. The *Training Magazine* survey shows clearly that company-based remedial training often bears little resemblance to the Three-Rs of adult basic education. When remedial education was left undefined in the survey instrument, roughly one-third (31.79%) of the survey respondents (all companies with 100 or more employees) said they offered “remedial/basic education.” However, when firms were specifically asked if they provided remedial education in reading, writing, arithmetic, or English as a Second Language, only 11.3 percent said they did. (The survey asked respondents not to include such items as listening, creative thinking, or computer skills.)<sup>54</sup>

The Towers Perrin-Hudson Institute survey of large firms found that 8 percent of its respondents had remedial programs, and that they spent 3 percent of their training budget on these activities. Another 9 percent were conducting pilot projects.<sup>55</sup>

The American Management Association (AMA) found far fewer firms with basic skills programs. In a 1989 survey of its members, AMA found that one-third of the respondents tested job applicants or current employees for basic skills, but only 3 percent offered remedial training to correct deficiencies.<sup>56</sup> Nearly 90 percent of the responding companies said they refused to hire workers who failed basic skills test—perhaps an explanation for the few companies with corrective programs.

<sup>51</sup>As cited in Mikulecky, op. cit., footnote 17.

<sup>52</sup>Portions of this section are drawn from Paul V. Delker, *Basic Skills Education in Business and Industry: Factors for Success or Failure*, Op. Cit., footnote 4.

<sup>53</sup>Information provided by Gail Spangenberg, Business Council for Effective Literacy, June 1990.

<sup>54</sup>Chris Lee, “The Three Rs,” *Training: The Magazine of Human Resource Development*, vol. 26, No. 10, October 1989, p. 68.

<sup>55</sup>Towers Perrin, Hudson Institute, “Workforce 2000—Competing in a Seller’s Market: Is Corporate America Prepared?” A Survey Report on Corporate Responses to Demographic and Labor Force Trends, July 1990.

<sup>56</sup>Ellen Sherman, “Back to Basics to Improve Basic Skills,” *Personnel*, July 1989, p. 22.

Table 6-2—Surveys of Employer Involvement in Workplace Basic Skills Programs

Source/Date/Response Rate	Business involvement	Comments
<i>Training(1989):</i> "Twenty thousand organizations with 100 employees or more were sent surveys; 3,130 surveys were returned for an overall response rate of 15.7 percent. However, only half the surveyed firms were asked special questions in which remedial education was defined to limit to the Three-Rs.	11.3 percent of respondents said they offered remedial education in reading, writing, or arithmetic, or basic education for employees whose native language is not English; when remedial/basic education was left undefined, 31.7 percent of companies said they offered programs.	Only 2 percent of respondents picked remedial/basic education as the most critical challenge for their training and development function over the next 2 to 5 years. (Of the 13 choices, the largest challenge, picked by about one-fifth, was new market strategies, followed by technological change—roughly 16 percent; quality improvement—about 12 percent; and customer service—about 10 percent).
<i>American Management Association (1989)</i> <sup>a</sup> Survey of AMA members, of whom 1,005 responded.	Only 3 percent of respondents said they provide remedial education in basic skills. However, more than one-third of the respondents (34 percent) indicated that they used basic skills testing of job applicants, new hires, and in some cases, current employees and candidates for promotion. Nearly 90 percent of the respondents issuing testing said they do not hire applicants that fail basic skills tests. None of the companies said they automatically deny promotion to candidates when testing shows basic skills differences; most allowed the promotion but also assigned the worker to remedial training.	In addition to the survey, AMA profiled some 30 company programs. Costs of remedial projects ranged from nothing to nearly \$1000 per employee, with the average cost around a few hundred dollars per employee. Programs averaged one session per week for 3 months or longer. Roughly half the profiled companies provided remedial training on company time.
<i>Society for Human Resources Management (1989)</i> <sup>b</sup> Survey was sent to a random sample of 4,600 SHRM members; 613 usable responses were received for a response rate of 13.3 percent. Some small firms (under 100 employees) were included in the sample.	Roughly one fourth (26 percent) of respondents said they provided remedial training, defined as "basic skills (i.e., writing, reading, math, English, etc.) that must be mastered before additional training or retraining can be undertaken successfully."	Survey found that firms rely far more on outside sources for remedial training than they do for other forms of training and retraining. (41 percent said all or a majority of remedial training was provided by outside providers, compared to 15 percent for other training and 12 percent for retraining.)
<i>Towers Perrin, Hudson Institute (1990)</i> <sup>d</sup> A questionnaire on human resource practices and concerns was sent to 4,000 firms; responses were received from 645 firms, for a 16.1 percent response. Most were large firms; the median firm had 1,953 employees; 25 percent had more than 6,200 employees; only 25 percent less than 765. Most respondents (73 percent) were in the East or Midwest. Financial services accounted for 22 percent of the responses; manufacturing, 14 percent.	Overall, 8 percent of respondents undertook remedial education; another 9 percent had pilot projects; 14 percent planned activities. On average, the portion of training budgets for remedial education was 3 percent. Firms with strategic plans for addressing skills gaps were much more likely to have remedial programs than those that had yet to plan measures to address skills gaps.	Poor basic skills was a major cause of rejection of new job applicants. Among firms hiring at least 150 new employees each year, 40 percent of the respondents had to screen 6 to 10 candidates to hire one worker. Nearly 60 percent of the firms cited inadequate writing and verbal skills as the most common reason to reject a candidate, followed by inadequate adaptation to the work environment (36 percent). Another reason for not hiring, failure to pass medical or drug tests, was cited by 10 percent.

<sup>a</sup>Chris Lee, "The Three Rs," *Training: The Magazine of Human Resource Development*, October 1989, p. 68.

<sup>b</sup>Ellen Sherman, "Back to Basics to Improve Basic Skills," *Personnel*, July 1989, p. 22.

<sup>c</sup>Society for Human Resource Management, 1989 *SHRM Training/Retraining Survey*, Alexandria, VA, 1989.

<sup>d</sup>Towers Perrin, Hudson Institute, *Workplace 2000: Competing in a Seller's Market: Is Corporate America Prepared?* July 1990.

