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# Improving Education and Training for Economic Development

*Joan McRae Stoia*

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*This article explores the connections between workforce quality and economic prosperity, as well as the role of the Massachusetts education and training system, in developing and preserving that quality and supporting the state's key industries. It includes a review of the most recent employment trend and projection data available from the Massachusetts Department of Employment and Training, information about several business-based workplace education models, and a discussion of the specific education and training needs of workers across the age/skill continuum. For the purpose of this discussion, the education and training system are broadly defined to include existing public, private, and quasi-public agencies and programs, educational institutions, and independent business and community efforts.*

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**T**wice during the past fifteen years, the Massachusetts economy has struggled through periods marked by the decline and disappearance of key elements within its manufacturing sector accompanied by tremendous job losses, particularly among older workers. In the late 1970s, many experts and policymakers viewed what was occurring as an inevitable shakeout among hundred-year-old industries that were no longer either competitive or relevant to the state's new economic destiny. The terms used to describe what was happening — “evolution” and “restructuring” — reflected a belief that the changes, though tragic for individual workers, were natural, inevitable, and of a kind Americans had experienced previously. It made sense, this old making way for the new. Even if we had not actually seen it coming, when faced with the need to change we would simply substitute a new generation of goods and services produced in high-tech environments with smarter workers. At least two assumptions informing that response have proved to be false: one, that there would always be enough qualified people to satisfy our manpower needs, and two, that it would take a long time for the new industries themselves to become “mature.”

The recession of the early 1990s challenged another assumption — that the new high-tech environments were immune to the kind of disruption experienced by traditional industries. Of the hundreds of thousands of workers to lose their jobs owing to continued restructuring across industries, many were midcareer professionals. Their trou-

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bles are an indicator of how closely global economic forces and the human capital of each individual worker have become intertwined.

A number of innovative programs emerged in the state during the 1980s to ameliorate the suffering of individual workers and stabilize struggling businesses. Programs to help dislocated workers update skills and start new enterprises, to train young people in emerging technologies, to help companies identify sources of new capital, to help the poor become economically self-sufficient, and to create partnerships between businesses and universities formed an education, employment, and training network.

Over a decade later, this loose confederation of schools, employers, government agencies, private contractors, colleges, and universities is still in business. Hard times in the old and uncertainty in the new industries and recurrent periods of contraction and worker dislocation suggest that there are no once-and-for-all solutions to economic problems. We are beginning to realize that there is no particular magic in any one set of industries, but that the answers may be as much in the “who” (workers and managers), the “how” (the way work is organized), and the “where” (a sharply competitive global playing field) as in the “what” (goods and services).

Training and education initiatives that enhance the knowledge base of workers, increase the sophistication of managers, improve quality and productivity, and expand the range of technologies available to businesses are some of the means by which Massachusetts, faced with the worst business climate in a decade, might better manage and ultimately achieve mastery over what we have come to recognize as continual and accelerated industrial change.

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### **Past Trends and Future Directions: A Review of Massachusetts Employment Data**

A comparison of employment figures for 1983–1993 published by the Massachusetts Department of Employment and Training (DET) tell the recent occupational and industrial history of the commonwealth and illustrate some of the challenges it faces.<sup>1</sup>

During the entire period, employment in the state’s traditional manufacturing sector fell by 30 percent. In contrast, high-technology manufacturing and service sector employment grew by 27 and 26 percent, respectively. In 1984 the government began reporting on a new high-technology nonmanufacturing sector in which the number employed increased 28 percent, representing more than 97,000 workers, by 1993.

Between 1983 and the beginning of the last recession, Massachusetts industries performed well, exhibiting a 16.1 percent increase in overall employment. Construction, finance, insurance and real estate, services, and trade posted the largest gains; within services, health was among the strongest performers. Not even the prosperity of the so-called miracle years could alter an overall downward trend in traditional manufacturing. By the late 1980s, the entire state economy, except for services and high-technology nonmanufacturing, was headed in that direction. Overall, about 300,000 jobs were lost during the recession.

