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Training That Works: Lessons from California's Employment Training Panel Program

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1
Introduction

In the late 1940s, Leo Fender, a radio repairman in Anaheim, California, invented the first solid body electric guitar to be mass-produced—the Fender Telecaster. Fender guitars became a classic American product like Harley-Davidson motorcycles. They have been played by rock stars from Jimi Hendrix to Bruce Springsteen, and Leo Fender himself was inducted into the Rock n' Roll Hall of Fame. The company prospered and was sold to CBS in 1965, but by 1981 the company was in desperate straits—losing market share to foreign competitors and plagued by declining quality. In 1985, at a point when almost all Fender guitars were manufactured overseas, company managers bought the company from CBS. In a bid to bring production back to the United States, company management began producing a small number of guitars in a Corona, California, plant with the 60 employees remaining from the original production group. For a long time the plant struggled to achieve acceptable quality at a reasonable cost, but by 1998, the company was in a position to open a new 177,000 square-foot plant in Corona, employing over 400 people. Today, the new plant manufactures over 350 Fender guitars a day, along with Fender amplifiers. The company's dramatic resurgence is a product of many factors, but one factor always mentioned by local managers is an obscure state-funded training program, the Employment Training Panel (ETP), which provides public funding to train California workers whose jobs are threatened.

The company, which was considering moving its remaining California production to a lower-cost state or overseas, decided instead to invest in a dramatic effort to improve productivity and quality. The centerpiece of this effort was training in state-of-the-art manufacturing techniques, such as total quality management and statistical process control, for Fender's predominantly Spanish-speaking workforce. Through ETP, the state spent over $700,000 to underwrite much of the cost of Fender's large-scale training program.

Quality-control technicians, most of them weekend rock musicians, wail away on each guitar as it comes off the production line. If

it plays well, it is tuned, buffed with a special cloth, and carefully placed in a guitar case. If its quality is unacceptable, it is hung on a rack to be reworked or scrapped. One of the technicians told us that, before the training, they filled up twelve racks with rejected guitars every two days. Since the training and implementation of the quality program, they only fill two racks a week.

STATE-FUNDED TRAINING PROGRAMS

California isn't the only state that sees value in subsidizing the training of incumbent workers. In 1998–1999, 45 states spent $593 million—7 percent more than the previous year—on customized worker-training programs paid for exclusively with state funds. Put into perspective, this is more than half of the $950 million the federal Workforce Investment Act (WIA) program spent on training adults in 2000, and about one-third of the $1. 6 billion that WIA spent retraining dislocated workers in all 50 states (Employment and Training Administration 2000). Customized worker-training programs are scattered across the states and vary greatly in size and in how they are managed. California, for example, spent over $117 million, while Vermont spent only $570,000. Despite their size and importance, there is little available data on these programs and their impact. A profile of the 45 existing state programs is included in Appendix A, which comes from a survey of the status published in *State Financed and Customized Training Programs* (Duscha and Graves 1999).

Our purpose here is to provide a comprehensive description and evaluation of California's Employment Training Panel Program—the largest state-funded customized training program in the nation, to use this program as a window into these important but overlooked programs, and to draw policy implications for the development of similar programs.

Program History

These state-funded programs are often referred to as customized training programs, or incumbent-worker training programs. The programs were often designed as incentives for businesses to locate, re-

main, or expand in a state. They typically provide funds to companies to train either newly-hired workers (called new hires), or to retrain existing employees (called retrainees or incumbent workers). In 1999, states spent about 60 percent of training funds on retrainees and the balance on new hires. These programs differ dramatically from federal job-training programs in that they do not target individual disadvantaged workers who may be unemployed or have other difficulties in the labor market. Rather, they target groups of workers who are employed by a particular company. Thus, these programs serve a wider array of people than federal programs and, in general, a less disadvantaged population of workers.

These programs first appeared in Southern states in the late 1950s as these states attempted to move from an agrarian-based to an industrialized economy. One strategy these states employed was to try to attract Northern manufacturing by offering incentives, one of which was free worker training. The programs also helped workers make the transition from agriculture to manufacturing. North Carolina established the first program in 1958 and was soon followed by South Carolina and other Southern states. As the programs grew, existing businesses demanded new services as well (Duscha and Graves 1999).