SOURCE: Office of Technology Assessment, 1990.

At the high end, the Society for Human Resource Management (SHRM) survey reports that 26 percent of responding employers provided remedial training. As indicated in table 6-2, SHRM's question about remedial education is more open-ended than the *Training* Three-R survey question. SHRM found

less than one-fifth of the smaller companies (those with fewer than 500 employees) had remedial training programs, while a third or more of the larger companies had programs. Companies tended to use outside providers to a greater extent for remedial training than for their other training activities.<sup>57</sup>

<sup>57</sup>Society for Human Resource Management, 1989 *SHRM Training/Retraining Survey*, Alexandria, VA, 1989.

Contrary to the claims sometimes made, firms in most industries probably spend very little of their total training budget on remedial education, opting instead to rely on outside, publicly supported Federal, State, and local basic education programs. But there are exceptions. A recent American Bankers Association (ABA) survey found that 38 percent of bank survey respondents had established basic-skills programs for employees. These banks spent about 23 percent of their training budgets on these efforts. The ABA estimated that the banking industry as a whole spent between \$23 million and \$135 million per year on basic skills programs. (The smaller figure assumes that nonresponding banks spent nothing on basic skills; the larger figure assumes that banks responding to the survey were typical of the industry.<sup>58</sup>) It seems likely, however, that a portion of this expenditure would be for industry specific basic skills-not the Three-Rs.

The ABA, through the American Institute of Banking (its educational affiliate), is its industry's largest provider of basic skills assistance and is in the process of developing industry specific materials to enhance its efforts. As trade associations in other industries (e.g., textiles, printers) become more involved in developing basic skills materials, more companies may be encouraged to set up industry specific programs for their employees.

Some large companies most involved in basic skills education have developed their own internal courses-often as part of a broader employee development or training program. Examples include Polaroid, Motorola, Eastman Kodak, and Aetna. Polaroid has offered basic education to its employees since 1970. The company has developed a fundamental skills program for basic literacy and arithmetic, and a technology readiness program that involves some math and science, computer skills, and so called skills for sustained learning (like problem solving).<sup>59</sup> Most Technology readiness courses are at the high school level; however, some are second-year college courses. Courses take place onsite, mostly on company time.<sup>60</sup>

Aetna is another company that has developed its own basic skills curriculum, called the Effective Business Skills (EBS) School. EBS was developed by the company's Institute for Corporate Education to build employees' basic skills (math, reading, writing, and oral communications) and to help them use computers and apply adult learning strategies. It is now available to other Aetna divisions. To attract students who do not wish supervisors and coworkers to know they are taking remedial courses, Aetna offers evening courses as well as during shifts (with the supervisor's permission). Many employees prefer the evening course because registration is kept confidential even from supervisors. The EBS program is intended to complement Aetna's "general business skills" program, which is used by employees whose basics are adequate but want to upgrade their job skills.

One reason why Aetna set up EBS was its concern that it might not be able to hire as many workers with good basic skills as it would like. Aetna already has problems, particularly in the Northeast and in California, in finding new hires with strong basic skills. Also, Aetna was concerned that it might have too few employees with the qualifications and training needed to move up into better jobs when vacancies occur. (Job vacancies are made known internally before being advertised outside the company.)

Another reason is that jobs are becoming more complex. Many jobs within Aetna that were once routine in nature now require new skills from workers. The claims processor job, for example, has been fundamentally altered by the decentralized use of computers. Once, paper files moved back and forth through multiple stations as they were processed. Now, one worker is responsible for multiple tasks and must possess a range of new skills (such as keyboard skills, an ability to use electronic mail, or spread sheets).

While the company offers general skills training for employees and specifies the skills needed for new jobs, few lower level employees took the training needed to qualify for these positions before EBS. Some of these employees may not have felt

<sup>58</sup>The American Bankers Association. *Executive Summary: The American Bankers Association's Survey on Basic Skills in Banking* (Washington DC: Spring 1989).

<sup>59</sup>Anne Skagen, ed., *Workplace Literacy*, AMA Management Briefing, no date, pp. 23-25.

<sup>60</sup>As cited in National Alliance of Business, *Lessons Learned: Job Skills Education Program Final Report*, report prepared for the Employment and Training Administration U.S. Department of Labor, May 1990, pp. 64-65.

themselves qualified to take the general skills courses. Others may not have gotten their supervisors' permission to take training on company time. (Aetna has a corporatwide policy of charging the costs of training to the cost-code of the department involved when the training takes place on company time.)

The company's basic skills program is highly job-specific (and even Aetna specific) in content. For example, in setting up a special EBS program for security guards, the Institute discovered (from supervisory personnel) that faulty "incident reports" were a real problem. The incident report is used as a training vehicle in the EBS program, apparently to good effect. (By contrast, the general skills course uses more generic examples.)

Onsite literacy services like Aetna's are rare. Partnerships with existing community educational institutions are more common. In these, employers may provide some support (e.g., paid release time for employees to take classes, provision of funds, materials, or advisory services). Some of these programs are, in essence, conventional adult basic education (ABE) classes with that serve the employees of a few companies. As discussed at the end of the chapter, conventional ABE is seldom the best model to use when the purpose is to achieve specific, defined, job-related objectives—such as upgrading of basic skills for statistical process control.

### ***Joint Initiatives Between Labor and Management***

Joint labor-management cooperative training programs (discussed in detail in ch. 8) support basic education for many workers represented by the United Auto Workers (UAW) and the Communications Workers of America (CWA). The joint programs are still in their early stages; the oldest began in 1982. Nonetheless, their size (over 700,000 workers are eligible for joint program benefits) and their resources (over \$300 million in 1988 for *all training* and tuition assistance activities) make them major training institutions. Depending on how well they implement their programs, these institutions could extend the sum of the Nation's knowledge about the most effective and appropriate ways to teach adults basic skills.



*Photo credit: UAW-Chrysler National Training Center*

Using computers in basic skills courses helps to familiarize workers with a technology increasingly needed at work.