According to DET sources, Massachusetts has regained 150,000 jobs in the last eighteen months. Growth among small and midsize companies in the computer software and hardware, subassemblies and components, telecommunications, environmental, and biotechnology industries and successful diversification into these areas by larger firms is responsible for the positive trend.<sup>2</sup> Much of the increase in employment is attributable to the reabsorption of midlevel managers and other high-skill individuals as consultants or “contingent” workers.

The Massachusetts economy relies on two kinds of workers — high-skill “knowledge workers,” whose investment in postsecondary education and training pays high dividends, and low-end service workers, whose jobs require few skills and pay little. Because industries drive jobs, growth in high-technology manufacturing and high-end service industries such as health and business services, as well as pressure for productivity improvements in finance, insurance and real estate, and retail and wholesale trade that use this technology, has created a demand for individuals with sophisticated skills.

In the future, slower job growth is anticipated among most sectors along with further deterioration in traditional manufacturing. Tomorrow’s firms will most likely exercise caution before adding new staff. Cost containment and concerns over future legislative action have already slowed and in some cases had a negative impact on employment in hospital-based health care. However, the aging of the population and continued pressure to reduce overhead are expected to contribute to expansion in non-hospital-based services. Biotechnology, in which a number of firms have cut back on “new discovery” research in favor of commercializing existing products, may eventually be affected by health care reform. Concerns over hazardous waste disposal will fuel the environmental industry, and expansion into foreign markets will further drive telecommunications.

Workers with the highest educational attainment levels will continue to benefit from these trends. The recent, though perhaps relative, success of many knowledge workers at recapturing jobs, either in new cutting-edge industries or in traditional industries seeking cutting-edge strategies for remaining competitive, is indicative of how advanced education and training are functioning as the new “safety net.”

Unfortunately, that net will also be a barrier to those at the other end of the education and skill continuum. Increased productivity, expansion into new markets, and the rapid advance of technology are some of the imperatives operating against unskilled workers whose proficiency levels have not kept pace with industrial change. According to the most recent government projections, few of the job categories that are expected to grow in the next ten to twelve years will be accessible to those without at least a high school education and good reading, writing, and math skills. Women, who are overwhelmingly clustered in slower-growing occupations, and racial minorities, particularly Hispanics, who have been much less apt than whites to complete high school, are more likely than other groups to remain trapped in low-wage jobs. Hispanic workers are concentrated in low-end services as well as in the declining machine operating and assembly occupations.<sup>3</sup>

Education and training are important because they offer a measure of job security, but perhaps more important, greater mobility, which is particularly critical for workers in declining industries, and a better quality of life. On average, workers who complete high school earn \$5,000 a year more than those who do not (\$20,573 vs. \$15,042) and those with a bachelor’s degree earn twice as much (\$32,522). The largest number of new high-wage jobs will be created in professional and managerial categories requiring an average 16.4 years of school.<sup>4</sup>

Change is no longer occasional but constant and, as these projections suggest, has created a two-tier job structure based on investments in human capital. When the investment is made, companies, individual workers, and the larger society benefit. When it is not, all the parties are likely to be affected. It is therefore in the best interests of all three to examine their roles and responsibilities vis-à-vis training and education for economic progress.

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## **Policy and the Projections**

Economists formulate projections on the basis of their analysis of the past and available information about the forces they expect will drive economic events in the future. Projections, positive or negative, are not determinative, but they are useful as a mirror to reflect the consequences of recent economic policies. In formulating employment and training goals as part of a larger economic plan, we should take a hard look at these data and at the questions they raise.

- Do we like the picture presented by the data? What does it say about the future quality of life in the commonwealth?
- To what extent can employment and training policy change the course of these projections?
- How might demographic, regulatory, environmental, and political factors affect business, and with it, projected demand for employees within specific industries and occupations?
- With continuing declines in manufacturing, how realistic is it for older displaced workers to expect ever again to apply their invaluable know-how — experiential, technical, social — in comparable work settings? Should we try to preserve their knowledge?
- What do we know about the inherent volatility of occupations located in areas projected to grow, such as travel and education? How many of the growth occupations listed among the projections rely on consumer behavior or local tax revenues?
- Does postsecondary training in all fields offer the same degree of opportunity or are some fields better than others?
- What about the rise in temporary employment not reflected in these data? As employers struggle to cut costs and retain flexibility, will some occupations involve more part-time/part-year work than others? How will we identify them?
- How will changes in the scale and scope of firms and productivity and quality measures, such as work teams, have an impact on the kinds of jobs required in the future? Do these projections take any of those issues into account?
- To what extent will corporate restructuring and downsizing continue to have an impact on administrative and managerial jobs? What, if anything, can be done to buffer college-educated workers from future layoffs?
- Given the widening gulf between high-skill/higher-wage jobs and low-skill/lower-wage occupations, how much real incentive exists for the economically disadvantaged to reach higher?

