

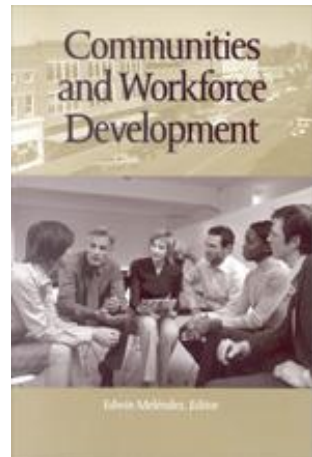
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Upjohn Institute Press

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# Workforce Development in the Information Technology Age

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Chapter 6 (pp. 191-212) in:  
**Communities and Workforce Development**  
Edwin Meléndez, ed.  
Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2004  
DOI: 10.17848/9781417596317.ch6

# 6

## Workforce Development in the Information Technology Age

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Over the latter half of the twentieth century, workforce development policy in the United States aimed at enhancing the employment and earnings of low-income and less-educated workers.<sup>1</sup> Although these efforts have met with mixed success, the rise of new information technologies in the economy presents new challenges and opportunities for workforce development policy.

The expansion of the knowledge-based economy in the late 1990s increased demand for labor in all sectors, but the skill sets required for these jobs also increased, leaving many low-skill workers on the outside of the “new economy” (Autor, Katz, and Krueger 1998). In the information technology (IT) world of today, job skill requirements seem to change much more rapidly than in the past, which adds to the difficulty of getting low-skill job seekers into employment. Thus, the ability of workforce development institutions to link disadvantaged workers to jobs in the IT sector is likely to rest on their ability to adapt to and train for the changing skill dynamics of IT jobs.

Is there a demand for workers in IT jobs? If so, can past and current workforce development practice successfully connect low-skill workers to growing employment opportunities in IT? And if it cannot, what are the “best practices” found in workforce development that can accomplish this? This chapter seeks to answer these questions by examining the demand for workers and the rising skill requirements in IT jobs, by evaluating whether current workforce policy is positioned to meet the growing labor market needs in the IT sector, and by investigating how workforce development policy can help low-skill workers overcome barriers in the new economy labor market.

The need for workforce development institutions to successfully place low-skill workers in IT jobs cannot be overstated. For too long, workforce development has been viewed as part of social welfare policy or as programs of last resort for disadvantaged workers. This view has probably influenced or reinforced employer perceptions that workforce development programs are poverty programs, and as such are irrelevant to their labor supply needs. To the extent such policy and programs can successfully integrate low-skill workers into the IT sector, they will be seen as a key part of national economic development policy. Lessons drawn from the successes should prove particularly useful during continued implementation of the Workforce Investment Act (WIA) of 1998.

## **THE DEMAND FOR WORKERS AND SKILL IN IT JOBS**

In order to analyze the demand for IT workers, it is necessary to first define IT. Although IT is a broad term, the U.S. Department of Commerce aptly defines it as “the infrastructure and knowledge that [are] necessary to market information [that is] readily available” (U.S. Department of Commerce 1999a, p. 3). IT positions include technical support, network administration, Web page design, software development, 3-D animation, digital video editing and mapping, hardware repair and maintenance, and database management and design. While IT jobs are heavily concentrated in high-tech sectors such as the computer industry, they have become integrated into most sectors of the economy, most notably the financial and health industries. It is estimated that by 2006 almost half of the nation’s workforce will be employed by industries and in jobs that are either major producers or users of information technology products and services (U.S. Department of Commerce 1999b).

### **Growth in IT Jobs, Shortage of IT Workers**

Jobs in the IT sector are growing rapidly. According to reports from the Commerce Department (2000) and the Information Technology Association of America (2000), between 1998 and 2000 the number of people working in IT-producing industries, or in IT occupations in non-high-tech industries, increased from 7.4 million to about 10 million (a

35 percent increase). At the end of 2000, such workers accounted for between 7 and 8 percent of the nation's workforce, up from between 4 and 5 percent in the mid 1990s.<sup>2</sup>