While the joint programs are separate from corporate training operations, cooperation at the plant level frequently allows basic skills programs to be offered in close conjunction with corporate initiatives. For example, at Ford's Dearborn Engine Plant, the UAW-Ford local training committee has provided basic arithmetic training off-hours to help workers taking Statistical Process Control (SPC) training on company time. The SPC training was developed with union input, although it was initiated and funded by the company.<sup>61</sup>

In some cases, the joint programs provide broad training to develop teamwork or problem solving skills while upgrading basic skills. Such a combined program, called "technical literacy," is offered by the UAW-Ford National Education, Development, and Training Center.

Because so many workers might be involved, the joint programs could obtain valuable data and information about different approaches. However, most programs do not yet involve much evaluation. This could change. The UAW-Chrysler National Training Center, for example, plans to evaluate the success of various delivery approaches for basic skills instruction used for Chrysler employees.

<sup>61</sup>Margaret Hilton, "The Role of Labor Unions in Training of Employed Workers," working paper #2, OTA Worker Training Project, May 28, 1989, p. 41.

The joint programs also could be a testing ground for instructional technology used in basic skills upgrading— particularly since some joint centers have access to in-plant computers or other instructional devices. Options for encouraging more systematic evaluation of basic skills courseware are discussed in chapter 2.

So far, the most elaborate use of interactive technology for basic skills at the joint centers is for motivation, not instruction. The GM-UAW's Skills 2000 program consists of 8 hours of modules on auto industry changes that will affect worker skills; tests and lessons to help workers sample their reading, writing, numbers, charts, and communication skills; information about educational opportunities available to GM employees; and plant-specific contacts. The program, partially funded by the U.S. Department of Labor, may eventually be delivered to workers at 1000 interactive videodisc terminals in 150 GM plants and worksites.<sup>62</sup>

An evaluation of the motivational program at two pilot sites found that it did prompt workers to consider ways to improve their skills, and that they were interested in educational development. However, the evaluators caution that Skills 2000 will be of little help unless it is combined with an overall strategy for improving worker skills.<sup>63</sup> Having developed the motivational program, the GM-UAW human resource center is now giving more attention to the type and quality of services available at local plants. Because the joint program is decentralized, it will be up to management and union leadership in each plant to make sure that employees, once motivated, get prompt attention and high quality educational services.

### ***State Basic Skills Program***

State governments have long been active in adult basic education as recipients of Federal Adult Education Act funds. Other State programs, as well, have had literacy components. More recently, the States have launched new literacy initiatives aimed at developing coordinated literacy strategies. At least 30 States have set up bodies to plan or

coordinate various literacy activities.<sup>64</sup> These bodies serve several purposes; most, however, are attempting to develop an overall State literacy strategy to cover the diverse groups (school children, high school dropouts, employees, displaced workers, people on welfare) and the numerous government programs (adult basic education, Job Training Partnership Act, vocational education, Job Opportunities and Basic Skills Program, and so forth) that channel funds for literacy programs to one population or another.

While few States now have strong programs for business involvement, this could change as the States move to implement the adult literacy component of the National Education Goals that the State Governors' adopted in 1990. The Governors' goal statement decried the fractured system for delivering adult literacy services and called for a public-private partnership in each State to create a "functionally literate workforce." <sup>65</sup> (See ch. 2 for further discussion.)

Several States have launched separate workforce literacy initiatives that complement State adult basic education programs or job training programs.<sup>66</sup> These programs, for the most part, emphasize upgrading basic skills of economically disadvantaged people, many of whom are not now employed but want work skills. To a lesser extent, these programs also support employer-based activities. Some States—such as Connecticut—are adjusting their adult education programs to encourage employer involvement. A few special initiatives aim primarily at the workplace. State activity in this area could well increase if Federal legislation now under consideration in Congress passes (see ch. 2). Also, if Federal Adult Education Act funds for workplace literacy grows to \$50 million, this program will be administered by the States, rather than nationally. (See box 6-E.)

### **Workplace Initiatives**

Several States—Massachusetts, Illinois, and South Carolina among them—have developed new mechanisms for employer involvement. Created in 1986, the Massachusetts Workplace Education Initiative

<sup>62</sup>Delker, op. cit., footnote 5, p. 76.

<sup>63</sup>James Bosco, *Evaluation Report of Skills 2000*, Western Michigan University, June 1989, Executive Summary.

<sup>64</sup>*Adult Literacy Programs, Planning, Issues, Business Council for Effective Literacy*, January 1988.

<sup>65</sup>National Governors' Association, *National Education Goals*, Feb. 25, 1990, p. 9.

<sup>66</sup>Judith K. Chynoweth, *Enhancing Literacy for Jobs and Productivity* (Washington, DC: Council of State Policy and Planning Agencies, 1989).

(WPE) is both a training delivery initiative and a research demonstration project.<sup>67</sup> WPE coordinates more than 20 workplace literacy programs, documenting each through a formative evaluation. The evaluation is used to track strengths and weaknesses of each model, identifying problems and offering technical assistance on an ongoing basis.

Organizers hope the evaluations will be instrumental in shaping a long term, systematic strategy for improving workplace literacy. WPE has attempted to develop and evaluate models applicable to a range of industrial needs, funding programs in both the manufacturing and service sectors, in unionized and nonunionized settings, for both native English speakers and immigrants.

WPE is a joint program of three Massachusetts State agencies, coordinated through the Commonwealth Literacy Campaign. In fiscal year 1989, WPE received approximately \$750,000 (\$600,000 from a Federal Workplace Literacy Grant and the remainder from State funds) and reached about 1,000 workers. A 3-year evaluation, conducted by an outside party, recommended that Massachusetts continue to invest in WPE, despite the current fiscal crisis facing the State.<sup>68</sup>

The Illinois Literacy Resource Development Project (ILRD) is a collective effort among six key literacy entities in Illinois, designed to help volunteer literacy and adult education programs garner additional resources.<sup>69</sup> At its inception in March 1987, ILRD set up task forces of local workplace literacy and adult education providers to develop implementation strategies. Examples included:

- marketing contractual literacy programs to business,
- soliciting corporate and foundation support,
- seeking individual donations,
- impacting local public policy, and
- exploring State implementation of literacy programs.