- How well do we communicate labor market information to students, trainees, and other job seekers?
- How well do existing linkages between businesses and employment and training (E/T) service providers in education and government work?

Decisions about the specific elements of an employment and training policy — worker retraining, literacy, entrepreneurship programs, and so forth — will ultimately be dictated by the needs of the industries that Massachusetts decides to nurture. However, it is possible to evaluate the current system to determine its capacity to meet continuing workforce development needs and make recommendations as to the amount of government intervention required by both new and traditional industries. One step in the process is to examine the critical issues that affect workers, managers, and the organization of work across target industries. Another is to assess workforce training needs and survey examples of successful public/private training partnerships that address them. Finally, we should learn what we can from those examples to create flexible change and growth-oriented policies that develop more competitive businesses, smarter workers, and a better employment and training infrastructure.

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### **Training and Education Needs of the Employed**

In a nation of immigrants, there have always been basic skill deficiencies and linguistic and cultural diversity among workers. One key difference between past and present is that the way work was formerly organized deliberately compensated for the lack of homogeneity in the labor force. Today, work teams, statistical process control, the need for worker participation in the development of reliable methods, and the size, scale, and complexity of either the goods being produced or the fabrication (or service delivery) process make it impossible to proceed unless everyone is speaking the same language. Language is a useful metaphor for a list of contemporary worker prerequisites ranging from adequate verbal skills, literacy, numeracy, computing, and the ability to operate complex automated systems to a shared vision of an organization's purpose and mission. Organizational culture has been defined as simply "the way we do things around here." Given today's business realities, that will not and cannot ever be the same again.

The most successful organizational cultures will be the ones in which managers are as engaged by the production process as workers, understand and appreciate cultural differences, are result oriented, and view continuous education as an integral part of each person's job. The creation of total learning environments must accompany the development of total quality workplaces.

In turn, employees must also be actively engaged by the work. As with managers, this is not always the case. Old attitudes die hard, but to produce the best goods and services, each member of the enterprise must be prepared to add value and have his or her efforts measured and evaluated in light of the organization's mission and goals and international standards of quality. For many of those who are currently employed, it will not be an easy adjustment to make. Part of the answer to worker motivation will lie in employers' rewarding learning by tying pay increases to measurable increases in skill. Change must be initiated, owned, and managed by individual firms.

E/T initiatives for employed workers should take the following into account:

- While there is no question that Massachusetts possesses an impressive set of training and business support programs, their existence, purpose, and location is not always known to prospective clients. Government needs to catalogue and communicate information about (1) the types of assistance available and (2) the guidelines and regulations for technical assistance. The need for information about English as a second language (ESL) and basic skills programs is particularly pressing.
- Coordination between business clients and service providers is critical. Because it is possible for an employer to require the services of more than one agency, there has to be a method, similar to the case management system in human services, whereby several agencies can work together smoothly at the same site to shield clients from bureaucratic red tape.
- Although economic survival is a powerful motivation, tax incentives for businesses and individual workers may help stimulate and sustain continuous education.
- Joint worker education programs developed at community colleges in partnership with local businesses should be better funded.
- Colleges, universities, and businesses should be encouraged to offer training in so-called soft skills for managers.
- Finally, because the number of companies currently engaged in self-assessment and improvement is woefully small, government should stimulate more business involvement by offering low-cost assessment services and finding additional ways to publicize and reward examples of excellence within each industry.

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### **Training and Education Needs in Declining Industries**

Many of the same concerns affect declining industries, in which workers and firms are under great pressure to survive. Is manufacturing decline inevitable? What conditions cause an individual manufacturer to lose ground, and once identified, can these conditions be reversed?