Program Financing

Programs are usually funded by one of three sources: a) a special tax associated with Unemployment Insurance (UI), b) general revenues, or c) bond financing:

- Ten states, including California (with the largest program), fund their training programs with a UI-associated tax. Here's how the system works: the state reduces UI taxes by a small percentage and creates a new tax equal to the amount of UI tax reduction, then the revenue from the new tax goes into a separate fund to support training projects. Since the net tax burden does not change and the tax is collected through the same mechanism, the tax does not generate the opposition a new tax resulting in a net increase might. For example, in 1982, California reduced the UI tax rate by 0.1 percent and enacted a new 0.1 percent "Employment Training Tax" on the first $7,000 of annual earn-

ings (the amount subject to the UI Tax), thus generating a maximum per-worker contribution of $7 (Duscha and Graves 1999).

- Thirty-one states tap their general revenue pool each year to pay for their training programs.
- Four states use bond financing to pay for their training. These systems work by having public colleges, which provide the training, sell bonds to investors. The proceeds from the bonds finance the training, and the bonds are repaid by dedicating new payroll tax withholdings from participating businesses towards repaying the bonds.

Complete descriptive data on the 45 states with incumbent worker programs is provided in Appendix A.

Training Providers

Most states (33 of 45) allow companies to use any training provider they choose. Companies may use in-house trainers, hire private training companies, or contract with public or private vocational schools or colleges. Some states reserve the right to approve specific trainers. In two states, the program is administered through a public training agency, but these programs still allow employers to contract with private providers. Twelve states allow use of only designated training providers, such as community colleges or public vocational programs.

PURPOSE OF THIS BOOK

Despite the size and growing importance of these state programs, there is very little published research on them. Over ten years ago, Leigh (1989) studied existing state programs helping displaced workers find new jobs. The focus of the study was an examination of the services provided and their effectiveness. The study mostly pulled together data from secondary sources to compare the programs' methods and effectiveness, relative to federal programs. The study did not attempt to examine services to incumbent workers. In the intervening decade, research on state programs has been mostly limited to a few descriptive profiles of state efforts. Over the last 15 years, the Califor-

nia Employment Training Panel has commissioned a number of studies of its own performance and of a number of program-related special issues. The primary purpose of this book is to pull together what is known about ETP, use this knowledge to examine the operation and impact of the ETP program, and then draw policy implications for other state programs. Also, we believe ETP's experience can offer some valuable insights to administrators of the new federal Workforce Investment Act (WIA). WIA allows states to spend some of their training funds on "customized training," which is designed to meet the needs of a particular employer. ETP's years of experience in designing and funding such customized training can help WIA managers and policymakers avoid some potential pitfalls inherent in the customized training model.

We begin our analysis by reviewing the history of ETP and examining the forces that shaped its development. Next, we consider what insights theory and research can provide into the motivations of the various groups and individuals involved in incumbent worker-training programs and the policy implications of these motivations. Returning to ETP, we then examine in detail the actual implementation of the ETP program in the field, based on 23 case studies. As part of this analysis, we identify the factors influencing the effectiveness of individual projects and propose a model to explain why some programs have a significant impact on the companies served and others do not.

We then examine the impact of ETP training on the individuals trained, on the growth of companies served by ETP, and on the California economy as a whole. Note that in projects ending in 1998–1999, 95.2 percent of ETP trainees were incumbent workers being retrained on their existing job (called retrainees by ETP), and only 4.8 percent were displaced workers (called new hires by ETP) trained in the hope of finding a new job (Employment Training Panel 1999). In previous research, we have focused equally on retrainee and new hire training (e.g., Moore et al. 2000a). In this book we focus only on retrainees, as they are the vast majority of ETP trainees as well as the majority of workers trained in most other state programs (Duscha and Graves 1999).

Finally, we make a series of policy recommendations aimed at improving the performance of state-funded customized training programs, and suggest evaluation methods that are a good fit for these programs.

2
A Policy History of ETP

Unlike the programs begun in Southern states, the California Employment Training Panel (ETP) was not initially created to attract or retain businesses. It was created by the state legislature in 1982, to respond to a wave of layoffs in the early 1980s that shocked Californians, who were used to an unemployment rate consistently lower than rest of the nation in the post-war era. The idea was that ETP would use funds from the unemployment insurance system to retrain workers and move them quickly back into employment. The logic was that by reducing periods of unemployment, the program would recoup the publicly funded cost of training through long-term savings to the UI fund.[1] The agency was located within the Employment Development Department, but governed by an independent panel made up of management and labor representatives. Since 1982, ETP has spent $762 million, and trained 417,000 workers.