The task forces put grassroots providers in contact with prospective sources of support. In addition, the task forces produce 'how-to' manuals and organize workshops and conferences designed to help local members raise money, market their programs, and increase awareness among community leaders, legislators, and other policymakers. ILRD is an independent nonprofit organization supported by grants from the Illinois State Education Board and private foundations or charities. In fiscal year 1989, combined funding totaled approximately \$130,000, enabling the ILRD to reach over 200 local organizations and 70 businesses, unions, and foundations.

South Carolina's Initiative for Work Force Excellence, launched by the governor in 1988, assists employers throughout the State in offering basic skills programs to workers. Each of the State's 16 two-year technical colleges now has a workforce specialist who serves as a basic skills consultant to employers and also meets with local business roundtables. By June 1989, the initiative had identified about 31,000 workers—about 2 percent of the State's employed workforce in need of basic skills training, a figure considered lower than the overall need. About 5,000 workers were either in training or had completed training. The technical institutes, long involved in industry training, are developing programs and offering courses for the companies where the identified employees work.

#### Customized Training and Basic Skills

The capacity to offer workplace basic skills instruction in association with other kinds of industry training is an attractive feature of State industrial training programs. Where the objective is to improve workplace skills, programs that focus on specific needs in particular establishments may be more likely to succeed than general ABE or GED programs.

OTA'S State survey (discussed in ch. 5) found that nearly all State industrial training programs authorize funds to be used for basic skills training, and two-thirds permit funds to be spent on English as a second language. While only about one-fourth of the

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<sup>67</sup>The following discussion is based on information from the *Massachusetts Workplace Education Initiative Program Summary* and OTA Staff communications with Sondra Stein, June 1990.

<sup>68</sup>Paula Rauman and Laura Sperazi, *Massachusetts Workplace Education Initiative: Year 3 Evaluation Final Report* (Wellesley, MA: Stone Center, Wellesley College), 1989, p. 106.

<sup>69</sup>This discussion is based on information from the *Illinois Literacy Resource Development Project Task Force #1 Handbook on Marketing Contractual Literacy Services To Businesses*, (Champaign, IL: ILRD), and OTA staff communications with Suzanne Knell, Executive Director, June 1990.

State customized training programs spend more than 10 percent of their funds on basic skills, there are exceptions.<sup>70</sup>

New York's Employer Specific Skills Training Program (ESSTP)-a program designed to help fill gaps between job demands and worker skills—offers workplace basic skills programs as a regular component of its assistance to business. ESSTP assists employers in assessing their workers' training needs, developing customized courses, and training workers. Often, basic skills instruction is carried out in conjunction with statistical process control training or with other workplace changes.

New York's program typically picks up most direct instructional costs; however, employers are expected to provide release time or paid time off to workers. Since release time can cost 3 to 10 times as much as the instructional costs, an employer's compliance is an important sign of commitment. Sometimes the release time requirement is eased for small businesses.

Some States are looking at tax incentives to encourage private sector involvement in basic skills programs. Mississippi, in 1989, became the first State to offer a tax credit to companies providing workplace basic skills programs that meet State qualifications.<sup>71</sup> The 25-percent tax credit can be applied to the wages of instructors (but not trainees), instructional materials and equipment, and construction and maintenance of training facilities. Several features of Mississippi's program aim to assure that the tax credit is focused on basic skills. The company must apply for the tax credit, and its chief executive officer must sign the application. The company must develop a training plan, a time schedule and a projected budget. Several State agencies, including the education department and the tax commission, are involved in providing technical assistance.

Mississippi has also become a leader among the States in investigating the potential to use instructional technology in basic skills instruction. The Governor's office has been instrumental in funding a pilot project to test civilian applications for the U.S. Army's computer-based Job Skills Education

Program (see discussion in next section and box 6-D).

A few States have called for broad improvements in the basic skills of their workforce to meet economic development objectives. Michigan's strategy for building a competitive workforce, set forth by the Governor's office in 1988, includes improving the literacy skills of one million Michigan adults by 2000 to meet the State's projected occupational requirements. "Workforce literacy" and "work readiness" objectives have become driving forces behind the numerous State adult education and training programs. Michigan encourages employers to assess their workers' basic skills, and will conduct job analysis and needs assessments for skills. It plans to make remedial education available to currently employed workers.

Michigan's adult literacy task force has established "core groups" in each region of the State, comprised of representatives of each organization and institution involved in adult literacy training. With help from facilitators, core groups build cooperation by developing uniform procedures, forms, referral processes, and outreach techniques. Core groups also hope to simplify the adult literacy training system by reviewing the division of responsibilities and funds, encouraging subcontracting where there is repetition.<sup>72</sup>

The Michigan strategy includes some innovations, including the Michigan Opportunity Card, a novel effort to make the Michigan employment and training system more user friendly. (The Card—about the size of a credit card-stores enough information about applicants for State-sponsored services to allow them to avoid filling out new forms whenever they seek education or training.)

### Adult Education Programs

For many years, States have funded local adult basic, adult secondary, and English as a Second Language projects, supported in part through the Federal Adult Education Act. At least 15 States have open-ended funding formulas for their adult basic education programs that can be used to cover instructional costs of workplace basic skills pro-

<sup>70</sup>Peter A. Creticos, Steve Duscha, and Robert G. Sheets, "State Financed Customized Training Programs: A Comparative State Survey," report prepared for the Office of Technology Assessment under contract L3-3810, March 1990, table 12.

<sup>71</sup> Senate bill 2925

<sup>72</sup> OTA staff communication with Judy Hollister, Governor's Council on Human Resources, June 7, 1990.

**Box 6-D—Trying To Transfer Military Training Technology: The JSEP Example**

**The effort** to transfer the Army's Job Skills Education Program (JSEP) to educational institutions and the private sector reveals both the promises and pitfalls of using training materials in settings different from those for which they were originally intended. The Army developed JSEP at a cost of \$11 million in the early 1980s. The attempt to transfer JSEP has been formally underway since 1986 through a joint effort by the departments of Defense, Education, and Labor, and is still not complete. The full JSEP program includes more than 300 lessons and 400 hours of basic skills instruction, built on analysis of educational proficiencies needed to perform 94 of the most common military occupational specialties (MOS). It includes a student management system that keeps track of performance data, and also gives individualized learning prescriptions based on pretest and other diagnostic information. JSEP also has learning strategy modules to help students develop time-management skills, test-taking skills, and problems-solving skills. Soldiers seem to prefer JSEP over conventional instruction, and their test scores generally improve if given enough time on JSEP.