Clearly, the cost, availability, and preparedness of the workforce are critical factors. In an earlier era, the education system prepared young people from a variety of linguistic and ethnic backgrounds for assembly-line jobs. Whether it continues to support national business objectives or does something else entirely is arguable. Whatever the reason, there is a wide disparity between the basic skills, English language proficiency, and work habits that businesses require and the competence level of many prospective workers. While no comprehensive or vocational high school in the world can produce graduates who are familiar with all the practices of individual firms, there must be more emphasis in school on “learning how to learn on the job.” Learning to add value, to head off problems before they occur, to contribute new ideas, and to adjust to changing circumstances will make it less likely that employees will be laid off in the first place, and easier for them to find new work when layoffs occur.

While employers have legitimate concerns about the basic skills and trainability of workers, it is not clear that they are doing enough to develop their personnel. Once a

firm is on the ropes, it is difficult to influence management's thinking about the value of training. Ironically, troubled firms are precisely those which should make a commitment. Given that the pace of technological change and foreign competition will not go away, management has no other choice than to begin operating differently. Government has both a facilitation and a direct service role in the process. Recommendations for such firms and workers include a mix of government intervention and private sector initiatives.

- Better understanding of the needs of business by the educational system;
- Long-range improvements in elementary and secondary schools that allow employers to get out of the basic-skills business and concentrate on providing firm-specific training and education;
- A buildup of educational resources targeted at firms with the most acute literacy problems, including reading and writing tutorials and English language classes for workers who need them, and programs that help firms assess and prioritize service needs before embarking on a particular course of action;
- Information sharing, reciprocal plant tours, and shared briefings in technical advances in other countries to encourage companies to talk to one another; less concern by businesses about training their workers for the competition;
- Cultivation of new and existing businesses by the state; monitoring conditions and practices inside each of its major industries and faster response to early signs of trouble. Industry should be stewarded like any other renewable resource.

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### **Training and Education Needs of Displaced and Disadvantaged Workers**

Significant barriers to employment among the poor, the uneducated, and the economically disadvantaged and obstacles to the reemployment of displaced workers can be addressed by appropriate mobilization of E/T resources.

The problems of the poor and disenfranchised with respect to employment are well documented. Massachusetts has done a great deal to help citizens trapped in the cycle of helplessness and dependency train for and obtain good jobs. However, business and community leaders, educators, and local government officials question whether current efforts are numerous and comprehensive enough to meet the growing needs.

While persistent unemployment among African-Americans, Hispanics, and Southeast Asian immigrants may once have seemed an isolated social problem, it has come to be a great deal more central to the long-term viability of state businesses. In the coming years, more than 50 percent of new entrants to the job market will come from minority groups. Chronic joblessness and low educational attainment rates among the poor is bad business. Problems that begin in junior high and high school make their way to the job market, where the ability to obtain and hold good jobs that support families is diminished by inadequate academic preparation, such fundamental needs as day care, transportation, clothing, and so on, information gaps about job search strategies and world of work skills, and psychological problems such as substance abuse and low self-esteem. Finding the right mix of services is often difficult because employment programs do not



always address poverty issues, and E/T programs designed principally to alleviate poverty sometimes fail to take industry demand and labor supply issues into consideration. Improved coordination and service delivery are indicated in at least five areas.

- Greater flexibility in the duration of time allowed for worker reeducation, basic education, and job training;
- Coordination and consolidation of the alphabet soup of poverty and unemployment programs, evaluation of those programs to determine their effectiveness, and more coherent organization of services at the state level;
- School-to-work transition programs such as cooperative education, apprenticeships, and work-study programs (provided they do not shorten the school day) for current students and short-term training programs in key technical areas for unemployed high school graduates;
- Incentives such as tuition reimbursement or loan options similar to the student loan program for college students to provide a living wage during training;
- Job training that links young minority males to employers and offers meaningful work at an adequate training wage to provide the kinds of skills and experiences that lead to good permanent jobs and undermine any attachment to the underground economy.

At the opposite end of the spectrum are skilled employees, blue-collar and professional, who are experiencing unemployment for the first time. Many do not understand the fundamental shifts in the workplace that caused them to lose their jobs and continue to make it harder for them to find work elsewhere.