From this straightforward beginning, ETP's policy purpose has grown increasingly complex and subtle. Looking over ETP's history, it is clear that the program was shaped by three factors that emerged repeatedly in policy issues. The first and most dominant factor was ETP's strict adherence to the principal of "pay for performance." Two lesser factors that shaped the program were its targeting priorities and its methods for setting the price it paid for training. The following section looks briefly at each of these three factors.

PAY FOR PERFORMANCE SHAPES THE PROGRAM

The key idea driving ETP since its inception has been "pay for performance." ETP's policy of "pay for performance" means that ETP will only pay for the training of workers who complete all training and stay on a training-related job for 90 days. This policy has shaped the character of ETP more than any other factor. The "pay for performance" policy responds to a frequent criticism of other publicly funded training programs: that training generates revenue for training

agencies but does not lead to jobs for trainees. ETP aimed to avoid this trap by paying only for training of individuals who complete training and hold a related job for 90 days. Essentially, the agency sought to shift the risk of unsuccessful training from the state to the training agencies or employers with whom the state contracts. In the traditional arrangement, the state pays public or private training agencies to enroll displaced workers or other trainees. Payment is based on trainee attendance. If the trainee fails to find employment related to training, the agency is still paid the cost of training. Hence, the risk of training failure is borne by the state and the individual trainee. In the ETP system, the training agency also bears significant risk—if the training does not lead to related employment, the agency will not be paid for the cost of the training. This powerful incentive immediately moved ETP away from its initial mission.

This policy was a dramatic departure from the norm at the time ETP was founded. Over the ensuing decades, federal training programs have become increasingly concerned with performance and have devised a variety of policies to reward performance. The new Workforce Investment Act (WIA) includes 17 separate performance measures, most of them related to program completions and success in the labor market after training.

ETP's initial mission was to train recently laid-off workers and get them back to work promptly. The training of incumbent workers was an afterthought, and employed workers could only be trained if they were in danger of being laid off. Although ETP's primary goal was retraining displaced workers, 76 percent of the workers who completed ETP training in fiscal year 1983–1984, its first year of operation, were incumbent workers ("retrainees"). The portion of retrainees grew every year, reaching 97 percent in 1989–1990. ETP's first executive director, Steve Duscha, explains what happened:

> The performance contract won out over legislative intent. The performance contract said retention was what mattered and only employers could drive retentions and employers had little interest in training new hires. They wanted to train incumbent workers and that is what ETP did. It was not too hard to make the case that almost any California worker was in danger of displacement, if that is what it took to support incumbent worker retraining. (Duscha 2000)

Even with a focus on retraining incumbent workers whose future employment was fairly certain compared to displaced workers, ETP was unable to allocate all of its funds until 1989 because many employers and training agencies were hesitant to take performance-based contracts. In fact, it was a widely held belief in public training agencies that it was illegal for a public agency to take a performance-based contract because it would have to tap other funds to pay for the cost of training if the program did not place its trainees.

FUNDING PRIORITIES: A MOVING TARGET

In the late 1980s, ETP staff and state legislators began to examine ETP's experience and reconsider the legislation governing the program. Much of the reform discussion revolved around the types of companies and individuals who should receive priority for ETP funding. The legislation governing ETP was overhauled in 1989, shifting ETP's focus in several ways. Faced with mounting evidence that California businesses were losing their competitive edge, the legislature recognized that ETP needed to help both businesses and workers meet the threat of foreign and domestic competition. Typical of the events that were driving the policy discussion was the closing of the last U.S. auto plant in California. ETP was to prevent unemployment by increasing the productivity of existing workers. These legislative changes, rather than driving change, actually reflected what had come to be ETP's practices, which were powerfully shaped by the pay-for-performance policy.

The legislation also set clear priorities for the type of projects to be funded. Training new hires (unemployed workers seeking training for a new job) remained the official top priority, but in practice these workers remained a small percentage of ETP trainees. Other priorities were retraining workers in small businesses, and retraining workers whose jobs were threatened by out-of-state competition.

The legislation also tried to commit ETP to funding only training for "good" jobs. The legislation set a wage floor of $7.66 per hour, meaning that ETP could not fund training for any job that did not pay at least this much after its training was completed (although exceptions were allowed). Companies that offered substantial fringe benefits, such

as health care, could meet the standard by adding these costs to the actual wage. Today there is no single fixed-wage floor—rather, minimum wages are set based on industry and region. In most California counties the minimum acceptable wage is $10.68 per hour, rising to a high of $11.54 in high-wage counties such as Los Angeles and San Francisco (Employment Training Panel 2001). In addition, ETP tries to avoid funding training in companies with high turnover rates. ETP has established a regulation that says, "The Panel shall fund training for employment that is stable" (Employment Training Panel 2000, *Regulations*, Section 4417a). In practice, this means the panel will not fund training at sites with an annual self-reported turnover rate of over 20 percent, unless the Panel is convinced that training will lower the turnover rate.