Why transfer JSEP to civilian use? Many military and civilian occupations are very similar (e.g., health care aides, electricians, machinists, auto repair people, and computer operators) and require similar levels of basic educational skills. However, most of the JSEP materials use Army or military examples that seem foreign in a civilian setting. Hence, JSEP has been partially "degreened" or "civilianized" to facilitate transfer.

Several demonstration projects have been funded, including a Mississippi project involving a community college and an electronics company. An evaluation of JSEP by the National Alliance of Business (NAB) found that it can work in civilian settings, at least under pilot or test site conditions. However, NAB found many barriers that would inhibit immediate and widespread use of JSEP. For example, JSEP's computer system is either not compatible with most commercial systems or requires high-cost special equipment to use. Also, complex copyright issues about control of JSEP courseware exist. Another barrier is the limited technical assistance for civilian users of JSEP.<sup>2</sup>

<sup>1</sup>National Alliance of Business, *Lessons Learned: Job Skills Education Program Final Report*, prepared by the National Alliance of Business for the Employment and Training Administration of the U.S. Department of Labor, May 1990.

grams. Where such formulas exist, educational systems are likely to be more aggressive in serving workplace needs—and are better able to approach employers with project proposals. (Most other States operate from fixed appropriations that limit their flexibility to act on requests for additional services that have not been specifically planned in advance.)

Connecticut has been especially aggressive in offering industry basic skills assistance. It ranks ninth among the States in matching Federal dollars; it spends about \$5 for every \$1 in Federal Adult Education Act funds it receives. When an employer contacts the State education agency, the agency often acts as a broker between the firm and a local education agency (LEA) to provide the services. The State is willing when necessary to cross jurisdictional lines to find an appropriate service provider.

In 1988, the Connecticut legislature made workplace programs more attractive to LEAs by allowing employers to "cash match" for State funds on a needs-based formula.

#### Instructional Technology and Basic Skills<sup>73</sup>

When properly used, high-quality technology-assisted training programs can be effective in delivery of basic education to adults.<sup>74</sup> Most, but not all, evaluations of computer use in adult basic education have found positive effects. Generally, these studies conclude that adults in classes where the computer is used to assist the instructor require somewhat less instructional time to learn than students in conventional classes, and may score a bit higher.<sup>75</sup>

<sup>73</sup>Chapter 7 discusses instructional technology in greater detail.

<sup>74</sup>Many studies of school-age students have found that that well-designed programs that use instructional technology can reduce learning time compared to the average course taught by traditional means, as well. For a discussion of this research, see U.S. Congress Office of Technology Assessment, *Power On: New Tools for Teaching and Learning*, OTA-SET-379 (Washington, DC: U.S. Government Printing Office, September 1988), pp. 44 et seq.

<sup>75</sup>See U.S. Congress, Office of Technology Assessment, *Technology and Structural Unemployment: Reemploying Displaced Adults*, OTA-ITE-250 (Washington, DC: U.S. Government Printing Office, February 1986) pp. 290-302, for a review of computer-assisted instruction in adult basic education.

While the initial costs of acquiring hardware and courseware can be high, computer-assisted instruction (CAI) can yield cost savings in classroom settings if students use the computers heavily and instructors take advantage of the computer to make more effective use of their time. One review of computer-based training in the military, for example, found it to cost 30 percent less than traditional instruction.<sup>76</sup> Other advantages of computers include flexibility in scheduling, individualized learning, privacy, and rapid feedback.<sup>77</sup> These features make computer-based systems attractive to adult learners, and to business, especially when firms already own the needed hardware.

Computer-assisted instruction has long been used in basic education.<sup>78</sup> Several large-scale, computer-managed systems exist. Two of these—the basic skills instruction offered by the Computer Curriculum Corp. (CCC) and PLATO (recently purchased by the National Education Corporation from Control Data)—have been used and revised for over two decades. WICAT, Jostens Learning Corporation's adult literacy program, and IBM's Principles of the Alphabet Learning Systems (PALS) are more recent. Although not necessarily computer-based, the Remediation and Training Institute's Comprehensive Competency Program (CCP), marketed by U.S. Basic Skills Corporation, has been used extensively in Job Training Partnership Act Title II programs for young adults.

Quite recently, the Federal Government has sought to transfer some military basic skills programs, including the Army's Job Skills Education Program (JSEP), to the private sector and educational institutions. By far the most extensive effort has involved JSEP, a version of which has been partially modified for civilian use. (See box 6-D.) A JSEP pilot project involving a Mississippi community college and a manufacturer of musical instru-

ments has been a collaborative effort among the Governor's office, Federal agencies and the National Alliance of Business (NAB).<sup>79</sup> Interviews with the first 64 employees participating in JSEP and their supervisors suggested positive outcomes for job performance (as reflected in productivity, accuracy, attitude, and job knowledge). Positive reactions to JSEP were also expressed by students in a pilot project involving a White Plains, New York, adult education center.<sup>80</sup>

Technology-based delivery of basic education has the potential to greatly increase opportunities for adult workers to improve their basic skills. Technology-based basic skills programs are now in relatively common use in local training projects receiving funds through the Federal Job Training Partnership Act—especially projects aimed at economically disadvantaged adults.<sup>81</sup> Several large companies, sometimes in conjunction with unions, are also using computer-based delivery of remedial education for their employees. Company demonstration projects, including the JSEP pilot projects and several interactive videodisc projects funded by the U.S. Department of Labor, are raising awareness of technology-based delivery options.