Many have spent years in compartmentalized jobs within large organizations, where they may actually have become deskilled in key areas such as office and plant automation. Responsible for families and caught in the poor housing market, they are limited in how far they can go to look for work. Programs offered by worker assistance centers and postsecondary institutions for these individuals should include the following strategies:

- Peer support groups for networking and sharing productive job search strategies; more information about self-employment;
- Workshops on new workplace realities, training in business software, résumé writing and job seeking, and job fairs designed to bring the unemployed into direct contact with employers;
- Better information about high-demand occupations and the short- and long-term training programs required to qualify for them;
- Changes in curriculum design and delivery, for example, evening and weekend classes that make it possible for people to work at least part time while they train for new careers.

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## Training and Education Needs of Future Workers

Tomorrow's workforce should be both educated and trained to make high-value contributions to high-value-added jobs. To do this, Massachusetts will require an entirely different kind of educational system.

One of the problems with the discussion about the education and training system is that it is not a single program, but a collection of agencies with different missions that do not always work together well. Beyond vocational education and the community colleges, elementary, secondary, and postsecondary education have few direct connections with business. About twenty-five years ago, educators, parents, and students, with good reason, rejected the assembly line's influence over teaching and the curriculum but put nothing in its place. The space race of the 1950s and the emphasis on youth's physical fitness in the 1960s are two of the only times in recent history when a larger social imperative had an impact on educational policy.

The educational and occupational experiences of the baby-boom generation, with its enormous influence on attitudes and the culture, eventually drove a wedge between education and employment. Ready access to low-cost higher education and the promise of well-paying professional careers made it possible for high school students who did even moderately well academically to attend college. Students who performed poorly in school went to work. Colleges absorbed huge numbers of high school graduates, and large government and private-sector organizations gobbled up the college graduates. A college degree became both a credential and a certification. Until the late 1980s, college graduates who wanted jobs were usually able to find them, which obscured a fifteen-year decline in their earnings and in the quality of positions outside certain technical and business specialties. Today, a significant number of bachelor's level generalists hold jobs similar to those once intended for high school graduates and are almost as ill prepared for the challenges of the workplace as the non-college bound.

An educational system that minimizes rote learning and emphasizes individual potential can open students up to a world of unlimited possibility. The danger is that without a clearly articulated mission and goals, education for anything can become education for nothing in particular. Lacking educational leadership that shares a larger national, and even international, vision, that develops clear standards for individual and group achievement and practical strategies for helping students embrace and master a complex world where science, technology, and commerce are part of their lives, our young people will continue to get half of what they, and we, need. We will continue to see an insufficient number of students intellectually engaged by math and science, fewer children of color persisting through and beyond high school, a limited understanding of the occupational and personal outcomes of education, and little recognition of the importance of lifelong learning and the continuous pursuit of new skills.

The place to begin is at elementary and secondary education, with reforms that include the following:

- The establishment of goals for kindergarten through twelfth grade that include mastery of advanced academic skills, measurement against national test scores, higher completion rates, and comparisons to achievement levels among students in other advanced countries;
- The development of new methods for financing education;

- Elimination of artificial barriers between working and learning by integrating practical experience and the classroom, promoting discussion between teachers and business practitioners, and improved career guidance for students.

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### **Workplace Education: Three Case Studies**

The following narratives describe the experiences of three typical employers and a variety of current and prospective workers from a range of backgrounds.<sup>5</sup> The employers represent both emerging and traditional industries. Their experiences cut across program types and agencies and have implications for statewide policy development.

#### ***Biogen***

Biogen is a fully integrated pharmaceutical firm that creates products from genetically engineered organisms for use as alternatives to traditional pharmaceuticals. Its mission is to develop products from inception through clinical trials to commercialization. According to company representative Christine Carberry, Biogen, like most biotechnology firms, began as a collection of scientists who “did everything from washing test tubes to writing scientific papers.” On its way to developing a workforce of more than four hundred, the company identified two principal challenges: the need to continuously upgrade its employees’ scientific knowledge and to recruit appropriately qualified manufacturing workers. It employed the following strategies:

- College and university courses funded by the company through tuition reimbursement;
- A heavy in-house training investment — 10 percent of its total manufacturing hours — in collaboration with institutions of higher education;
- The creation of a unique internship program that allows workers in declining industries to train for entry-level positions in biotechnology.