The wage and job security requirements reflect a persistent fear by some parties, such as labor unions, that ETP funds would be exploited by large employers to train low-wage workers for poor quality, high turnover jobs. Thus "training for a good job" became a key idea in ETP policy. A crucial event illustrating this controversy was an ETP project in Ventura County that trained field workers to pick various crops. As is standard practice, workers were paid a per-piece rate for what they picked and were employed seasonally. Many lawmakers objected to the project as a misuse of ETP funds, since it did not lead to "good jobs" but merely subsidized a large agricultural producer. In response to the complaints, and several news stories, then-Governor Deukmejian removed the three members that he had appointed to the panel that approved the project.

In the early 1990s, several analyses of ETP concluded that the program would have a greater impact on the state's economy if it targeted basic industries (e.g., Moore and Blake 1992). The logic of the recommendations was the same in each analysis: when basic industries prosper, they generate economic growth by creating jobs in the companies that supply them. After an extended discussion of the basic industry concept, ETP decided in January 1994 to limit its funding to companies that "faced out-of-state competition." The logic was that a company was a basic industry if it manufactured a product or produced a service that could be imported from out of state. Conversely, if a company having only in-state competition grew and became more competitive, the company's growth would come at the expense of other

California companies and there would be no net gain to the state in employment. This decision was controversial, as ETP had been funding large programs in the banking sector that trained many branch employees. Retail banking was now to be considered a non-basic, service industry, and hence would not be eligible for funding. In addition, several major department store chains that previously had large ETP contracts would now be excluded from the program.

In fact, this new policy dealt with an additional problem: Sophisticated human resource managers in companies with large-scale training operations and high turnover (such as retail banks and large retail store chains) had found that they could subsidize large parts of their training budgets by applying for ETP funding. Many ETP observers believed that these projects did not add to the stock of training in the state but merely substituted state investment for private investment.

There were some nuances in the policy. Corporate headquarters were considered eligible on the argument that corporations, using modern communications technology, could move their corporate offices anywhere. Thus, the corporate headquarters of a fast-food chain would be eligible for ETP training, but not workers in fast-food restaurants. Also, new-hire training was allowed in any type of business because reemploying displaced workers officially remained the primary ETP goal. All manufacturing was considered basic industry, and over time, this policy led to a significant shift in the mix of industries served by ETP. From serving mostly the service and retail industries, ETP came to serve predominantly manufacturing industries.

The 1994 policy also changed which basic industry workers were eligible for training. Previously, ETP's standard had been that retrainees must be "potentially displaced" to be considered eligible for training. In practice, this meant that employers had to certify that if workers were not retrained, they were in danger of being laid off. In reality, most employers found a way to rationalize this certification. Under the new regulations, workers were eligible for training if it would "lead to a high-performance workplace." These new regulations opened the program to employers who wanted to train workers in modern production techniques such as Total Quality Management (TQM), Statistical Process Control (SPC), or Just-In-Time Inventory (JIT). With this change in policy, a host of consultants who helped companies adopt

these techniques became salespeople for the ETP program. The issue of managing these training consultants is discussed in a later section.

Controversy over ETP-funded projects did not end with these changes, as a controversy erupted in 1997 that threatened ETP's very existence. ETP funded a $500,000 project that trained a large firm's lawyers to use a new computer system. The law firm had argued that they were a basic industry because their clients could take their legal business to out-of-state law firms. Senator Patrick Johnston, who had sponsored ETP's original legislation and had shaped and promoted the program as a State Assemblyman and as a State Senator, was outraged at news of this project. Though not a firm policy, ETP's practice had always been to focus its funds on "front-line workers" (typically production workers in manufacturing). The thought of ETP funds being spent on highly-paid lawyers set off a large-scale public controversy. Attacking ETP as "an example of egregious corporate welfare," Democratic Assemblyman Dick Floyd introduced legislation to shut it down (City News Service 1998). The legislation did not pass, and ETP survived, but policymakers' views on the appropriate role for ETP were clear. After much discussion, ETP adopted a policy that prohibits training individuals who have "advanced degrees" (defined as a masters degree or higher) and are employed in service industries.