But many jobs in IT sectors and occupations are left unfilled at any given time. According to the 2000 Information Technology Association of America (ITAA) study, it was expected that about 840,000 of the anticipated 1.6 million newly created jobs in IT would go unfilled.<sup>3</sup> The overall vacancy rate for IT jobs was 8.4 percent, notably higher than the rate of 5 or 6 percent for the general economy during a typical economic expansion (Holzer 1994). This shortage hurts the prosperity of companies and of the economy as a whole. Recent studies on the crisis in filling IT service and support positions indicate that the shortage of IT workers has cost companies money through increased expenses such as overtime, lost revenue, and lowered profits, to the amount of \$33.4 billion in 1999 (Computer Technology Industry Association 1999; U.S. Department of Commerce 2000; ITAA 2000). These results suggest that there is substantial unmet demand for IT jobs and a strong incentive for companies to connect with workforce development organizations and institutions to meet their labor supply needs.

The difficulty in filling IT jobs is in part related to the economic expansion of the late 1990s, which generated some of the lowest unemployment rates in 30 years. Though the labor market has loosened somewhat during the past three years, its earlier tightness, with unemployment rates hovering between 4.1 and 4.5 percent in 2000 and 2001, left few workers available to fill vacant IT jobs (U.S. Bureau of Labor Statistics 2000, 2001). However, even in a robust economy, there are demographic groups that experience labor market difficulties. The unemployment rate of African Americans (8.6 percent) and Latinos (6.3 percent) in March 2001 was still two to three times as high as that of whites (3.7 percent) (U.S. Bureau of Labor Statistics 2001). Yet it is precisely these groups that, if properly trained, can fill a significant percentage of vacant jobs in the IT sector. Indeed, the National Science Foundation (NSF) Commission for the Advancement of Women and Minorities in Science, Engineering and Technology Development reports that the shortage of high-tech workers could halt sustained economic growth unless more minorities and women are trained for these positions (NSF 2000). Community-based organizations (CBOs) and many community colleges are in an advantageous position to play an intermediary role of

helping these workers acquire IT jobs because they have strong connections to inner city and minority communities.

### **The Skill Requirements of IT Jobs**

The need for skills, on both the demand and the supply side of the labor market, challenges workforce development institutions trying to match disadvantaged workers with IT jobs. On the demand side, skill requirements for IT employment tend to be higher than for the overall job market. The U.S. Commerce Department (1999a) estimates that about 60 percent of core IT jobs require at least a college degree, while only 25 percent of jobs outside of this sector require a college degree.<sup>4</sup> Moreover, the skill requirements of jobs, in particular regarding the use of computers, are changing rapidly. Research indicates that in 1984, 25.1 percent of all workers in the United States used a computer at work (Autor, Katz, and Krueger 1998). By 2000, this figure had risen to 68 percent, representing a 170 percent increase since 1984 (Heldrich Center for Workforce Development 2000).<sup>5</sup>

Although skill requirements do appear to be higher in IT jobs, about 40 percent of IT employment does not require a college degree. These non-four-year-college jobs (e.g., telecommunications installer) often require a certificate of training but are positions that workforce development institutions could realistically and successfully train low-skill workers to fill. In order to capitalize on such training opportunities, workforce development institutions must become more strategic in their efforts by researching IT jobs to determine their skill requirements and by orienting training toward those jobs that are a good fit with the interests and abilities of low-income, low-skill workers.

On the supply side, the ability of workforce development institutions to groom disadvantaged workers for IT jobs is hampered by their lack of access to technology. The U.S. Commerce Department (1995) reports that individuals have unequal access to computer technologies according to their income, race, and education. For example, from 1994 to 1998, the gap in computer ownership between whites and African Americans grew by 39.3 percent.<sup>6</sup> Similarly increasing gaps in computer ownership and Internet access are found between rich and poor and between those with college degrees and those without high school diplomas (U.S. Department of Commerce 1999a). These data indicate

that historical inequities dividing the nation, characterized by race and poverty, are the very ones along which the digital divide has opened.