In 1992, 50 percent of Biogen’s employees availed themselves of tuition reimbursement to take courses.

Biogen’s original involvement with the Massachusetts employment and training system was as an internship site for a grant-funded certificate program designed to upgrade biological science and math skills of prospective biotech employees. The internship is a required component of biotechnology programs offered at Minuteman Vocational-Technical High School, Middlesex Community College, and Aquinas Junior College, which lead either to a certificate or a two-year associate’s degree.

Hiring workers who graduate from the program has done a great deal to lower recruitment costs. During the past two years, the company has hired 86 percent of the participants who interned with it, people who, according to Carberry, “we would not otherwise have hired.” Participants are displaced workers, many of them single mothers, who are older and “nontraditional” consumers of postsecondary programs. Eager and grateful for a second chance, graduates are competent and well motivated. Once hired, many former interns use the company’s tuition reimbursement plan to obtain further education and training. Eighty-six percent are promoted within twelve months on the job.

According to Carberry, some of the critical success factors of the biotechnology re-training program are its short-term nature, accountability by host institutions, and the amount of industry input into the design, implementation, and ongoing evaluation of the curriculum. Extensive use of the DACUM (developing a curriculum) job-analysis process, industry surveys, and advisory boards are common. Of concern is the entrance of more schools into the biotechnology training field and a possible glut of candidates. "Someone needs to take a look at quality and graduating class size" to maintain the relative balance that existed between candidates and available openings, she says.

In addition to becoming invested in continual learning, Biogen has also realized that it has a stake in science education at the high school level and in helping students and parents see biotech as an attainable career.

As the company continues to grow, Carberry anticipates that it will continue to use educational partnerships to identify, train, and develop workers, despite what she calls the quirks of working with the job-training system.

### ***United Electric Controls***

Under pressure several years ago to survive amid declining markets, the only course of action for this sixty-year-old sensor and temperature control manufacturer was change. United Electric (UE) had to improve quality and respond to market forces by adopting a philosophy of continuous improvement. At that time, 40 percent of the UE workforce had limited English proficiency. The firm realized from the start that the development and practice of reliable methods could not begin until all its employees shared a common language.

Committed to creating a continuous improvement environment, the company took the following action:

- In-house ESL instruction for employees whose first language was not English;
- Ergonomic training for workers, offered with the aid of a government grant;
- A skills development program to qualify workers for each pay grade;
- Forty hours of classroom training a year for each employee;
- Two-day seminars at the plant for customers and suppliers to share information on quality standards.

UE transformed itself, cutting lead time from ten weeks to one week, improving due-date delivery from 60 to 90 percent on time, reducing inventories, and ultimately receiving a Shingo award for manufacturing excellence in 1990. It achieved its status as a continuous improvement company by becoming a continuous education employer whose every employee is both a learner and a teacher. According to the company's vice president for human resources, Fred Ritzau, the new philosophy at United Electric Controls recognizes that "workforce development goes hand in hand with economic development."

### ***TempPro Company***

A much smaller member of the temperature-sensing industry, TempPro of Northampton

faced similar due-date and inventory problems, along with an underprepared workforce. Of particular concern was the fact that employees lacked familiarity with the company's product lines. To improve production methods, ensure quality, and upgrade worker skills, TempPro adopted the following strategies:

- In-house and external training courses developed in conjunction with local education institutions;
- A three-week training program for new hires that promotes sharing of new information from worker to worker;
- Tuition reimbursement for job-related course work at the University of Massachusetts Amherst and local community colleges;
- A certification process for workers, developed with the help of the local Private Industry Council;
- Management refresher courses in legal and contemporary management issues, offered by the local employers association.

TempPro is a valuable addition to the area economy because it employs, in addition to computer operators, unskilled production workers and machinists, two job categories that are rapidly disappearing and offer a chance to high school graduates with few marketable skills. For this company, progress meant changing management's attitude toward the costs associated with training. Investing in workers, positioning the company in the market rather than being controlled by it, and emphasizing outcomes as well as high-quality processes has proved to be a successful formula.