Even so, barriers to wider use of these technologies exist. While computer-based instruction for adults can be quite effective, methodological issues complicate comparison among the different systems themselves and with conventional instruction.<sup>82</sup> Also, there is a lack of reliable information about the many different products and services now on the market. While many of these products aim for the adult basic education market, very few of them were specifically designed to meet the needs of mature adult learners. Many adults have difficulty relating to materials designed for young dropouts or high school students. There are also very few examples of computer-based materials that were developed spe-

<sup>76</sup>As cited in *Power On*, op. cit., footnote 74, p. 78.

<sup>77</sup>Don F. Seaman and Joe Michael McAllister, *An Evaluation of Computer-Assisted Instructional Systems to Deliver Literacy Services for J.T.P.A. Participants at Houston Community College*, The Texas Center for Adult Literacy and Learning, College of Education, Texas A&M University, no date, p. 22.

<sup>78</sup>Alan Weisberg, "Five 'Big' Systems and One 'Little' Option," *Adult Literacy and Technology Newsletter*, vol.3, No.1, May 1989.

<sup>79</sup>Jorie W. Philippi, *Technology Transfer Partnership Project: Meridian Community College-Peavey Electronics Corporation: Lessons Learned* (Washington, DC: National Alliance of Business, Jan. 2, 1989).

<sup>80</sup>National Alliance of Business, *Lessons Learned: Job Skills Education Program Final Report*, report prepared for the Employment and Training Administration U.S. Department of Labor, May 1990, p. 32.

<sup>81</sup>For example, see Education TURNKEY Systems, Inc., *The Job Training Partnerships Act and Computer-Assisted Instruction* (Washington, DC: National Commission for Employment Policy, August 1988).

<sup>82</sup>*Ibid.*, p. 5.

cifically for workplace basic skills. Finally, problems in converting technology-based products from one system to another continue to exist. Many existing products, including many products developed under contract for Federal agencies, are not very portable because they were developed using unique features or systems that are not widely used.

To facilitate transfer of effective programs, strategies and approaches (including technology-based methods), some State officials have proposed creation of a National Basic Skills Consortium (NBSC). It would work to develop ways that States and other service providers could share assessment and testing tools, curricula, and other products and information. It would also promote joint development of needed products and programs. While still being formed, NBSC might become an effective instrument for disseminating information about successful approaches. It currently lacks startup funds and staff.<sup>83</sup>

## IMPLICATIONS FOR POLICY: BASIC SKILLS, CORPORATE TRAINING, AND THE EDUCATIONAL SYSTEM

The workplace basic skills issue has emerged just as the Nation's general literacy problems are drawing public attention. The Nation's Governors, from among their national education goals, call for every American to be literate, with the necessary skills and knowledge to compete in the global economy and exercise good citizenship, by the year 2000. Similarly, the Secretary of Labor's Commission on Workforce Quality and Labor Market Efficiency called on the Federal Government and the States to work together to ensure lifetime access to basic skills education, with the objective of eliminating illiteracy by 2000.<sup>84</sup>

Major expansion in Federal support for workplace literacy (as well as for adult literacy in general) is under consideration by the 101st Congress. Bills in

the House and Senate would amend the Job Training Partnership Act (administered by the Department of Labor) and the Adult Education Act (administered by the Department of Education). Both would substantially expand existing Federal support for workplace literacy. (See box 6-E.) More than likely, debate will continue on the Federal role in workplace literacy and its relationship to Federal support for general purpose literacy programs.

### Workplace and General Basic Skills Programs

Where do workplace basic skills programs fit in developing national policy on adult education and training? Are these programs so different from traditional adult basic education projects that they should continue to be singled out for special emphasis in Federal and State policy? What is the relationship between workplace basics and broader efforts to develop the skills of the workforce? Will more assistance for employed workers cut into education and training for unemployed people and the economically disadvantaged? These and other questions will become more central in the coming years as experience with workplace programs grows.

There are good reasons for policymakers to treat workplace programs as different. Successful workplace programs use tasks and materials similar to those used at work to enhance retention.<sup>85</sup> Few general-purpose ABE programs can do this, even though many participants have job-related reasons for participating.<sup>86</sup> Employers are not likely to make major commitments to improving their workers' basic skills (such as giving people release time from their jobs) unless these programs pay off through better work performance.

In theory, better performance might induce firms to provide programs at their own expense. However, there also could be more competition for the limited

<sup>83</sup>"New Basic Skills Consortium Formed," *Workforce Development Strategies*, vol. 2, No. 1, June 1990, p.8.

<sup>84</sup>*Investing in People: A Strategy to Address America's Workforce Crisis*, Op cit., footnote 48, report of the Commission p.21. A similar goal, with a few more guidelines for implementation, is contained in Forrest P.Chisman, *Jump Start: The Federal Role in Adult Literacy*, Final Report of the Project on Adult Literacy Sponsored by the Southport Institute for Policy Analysis, January 1989.

<sup>85</sup>A military study, for example, found that recruits given traditional basic skills training tended to lose their skills within 8 weeks. Those given job related training tended to retain their skills. See Thomas G. Sticht, *Basic Skills in Defense* (Alexandria, VA: Human Resources Research Organization, 1982) p. 27. Reasons why this is so are not well understood, but may relate to the continued opportunities for practice and higher motivation when the student learns from materials encountered daily on the job. See Mikulecky, "Second Chance Basic Skills Education," op. cit., footnote 17, p. 250

<sup>86</sup>Anthony P. Carnevale, Leila J. Gainer, and Ann S. Meltzer, *Workplace Basics Training Manual*, ASTD Best Practices Series: Training for a Changing Work Force (San Francisco, CA: Jossey-Bass, 1990), p. 3A-6.

**Box 6-E—Workplace Literacy and the Adult Education Act**

**While the** Federal Government has supported adult basic education (ABE) and adult secondary education (ASE) since the mid-1960s, its involvement in workplace literacy programs is recent. Funds from several Federal programs can be used to support basic skills instruction for employed workers under some circumstances. However, only a few activities—mostly demonstration projects funded by the U.S. Department of Education and the U.S. Department of Labor—focus on the workplace per se.