## **THE RECORD OF WORKFORCE DEVELOPMENT POLICY**

Can workforce development policy and institutions meet the challenges of placing low-skill workers in a growing number of IT jobs? To answer this question, we must examine the record of past workforce development policies and programs. Over the past 25 years, three programs have largely governed workforce development policy. First came the Comprehensive Employment and Training Act (CETA), from 1973 to 1982, then the Job Training Partnership Act (JTPA), from 1982 to 1998, and, most recently, the Workforce Investment Act of 1998, which took effect in July 2000. The primary objective of these statutes has been to increase the employment, earnings, and retention of disadvantaged and dislocated workers. Although a diverse array of programs has been implemented under these policy regimes, a closer look reveals that there are two broad employment and training models that have been tried: stand-alone basic education, and quick employment—or work first.<sup>7</sup>

### **The Basic Education Approach**

Basic education was the dominant approach to employment and training under CETA and during the early years of JTPA. In this model, programs sought to remedy the lack of basic skills of disadvantaged workers by providing classroom training in basic subjects such as reading, writing, and math. With an objective of enhancing skills, many programs focused on helping program participants achieve their high school diploma or equivalency degree (the GED). The underlying philosophy of this training model is that education and skills are the chief determinants of an individual's future employment and earnings.<sup>8</sup>

Although this approach seemed sound in labor economic theory, evaluations of these basic education and training programs, such as the Work Incentive (WIN) program, indicated only a small impact on participants' employment, wages, or job retention. Where significant wage increases were found for program participants, few of the wage gains

were attributable to enhanced skills development; most were due to longer hours worked by program participants (Strawn 1998; U.S. Department of Labor 1995).

There are several reasons basic education programs of the past failed to improve the employment, earnings, and retention of disadvantaged workers. These include the stigmatization of program participants by employers, the short duration of training programs, the lack of relevant skills training, and a disconnect between training programs and employers. Many employers were unwilling to hire program graduates because they viewed these programs as poverty—not training—programs. They were skeptical of the skills and productivity of program graduates and therefore viewed them as irrelevant to their labor needs (Harrison and Weiss 1998; Blank 1997; LaLonde 1995; Manski and Garfinkel 1992). Still, some training programs that used the basic education model were successful in connecting disadvantaged workers to jobs. Successful programs often had close ties to employers. As a result, on-the-job training and job search assistance were based on relevant and up-to-date information from employers (U.S. Department of Labor 1995).

### **The Work First Approach**

During the last 10 years of the JTPA program, following the passage of the Family Support Act in 1988 (which included implementation of the Job Opportunities and Basic Skills [JOBS] program), there was a shift in employment training from centering on basic education and training to focusing more on job search assistance, work experience, and other employment related services. This approach, reinforced and expanded upon after welfare reform in 1996, has become known as the “work first” model. The work first model concentrates on giving participants rapid entry into the labor market by providing short-term training in employment enhancing activities and direct job search assistance, such as help with finding work, writing resumes, and training for interviews. The philosophy supporting the work first strategy is that social or “soft” skills (i.e., punctuality, dress, speech, workplace norms, etc.), knowledge of successful job search strategies, and quick entry into employment are important for obtaining a job and gaining work experience and on-the-job training to find better employment.

The evaluation evidence on work first training programs indicates that in the short term (i.e., one to two years) such programs have a greater impact on participants' employment and wages than the stand-alone basic education efforts. As was found with the basic education models, these work first programs increased earnings through more hours worked, rather than through higher wages (Friedlander and Burtless 1995; Kempel and Haimson 1994). However, the initial increase in the employment and earnings of participants in work first programs disappeared in subsequent years. How quickly and to what extent these program effects fade seems to depend on program design. The effects seem to fade most quickly in low-cost, job-search-only programs, called quick employment programs. However, work first programs that use a mixed approach to training by treating program participants to a full range of employment and training services, including skill development and basic education, in addition to sponsoring job search and soft skills training, have larger and longer-lasting program impacts (Strawn 1998; U.S. Department of Labor 1995). For example, Greater Avenues to Independence (GAIN) programs in Riverside and San Diego, which used a mixed approach to training that included work first and basic education components, sustained employment and wage increases for participants over a five-year period, whereas the employment and earnings of their control group peers who only received job search assistance diminished quickly after the first year of treatment (Strawn 1998; U.S. Department of Labor 1995).