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### **Recommendations**

The three companies represent two generations of technology, present and futuristic, and a shared need for more sophisticated skills than the labor market can currently deliver. What they have in common are six beliefs that form a truly revolutionary credo for any company that would be excellent and serve as prerequisites for successful employer participation in a Massachusetts employment and training system:

- Proactive management, a top-down commitment to changing the organizational culture and ownership of the process by everyone in the firm;
- Appreciation of the barriers to recruitment, employment, and job performance created by low basic skills, gender, economic disadvantage, culture, and language differences;
- Adoption of a worker as learner and teacher philosophy that promotes a sense of interdependence among all in the firm;
- Incorporation of education and training as an essential part of the job, a realization that if employees are not engaged in continuous learning, they are falling behind;

- Recognition of the importance of external stakeholders to the success of the enterprise — customers, suppliers, parents, students and other prospective workers, and even competitors;
- Emphasis on evaluation and outcomes.

In turn, government, educational institutions, and training agencies will need to commit to

- A complete assessment of the state resources currently devoted to education, training, and business stabilization;
- Better coordination of the services we decide to continue after this assessment and better publicity about their existence, mission, and requirements;
- Workplace and community-based ESL and basic-skills programs to address the short-term needs of employers for able and contributing employees;
- A clearly articulated mission for elementary, secondary, and postsecondary education that addresses the long-term needs of learners and the economy and recognizes the centrality of work to both the development of the individual and the overall health and security of the commonwealth;
- The expectation that educational institutions at all three levels share the responsibility for preparing young people to lead productive lives as workers and as citizens;
- The establishment of measurable academic performance and achievement goals that take into account international standards of excellence;
- Dramatic improvements in the dissemination of occupational information and delivery of career education and job-placement services in public high schools and colleges;
- Insistence upon the development of school-to-work transition programs at the high school and college level;
- A system of accountability that measures individual academic progress and institutional effectiveness in fostering individual achievement;
- The development of programs and educational strategies that emphasize lifetime employability among prospective workers;
- Government-funded assessment services for businesses wishing to examine their practices and tax credits or other incentives for businesses to engage in continuous improvement;
- Tax credits or other incentives for employees who engage in continuous education.

A number of these suggestions were incorporated in a government blueprint for job creation and economic growth entitled "Choosing to Compete," prepared by the state's Executive Office of Economic Affairs and the University of Massachusetts. Sixteen months after the publication of this statewide strategy, progress was being made in the employment and training arena, most notably in terms of improved communication between the various players.

In education, the process has been articulated for charter schools and curriculum reform, two of the means to infuse more accountability into the system. Standards for math and science curricula have been published and more are under development. The Bay State Skills Corporation will soon begin efforts to coordinate schools and social service agencies. Technical preparation programs are beginning to close the gap between secondary schools and community colleges, ensuring that more of the students who do not immediately enter four-year degree institutions understand and have access to post-secondary programs that meet their needs.

In employment, plans are being made to implement a placement accountability system to track employment and earnings and monitor the effectiveness of workforce development programs. The Massachusetts Jobs Council is working closely with regional employment boards to improve coordination and access by prospective business and education partners.

Employers in emerging high-technology industries such as telecommunications, biotechnology, and the environment have founded formal industry associations that, among other functions, provide central contact points for prospective education and government partners.

Finally, investments in state government's information infrastructure and the infusion of new federal moneys for school-to-work training and education initiatives will stimulate further gains. The key to continued success is ongoing assessment, program design based on input from partners and training "consumers," better marketing of those programs, and evaluation and dissemination of program results. The education, government, and vendor components of the education and training system, as well as businesses, must adopt a continuous improvement philosophy that anticipates change and offers its constituents high quality and measurable results. 🐼

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## Notes

1. "Where the Job Engine Is Revving Up," *Connection 9* (Spring 1994): 33-34.
2. Ibid.
3. Massachusetts Department of Employment and Training, "Massachusetts Occupational Projections, An Analysis of Employment by Occupation to 2005" (Boston, 1993).
4. Ibid.
5. I chose to describe these three companies during a conference organized by the Massachusetts Executive Office of Economic Affairs and the Maurice A. Donahue Institute, at the University of Massachusetts Boston, July 23, 1992. I updated the information where possible.