The largest Federal workplace literacy program is a demonstration grant program added to the Adult Education Act in 1988.<sup>1</sup> Under the program, the Secretary of Education can make workplace literacy grants for projects designed and operated by partnerships among businesses, labor organizations, and education, training, or community-based organizations. Among eligible services: English as a Second Language; updating basic skills to meet workplace needs; and improving worker skills in speaking, listening, reading, and problem solving. Child care and transportation services, as well as educational counseling, also can be provided. Grant recipients provide at least 30 percent of program costs.

In its first round of grants (made in late 1987), the Education Department funded 37 projects, serving about 40,000 workers, at a cost of \$9.7 million. Evaluation information from the first round of projects was not available when this report went to press. A second round of grants for 43 awards were made in the spring of 1990. Congress appropriated a total of \$11.7 million for fiscal year 1989, and \$19.7 million for fiscal year 1990. As is discussed in the policy options part of chapter 2, a major expansion of this program was under consideration in the 101st Congress as this report went to press.

The lion's share of Adult Education Act funds (\$137 million in fiscal year 1989) is used not for workplace literacy but to assist States and localities in providing adult basic education (ABE), English as a Second Language (ESL), and high school equivalency (GED) projects to educationally disadvantaged adults. About 40 percent of the people in adult education programs are employed. Another 45 percent are unemployed but looking for work.<sup>2</sup>

ABE projects have diverse goals, ranging from helping people to function effectively in society to helping them become more employable. In 1987-88, AEA projects served roughly 3 million people; two-thirds received basic education or ESL; the remainder were in GED programs.

Federal funding for AEA programs, flat for several years during the 1980s, is now on the increase. Congress appropriated \$193 million for AEA in fiscal year 1990—compared to about \$162 million the previous year. The Bush Administration seeks \$239 million for the program in fiscal year 1991, including \$19.7 million for a separately funded workplace literacy program. The Department of Education estimates that the proposed 1991 funding level would allow services to reach nearly 4 million adults—1 million more than in fiscal year 1989.<sup>3</sup>

Funding from non-Federal sources for AEA has increased significantly. The States tripled their contributions, compared to the Federal Government, from about 25 percent in 1969-70 to 76 percent in 1986-87.<sup>4</sup> Many States spend several times more than their Federal grant on adult education, while some other States put in only the minimum needed to qualify for the Federal grant (a 15 percent cost-share in 1990).

<sup>1</sup>Section 371 of the Adult Education Act.

<sup>2</sup>Anthony p. Carnevale, Leila J. Gainer, and Ann S. Meltzer, *Workplace Basics Training Manual*, ASTD Best Practices Series: Training for a Changing Work Force (San Francisco, CA: Jossey-Bass, 1990).

<sup>3</sup>U.S. Department of Education, *Justification of Appropriation Estimates for Committees on Appropriations for Fiscal Year 1991*, mimeo., vol. 1, p. H-54

<sup>4</sup>U.S. Departments of Labor, Health and Human Services, Education and Related Agencies Appropriations for 1990, Hearings, House Appropriations Committee, Part 6, Department of Education (Washington DC: U.S. Government Printing Office, 1989), p. 692

Federal funds available for basic skills education.<sup>87</sup> To minimize competition for funds, complementary approaches to encourage firms to become involved in workplace basic programs might be considered. As discussed in chapter 2, a variety of mechanisms,

ranging from training consortia to tax credits to training levies, have been proposed to induce employers to provide more training. Basic skills could be singled out for special emphasis, in the event that Congress adopted one or more of these approaches.

<sup>87</sup>Indeed, workplace programs are popular. The U.S. Department of Education received more than 350 applications requesting nearly \$100 million for workplace literacy projects when it began its workplace demonstration grant program. Ultimately, only 37 projects and \$9.7 million in funds were awarded. At the same time, some urban areas are experiencing waiting lists for general purpose AEA projects.

### The Small Business Dilemma

Large or medium-size businesses set up most company-based workplace literacy programs. Small businesses seldom have the resources to undertake their own programs.

While generalizing may be risky, workers in small firms are often assigned a broad range of responsibilities<sup>88</sup> for which strong basic skills are useful.<sup>89</sup> Yet, small firm employees, on average, have less education than workers at large firms. Nearly 23 percent of employees of very small firms (those with under 25 workers) are not high school graduates, compared to 18 percent at firms with at least 500 employees.<sup>90</sup> Young adult workers with an eighth grade education or less are more likely to work at small and medium-size firms (4 percent compared to 1 percent in large firms).<sup>91</sup> It seems likely, therefore, that basic skills problems may be more prevalent and more serious in the small business workforce.

Small firms, for the most part, have few resources to devote to formal job training—let alone basic skills training. A firm with 50 employees, for example, will find it very difficult to provide paid leave or other on-the-job support for basic skills training, since there are few workers available to fill in the slack. Very few small businesses are able to assign personnel to training. Indeed, it is rare to find a full-time training coordinator at a firm with less than 250 employees. Many large companies, by contrast, not only have trainers but also assign staff to apply for public support for training activities, including basic skills.

Bringing basic skills programs to small businesses and their employees will be a major challenge for administrators. Some States have coupled basic skills training with technical training offered by their industrial training services. Involving several firms in the effort can also help. Dry cleaners in South

Carolina are working to develop a program for entry-level workers that uses job-specific materials.<sup>92</sup> In New York City, for example, the Chamber of Commerce provided basic skills instruction to employees from several small businesses, with the Department of Labor providing funds. There is a clear need for more emphasis on small business in Federal workplace literacy projects. Only 1 of the initial 37 workplace literacy projects issued by the U.S. Department of Education had small business involvement as its primary objective.

### The Role of the States

The States—already active in workplace basic skills programs—could assume a more prominent role in the years to come. While the Education Department's demonstration program is federally administered, the program could become part of the AEA's regular grants to the States if Federal funding increases to over \$50 million per year. Some States also are integrating basic skills instruction with other kinds of industry training assistance—a feature bound to be attractive to firms. States also receive and are responsible for grants under several other Federal programs for basic skills and training—suggesting at least the possibility of more coordinated delivery of services.