While the mixed approach to work first training had longer lasting employment and wage effects than did quick employment programs, most programs failed to raise job retention rates of participants very much. The few exceptions are programs that combine employer-based training in relevant job skills with basic education, soft skills training and post-employment assistance (Strawn 1998). The evaluation literature clearly indicates that work first programs that focus only on quick employment strategies fail to increase the employment, earnings and retention of participants over the long run. This can be partly attributed to placements in mostly low-wage jobs that are unlikely to provide on-the-job training and advancement potential (Osterman 1995).



## **Implications for IT: Lessons Learned from the Basic Education and Work First Training Models**

Workforce development experience offers some lessons about the potential applicability of basic education and work first training models to workforce development efforts geared toward IT jobs. Given the heightened skill requirements for IT jobs, programs that rely on work first models, which move low-skill workers quickly to work without first providing hard skills training, may have limited worth. Likewise, programs that use a basic education approach are disconnected from employers and lack relevant skills training, so they also may have limited success in linking low-skill workers to IT jobs. However, programs that provide training in concrete and relevant skills, that make connections to employers, and that give attention to post-employment assistance stand a chance of being much more successful. Moreover, job search assistance and soft skills training exercises seem to be effective workforce development practices when, and only when, they are used as complementary activities to hard skills training.

### **BEST PRACTICES IN WORKFORCE DEVELOPMENT**

In response to the limited success of previous workforce development programs, a number of organizations have begun to experiment with different strategies and practices to improve the employment and earnings of low-skill workers. What are these practices, and do they promise to be successful in training low-skill workers for the dynamic IT sector?<sup>9</sup> An examination of the workforce development literature revealed best practices that often can accomplish this. These include employer links, relevant and timely skills training, a mixed approach to training, community colleges, flexibility and responsiveness, networking and collaboration among training providers, and post-employment assistance. We shall look at each of them in turn.

#### **Employer Links**

Not surprisingly, programs with links to employers have more success in placing program participants, in raising their wages, and in in-

creasing their job retention than programs without connections to employers. In one example, CBOs contracted with San Francisco Works, a Welfare-to-Work, public-private partnership, to train welfare recipients for employment in the health and financial technologies areas. These CBOs had more success in placing program participants when employers were involved in the training process than when they were not involved (Bliss 2000). Beyond that, organizations in the IT sector that have shown large program impacts on participants' labor market outcomes, such as the Center for Employment and Training in San José, California, have employer involvement as a central component of their training design (Meléndez and Harrison 1998).

A number of factors explain the increased success of training programs that rely on employer involvement. First, training providers who deal with employers are more likely to have current information on work standards, skill requirements, and state-of-the-art technologies. Second, these relationships often lead to employer buy-in. Thus, training agencies with which employers are involved find themselves in the enviable position of being able to negotiate with employers over placing program participants, assisting them after employment, and altering training approaches. The Denver Workforce Initiative (one of the Annie E. Casey Foundation's Jobs Initiative sites), created a workplace curriculum for managers of companies involved with training providers. The curriculum helped managers understand workplace issues from the perspective of disadvantaged workers. This insight has led them to institute workplace policies such as transit assistance and to change cultural norms at work in ways that help low-skill workers stay employed at the firm longer, such as by supporting English as a Second Language (ESL) courses (Annie E. Casey Foundation 2000).

Third, such programs provide employers with incentives to hire program participants. Employers involved in training programs typically reduce their search and training costs because of greater access to an appropriately trained labor supply.<sup>10</sup> Thus, all of these factors tend to lead to greater placement and employment rates, wages, and retention for participants trained in programs with employer involvement. At the same time, firms that participate in external training programs also benefit through increased productivity, increased profits because of lower search and training costs, and greater retention of employees (U.S. Department of Labor 1996).

Employer involvement is accomplished in a variety of ways. The Bay Area Video Coalition (BAVC), a media arts center in San Francisco that successfully trains participants in multimedia and Web design, strategically uses its advisory board—made up of elected officials, members of community organizations, and industry executives—to gain access to employers (Chapple et al. 2000). Some local governments, such as the cities of Berkeley and Portland, use “first source hiring” strategies to bring employment opportunities to disadvantaged workers. They negotiate with businesses for access to job opportunities in exchange for development incentives (such as loans and tax abatements) (Molina 1998). Some organizations use sectoral strategies to target training at a cluster of jobs and employers in growth occupations and industries in the region (Annie E. Casey Foundation 2000). Others target IT jobs specifically. (Project Quest, a successful training program in San Antonio created by the Industrial Areas Foundation and two CBOs, focuses on specialized occupations in environmental technologies, financial services, and health care [Lautsch and Osterman 1998].) To achieve a narrow focus, some organizations conduct analyses of growth industries using labor market data on the region, and some hire job developers to directly approach firms to discuss the benefits of involvement with external training organizations (Annie E. Casey Foundation 2000).

Employer involvement is also uneven. Larger firms and firms with more resources are much more likely to participate than smaller and resource-poor firms, in part because of economies of scale: the former usually have personnel or expertise available to help facilitate their participation in external training programs (U.S. Department of Labor 1996). In addition, firms with unmet labor needs are much more likely to participate than those with fewer labor supply problems, for obvious reasons (Holzer 1999). Tucker Technology, a national, minority-owned telecommunications installation and maintenance company based in Oakland, California, faced severe labor shortages as a result of the explosive growth in fax machines, cellular phones, and Internet hook-ups. To satisfy its labor needs, the company formed links with CBOs throughout the country. They in turn designed and customized telecommunications installation training curricula for low-income community participants (Caggiano 1999).

## **Relevant and Timely Skills Training**

Given the pace at which required skills and tasks in IT jobs change, relevant and timely skills training seems mandatory to successfully place and keep low-skill workers in IT jobs. But actual training in relevant skills has been absent from previous employment and training models, especially those that follow work first strategies. In large part, employer involvement in training will help agencies fill this absence and accomplish relevant and timely training. Another way to accomplish it is to contract with other agencies that have track records of successfully training workers in relevant skills. In the Casey Foundation's St. Louis Jobs Initiative, the Better Family Life (BFL) organization, which was responsible for coordinating training efforts as part of this initiative, asked St. Louis Community College to conduct its training because of the college's success at leading training in the past and its larger facilities and better equipment. This led to the creation of WorkLink, a program whereby BFL concentrates on soft skill and other pre-employment training while the community college trains the hard skill set (Annie E. Casey Foundation 2000).

The establishment of standardized curricula for various skill sets is another way to effectively train workers in relevant skills. Mature occupations are usually defined by skills standards, which are used to establish consistent information about the set of skills required for a particular job. The National Skills Standards Board defines these standards as "performance specifications that identify the knowledge, skills and abilities an individual needs to succeed in the workplace" (Northwest Center for Emerging Technologies 1999, p. 4). Hence, standards allow employers, trainers, and educational institutes to determine the exact skill requirements of jobs. Once established, standards allow job trainers to develop curricula to train workers in specific skills, and by definition such training should produce somewhat consistent skill outcomes across different training sites. This consistency of training allows programs to certify their program graduates, which plays two roles: it provides employers certainty about the bundle of skills that the potential worker possesses, and it also provides the potential worker with a marketable credential.

Job trainers in IT need to become familiar with IT skill standards, and standards must be updated regularly to keep up with the rapidly

changing skill requirements of IT professions. There are a number of organizations that are establishing these standards. A national leader in creating standards in IT is the Northwest Center for Emerging Technologies (NWCET). Many institutions offer general or vendor-specific programs that lead to certification in an array of IT skills. For example, the Computer Technology Industry Association (CompTIA) offers a program on computer repair and maintenance that leads to an A+ certification. It has trained nearly 180,000 workers worldwide (CompTIA 1999).

The timing of skills training also matters to success. The literature indicates that training in hard as well as soft skills *before* job placement produces the greatest positive effect on job retention. San Francisco Works found that instruction in hard skills such as computer training for jobs in the financial and banking sector before employment or internship placements produced longer job retention rates for participants than when it occurred simultaneously with work (Bliss 2000). Presumably, training before placement led to greater familiarity with the computer skills and components, which in turn fostered greater confidence and ability on the subsequent job. This lesson contrasts sharply with the philosophy of work first, which attempts to move participants quickly into jobs and to rely on on-the-job training and job experience to train them.