State government policies toward community colleges and other potential providers of training also have an impact. Many businesses contract for training with community colleges, which are more familiar with business needs than typical ABE programs. A recent Department of Education survey identified at least five States that provide all ABE/GED training through community colleges. Another 10 States have active programs with community colleges.<sup>93</sup> However, some States continue to prohibit community college involvement in adult basic education programs.<sup>94</sup>

<sup>88</sup>Anthony P. Carnevale and Leila J. Gainer, *The Learning Enterprise* (Alexandria, VA: American Society for Training and Development 1989) p. 18.

<sup>89</sup>As suggested in *Workplace Literacy: Targeting the Future*, report of the First National Conference on Small Business and Workplace Literacy, hosted by the Office of Advocacy of the U.S. Small Business Administration, Washington DC, Oct. 3-4, 1988.

<sup>90</sup>U.S. Small Business Administration, *Small Business in the American Economy* (Washington, DC: U.S. Government Printing Office, 1988) p. 79.

<sup>91</sup>*Ibid.*, p. 102

<sup>92</sup>*Ibid.*, pp 8-9.

<sup>93</sup>U.S. Department of Education, Division of Adult Education, "ABE/GED in Community Colleges: A National Study" June 1988. "The States were Iowa, North Carolina, Oregon, Washington and Wisconsin. Since only 15 States were surveyed, some other States may also rely exclusively on community colleges.

<sup>94</sup>Carnevale et al., *Workplace Basics Training Manual* op.cit., footnote 86.

The question of how State capacities could best be tapped to address basic skills issues is part of a broader debate about improving workforce quality—and in particular the State and private sector role in implementing the national education goals adopted by the Governors' in 1990. The States are becoming more active in putting together public-private partnerships to improve the public education system; the States might well become a primary vehicle for delivering basic skills services to employees in partnership with industry. To that end, the National Governor's Association (NGA), using foundation support, set up a State literacy exchange in late 1989.<sup>95</sup> Among other things, the project will annually survey the States, provide technical assistance, and convene conferences on State literacy activities. The Governors and NGA are also defining alternative State options for enhancing workplace excellence through partnerships with business, labor, and education.<sup>96</sup>

#### Research and Dissemination Needs

There will be a continuing need for research on workplace basic skills programs, with dissemination of best practices to industry and the educational community. It seems clear that the traditional model for adult basic education or GED preparation needs to be refocused when applied to the workplace.<sup>97</sup> But it is also true that workplace programs can become too narrowly focused on the specific tasks required at work. There is not yet a consensus about how to offer a continuum of instruction that builds workplace specific skills while also developing more general skills.

Much of what is known about workplace basic skills comes from federally supported research, principally aimed at developing effective training methods for military personnel. While some findings from the military research are directly relevant to the private sector, more research needs to be focused solely on the civilian workforce. Given the new mix in workforce demography, rapidly chang-

ing technology, and new strategies for organizing work, what *is known* now about the most effective approaches needs to be effectively disseminated to practitioners in industry and government.

The military aside, little research is conducted on the factors contributing to successor failure in adult basic skills projects. Only about 1 percent of Federal Adult Education Act funds went to research in fiscal year 1990, for example. Moreover, from 1975 to 1988, no AEA funds were available for national programs, a key source of funds for basic education research, evaluation, and dissemination.

In 1990, the Department of Education, in conjunction with the Departments of Labor and Health and Human Services, announced a competition for an adult literacy center that would go part way toward accomplishing these needs. However, funding for the center (about \$10 million over 5 years) is modest. Far higher levels of funding for basic skills research and dissemination have been proposed. One recent study, for example, called for a \$30 million center, with \$10 million devoted to research, \$10 million for technical assistance, and \$10 million for monitoring basic skills levels 'and undertaking analyses useful for policy formulation.'<sup>98</sup> The study also recommended an additional \$7 million in research funds by the departments of Labor, Education, and Health and Human Services (which now administers one of the largest basic skills programs through the JOBS program). Another approach might be to target a portion (say 1 percent) of all Federal funding for basic skills programs to research and development; if total Federal funds were \$1 billion per year, R&D would be about \$10 million.<sup>99</sup>

More emphasis might also be given to evaluation and dissemination of best-practice information on the use of instructional technology in basic-skills programs. Several mechanisms for information dissemination, including clearinghouses and shared efforts such as the previously mentioned National Basic Skills Consortium either exist or are in

<sup>95</sup>National Governors' Association News Release, Dec. 7, 1989, "Governors to Establish State Literacy Exchange."

<sup>96</sup>National Governors' Association, *Excellence at Work: The Issues*, Washington D.C., 1990.

<sup>97</sup>To some extent this is happening on its own. For example, in one Alabama community, companies are providing job-specific materials that are used in basic skills and GED programs their workers are taking. See Carnevale et al., *Workplace Basics Training Manual*, op cit., footnote 86, p. C.3.

<sup>98</sup>*Jump Start: The Federal Role in Adult Literacy*, Op cit., footnote 84, p. 24.

<sup>99</sup>The possibility of setting a 1 percent investment goal for total national spending on education research (including Federal, State, local, and private sector funds) is discussed in *Preliminary Staff Report on Education Research, Development and Dissemination: Reclaiming A Vision of the Federal Role for the 1990s and Beyond*, Committee Print prepared for the Subcommittee on Select Education of the House Committee on Education and Labor, 1989, pp. 9-10.

formation. With sufficient support, these mechanisms could work to improve the application of instructional technology in basic skills projects.

#### A Concluding Note

Workers with strong basic skills are needed at all levels within the economy. Yet, today, employers are finding that an alarming fraction of workers cannot read, write, compute, or comprehend at a high school level. In the past, workers without strong basic skills may have had limited choices in terms of their own career choices, but few companies had difficulty in finding enough qualified workers. With an increasing number of countries possessing highly educated workforces, basic skills issues must now be considered in a broader context.

Ultimately, it is the responsibility of the public education system—not employers or the training community—to prepare young people with a foundation of skills needed for their worklives. The foundation of skills young people need includes not only the traditional Three-Rs, but also an evolving set of broader competencies (such as **the social skills** needed to function within workteams) **that** employers increasingly use. While the U.S. educational system is now undergoing substantial reforms, it will take years for the effects of reform to be reflected in the workforce. In the meantime, considerable resources must be focused on developing and enhancing the basic skills of people at work today.