### **Mixed Approach to Training**

Work first employment programs clearly show that assistance in job search and training in workplace norms and customs is an important component of training, particularly for those participants who have been out of the labor force for long periods of time. A 1995 study by the U.S. Department of Labor (USDOL) indicates that successful training programs are ones that include soft skills training in addition to job-specific hard skills. The Casey Foundation's New Orleans Jobs Initiative (NOJI) has followed this strategy and gotten positive preliminary program results. Participants receive technical skills training and pre-employment and soft skills training, which teaches workplace codes (Annie E. Casey Foundation 2000). Welfare-to-Work programs such as Riverside's GAIN program, Florida's Family Transition Program and

the Baltimore Options program also follow this balanced approach with signs of success (Strawn 1998).

### **Community Colleges: Flexibility and Responsiveness**

Partnerships with community colleges will be increasingly important in workforce development, particularly in IT jobs. Community colleges have more capacity and resources than smaller job training sites or CBOs, which have traditionally served the disadvantaged. In fact, under the WIA there are great incentives for community colleges to play this role. To what extent they do so will be determined by a number of factors. It will depend on how far such institutions succeed in streamlining their policies and procedures with regard to changes in curricula, programs, and degrees or certificates; in increasing their funding base for training equipment; in connecting with industry to determine the appropriate and skill sets for which they should train; and in reaching out to CBOs to increase their potential client or student base (Lerman, Riegg, and Salzman 2000; Brewer and Gray 1997; Grubb 1996).

Community colleges can also play a big role in providing hard skills training for IT jobs. However, in order for this to occur, changes must be made both at the administrative level to streamline the bureaucratic process and bolster funding, and at the practical level by reaching out to industry. For example, NOJI is a collaboration of CBOs (such as the Citywide Tenement Group and All Congregations Together, a faith-based group), a local community college, businesses, and foundations. The community college is responsible for the technical skills training. To design the best training curriculum, the college worked closely with employers to determine industry standards. In addition, NOJI convinced policymakers and community college administrators to invest \$65,000 in state-of-the-art machinery for its enrollees to use in training (Annie E. Casey Foundation 2000). These changes in responsiveness by the administration at the community college are illustrative of the kind of flexibility colleges must exhibit in order to make themselves part of the engine of economic growth in local economies.

## Networking and Collaboration among Training Providers

No single organization usually has the internal capacity (size, resources, equipment, facilities, access to clients, and expertise) to complete the training process from beginning to end; thus, collaboration is necessary for success. Even when organizations appear to be encroaching on one another's "territory," either in geographic or program areas; collaboration may be effective (Harrison and Weiss 1998).

There are a number of examples that illustrate this. In both the St. Louis and the New Orleans jobs initiatives, CBOs and community colleges partner to accomplish their training goals. In both cases, community colleges conduct the hard skills training because oftentimes the CBOs do not have the expertise, the capacity or the resources and equipment to conduct the training themselves. However, the community colleges gain from these partnerships as well. They benefit from the additional participants referred to them from these CBOs, which usually have deep roots in disadvantaged communities, and from the additional soft skill training that CBOs conduct (Annie E. Casey Foundation 2000).

Such partnerships are also likely to benefit community technology centers (CTCs). Many CTCs are publicly funded organizations designed to close the digital divide by making computers and the Internet accessible to individuals in low-income and minority communities. Although their primary purpose is to provide access to technology, many CTCs, such as the Community Technology and Training Centers (CTTC) in Austin, Texas, are moving into more formal technical training for IT jobs (Chapple et al. 2000). To do this, they are partnering with larger training institutions, such as community colleges, because of their size and expertise. As these programs evolve, and as their training goals grow to include soft skills training, many CTCs presumably will look to partner with CBOs that have expertise in conducting such training.

These evolutions suggest the need for more regionally based coordinating agencies, which can facilitate networking and partnering among workforce development institutions. For example, Workplace Incorporated provides workforce development by coordinating job training, employment, and education services in the Bridgeport-Stamford region of Connecticut. It brings together community colleges, technical institutes and CBOs to train workers in computer repair and in computer-re-



lated design and drafting (U.S. Department of Commerce 1999a). Some CBOs are also playing this role, though perhaps not explicitly. The New Community Corporation in Newark, New Jersey, one of the largest community development corporations in the United States, brings together a variety of interests including corporate, education, and trade union representatives from throughout the region who help one another accomplish their employment and training goals (Harrison and Weiss 1998).

### **Post-Employment Assistance**

Post-employment assistance can help participants learn new skills quickly and continuously, so as to keep pace with the rapid changes in task requirements in IT jobs. Post-employment programs can be located either at the worksite or at an external training institution. Research indicates that such programs are particularly effective when developed in conjunction with employers and that they are sensitive to specific workplace dynamics (Bliss 2000). In post-employment assistance, whether it takes the form of on-the-job training or formal apprenticeship programs, employers provide continued instruction in job skills. The Cooperative Health Care Network offers both in-service training and career upgrading programs to its graduates, with the objective of strengthening or updating skills for the current job or facilitating career advancement (Strawn 1998).

Post-employment assistance is most effective when it addresses the entire range of issues that confront disadvantaged workers. Indeed, this form of assistance is particularly important for reducing absenteeism and increasing job retention. Recent research indicates that 64 percent of the absenteeism problems of welfare recipients stem from child care and transportation problems (Holzer and Stoll 2001). To address these kinds of issues, the Chicago Commons Employment and Training Center provides comprehensive on-site support services, transportation assistance, and child care for its program graduates (Strawn 1998).

Another post-employment service some programs offer is the provision of mentors. Mentors give program graduates a point of contact for raising concerns, seeking advice, asking questions, and resolving conflicts at work. Though no studies have been conducted to assess whether such programs improve job retention and mobility, anecdotal



evidence from San Francisco Works strongly suggests that such an approach is effective at lengthening participants' job tenure (Bliss 2000). One strategy is to use senior program graduates as mentors for recent graduates. In the St. Louis Jobs Initiative, program graduates who have stayed in a job for at least six months are asked to become program alumni, which entails assuming mentoring responsibility for current or recent program graduates (Annie E. Casey Foundation 2000). Some programs approach personnel in firms where graduates are placed and ask them to become mentors to the graduates. Many of the businesses that partnered with San Francisco Works matched employee volunteer mentors with San Francisco Works' program graduates.

## CONCLUSION

The growth in demand for IT workers and the rise of innovative workforce development practices suggests there is great hope that new training institutions can play a large role in linking low-skill disadvantaged workers to IT jobs. But the rising and changing skill requirements of IT jobs present challenges in doing so.

This analysis reveals a number of lessons for workforce development practice. To be successful at placing low-skill workers in IT jobs, workforce development institutions must first move away from ineffective employment training models. Neither basic education training programs, which are disconnected from employers and lack relevant skill training, nor work first models, which move workers quickly to work without skills training, are likely to work in this new, skills-driven economy. Instead, workforce development institutions must become more focused on a mixed training approach that blends hard and soft skills. But in order to do so effectively, such institutions must be able to identify relevant jobs and skills in the IT sector for which they can realistically and effectively train low-skill workers. And, to the extent possible, they must include lifelong learning components to continuously upgrade the skills of participants. They must also be sufficiently connected to the IT sector to gain information quickly about the changing skills required for jobs and adapt in a reasonable amount of time to satisfy those new skill demands.

Likewise, workforce development systems must be dynamic and flexible in order to quickly respond to technology and changing skill characteristics of IT jobs. This includes adopting innovative practices such as establishing employer links, providing relevant and timely skills training, using a mixed approach to training, strategically networking with other training institutions, and instituting post-employment assistance. To the extent that institutions can bring about these changes, they should have success at continuing their mission of providing labor market opportunities for low-skill workers and should become key and valued players in the IT sector.

There is great hope that such practices can be promoted and instituted on a national scale under WIA. When it replaced JTPA as the main federal policy guiding workforce development, it mandated integration of national and state job training programs, reduced the number of funding streams from 70 to 3, and consolidated a patchwork of some 60 federal job training programs that had been generated over the past six decades. WIA is an ambitious attempt to rewrite and make sense of a wide variety of federal job training programs. In concept, it provides considerable flexibility in the provision of training services by creating a set of performance standards and by providing opportunities for trainers to understand the needs of industry in the local labor market. Such policy and program characteristics hold promise, since they promote flexibility and industry responsiveness. To what extent that promise can be realized under WIA would seem to depend on WIA's capacity to do three things: avoid undue influence by work first training models, obtain sufficient federal and state funding for training providers to offer relevant skills training, and foster a sharing of information and resources between business and training providers. Successful models exist to point the way.

## Notes

The author would like to thank PolicyLink for its generous support of this project.

1. The term *workforce development* is used to describe those public policies (such as contained in the federal government's Job Training and Partnership Act) and nonprofit institutions (such as community-based organizations, other not-for-profits, and community colleges) that aim to improve the skills and therefore the labor market outcomes of disadvantaged workers in the United States, including the less educated, welfare recipients, dislocated workers, and disadvantaged youth. Although much of the coordination of workforce development has historically emanated from the federal government, increasingly state and local governments and private foundations, among others, are helping to shape workforce development in the United States.
2. Reports from the U.S. Department of Housing and Urban Development (2000) and the U.S. Department of Labor (1999) also confirm this trend. In fact, the U.S. Department of Housing and Urban Development estimates that in the largest 101 metropolitan areas in the United States from 1992 to 1997, high-tech jobs grew at a much faster pace (31.2 percent) than overall job growth (13.6 percent).
3. This estimate compares favorably to earlier studies of more limited IT occupations, which indicate that about 346,000 vacancies are anticipated, using a sample of for-profit companies with more than 100 employees (ITAA 1998).
4. This estimate of the percentage of jobs in the general economy that require a college degree is fairly consistent with recent data from other representative employer surveys, which show that about 20 percent of all jobs in the economy require at least a college degree (see Holzer 1996).
5. Both studies rely on Current Population Survey data from the National Bureau of Economic Research, collected in response to the same survey question.
6. This widening gap occurred even though computer ownership by African Americans grew at a faster rate, more than doubling from 10.3 percent in 1994 to 23.2 percent in 1998. Ownership among whites grew from 27.1 to 46.6 percent during that period.
7. The division of workforce development models into basic education and work first has also been noted in other studies (see, for example, Strawn 1998; U.S. Department of Labor 1995; Grubb 1995).
8. These ideas were in part influenced by the development of human capital theory in economics (see, for example, Becker [1964] for a discussion of these ideas).
9. In reviewing this literature, a broad base of training organizations was examined. It included, among others, CBOs, community technology centers, community colleges, and public and private initiatives and training intermediaries. This discussion highlights a number of promising practices. However, the coverage of these practices should not be viewed as exhaustive, but rather as representative of some of the more important practices that are likely to be particularly useful to agencies as they train workers for the dynamic IT sector. Moreover, these

practices should not be viewed as mutually exclusive: some practices may serve dual purposes, and many organizations incorporate more than one practice into their training programs and strategies.

10. Employers spend a nontrivial amount of money to keep any one low-skill job filled, particularly when one factors in the high turnover rates that are characteristic of these jobs. Research indicates that employers' search costs for low to semiskilled workers average between \$300 and \$1,500, depending on how difficult it is to find appropriate labor, and that training costs for these workers range from \$700 to \$3,000, depending on the type of training required (Frazis et al. 1998; Bishop 1994).

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# **Communities and Workforce Development**

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*Editor*

2004

W.E. Upjohn Institute for Employment Research  
Kalamazoo, Michigan



**Library of Congress Cataloging-in-Publication Data**

Communities and workforce development / Edwin Meléndez, editor  
p. cm.

Includes bibliographical references and index.

ISBN 0-88099-316-2 (pbk. : alk. paper) — ISBN 0-88099-317-0  
(hardcover : alk. paper)

1. Occupational training—United States. 2. Employees—Training of—United States.  
3. Welfare recipients—Employment—United States. 4. Public welfare—Government  
policy—United States. I. Meléndez, Edwin

HD5715.2.C613 2004

331.25'92'0973—dc22

2004025118

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300 S. Westnedge Avenue  
Kalamazoo, Michigan 49007-4686

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Cover design by Alcorn Publication Design.  
Index prepared by Diane Worden.  
Printed in the United States of America.  
Printed on recycled paper.