Today, ETP sees itself as an agency helping both businesses and individuals prosper in uncertain times. Its current mission statement reads:

> The Employment Training Panel is a significant economic development tool for business attraction and business retention. ETP will work in partnership with business, labor and government to provide funds for training California's workforce in the skills necessary for businesses to remain viable and compete in the global economy, while providing workers with reasonable wages and secure employment. (Employment Training Panel 1998)

Flexibility for experimentation was built into the 1989 legislative amendments authorizing "Special Employment Training" (SET) projects. These are projects that wouldn't normally be approved under ETP's eligibility requirements but, because of some special circumstance, seem appropriate for ETP funding. For example, ETP has used SET money to fund the training of people, such as welfare recipients

or youth, who would not normally be eligible for ETP training because they are ineligible for unemployment insurance. SET projects have also combined ETP funding with other funding sources, such as the Federal Job Training Partnership Act Funds (JTPA), to serve special groups such as veterans. The SET exception also allows ETP to respond to political pressure to put its resources to work in exceptional situations such as the aftermath of the 1994 Los Angeles riots or welfare-to-work initiatives. Today ETP sets aside ten percent of its training funds for SET projects and invites proposals concerning workers with multiple barriers to full-time employment, career ladders for low-wage workers, and small-business owners.

HOW, AND HOW MUCH, TO PAY FOR TRAINING

Awarding training money is tougher than it sounds, and the key question is, of course, how much money to award. ETP has wrestled with this question since its inception. When ETP began, each proposal included a training budget detailing the costs of training to be reimbursed by ETP. Budgets quickly became complex, and negotiations between ETP and contractors contentious. It was very difficult to determine, for example, when ETP should pay for equipment that would be used for instruction but could also be used for production. How much should ETP reimburse training agencies for instructors? What if a company wanted to fly in a $2,000-a-day industry expert to provide training? These conflicts led to rapid proliferation of budget rules and guidelines specifying what expenses ETP would and would not reimburse. Still, standards were never completely clear. Staff members, often unfamiliar with a particular industry and having little budget or accounting experience, were quickly overwhelmed. Often it was left to the Executive Director and the Panel to resolve budget disputes.

The 1989 legislation allowed ETP to establish fixed training fees. In 1990, after some internal study, ETP adopted a schedule of fixed fees for 14 different types of training. Within each type, the rate varied by type of trainee (new hire or retrainee) and type of trainer (in-house or contract trainer). The fees were set per trainee hour. Fees ranged from $6.49 per trainee hour for employer-provided, new-hire "Certified Nurses Assistant" training, to a high of $17.39 for "Computer-

Assisted Numerical Control" training. Most rates were between $8 and $10 per trainee hour. This system remained in place until 1994, by which time it had been revised six times. The new fee schedule brought some clarity to the problem and sped up program development, but it generated other conflicts. No set of fees could cover every type of training, and companies and their training consultants naturally tried to get their training classified into the highest fee category, leading again to conflicts between the staff and applicants (Employment Training Panel 1994). ETP was still willing to accept proposals with a negotiable training budget. It did not force all applicants to use the fixed fee, but the efficiency of the fixed fee appealed to both staff and applicants, so few applicants chose to submit a budget.

In October 1994, the Panel attempted to streamline the fixed-fee system by eliminating the 14 funding categories. Instead, ETP would reimburse all retrainee projects using a training vendor at $13 per trainee classroom hour, while company-provided training would be reimbursed at $10 per hour. Class size was limited to a maximum of 20 trainees. New-hire fees were set at higher rates of $14 per trainee hour for vender training and $10 per hour for company trainers, and class size was restricted to no more than 15 trainees. Under this system, ETP reimbursed employers for a total of either $260 or $200 per class hour for retrainees, and either $210 or $150 per class hour for new hires. A separate rate of $8 per trainee hour was set for structured on-site training (SOST).

This fee structure paid more for vender-provided training than for in-house training and much less for SOST, which was really practicing skills on the job with some coaching. The unintended consequence of this structure was a dramatic increase in demand for training consultants, because a company got 30 to 40 percent more money for using consultants than for providing the training themselves. For the host of consultants who used the availability of ETP funding to attract clients, there was a powerful incentive to design training that could be offered profitably at $13 per trainee hour. This difference shifted the mix of ETP training away from highly technical skills that might require specialized equipment and labs to "softer skills," such as TQM, that could be offered profitably at the going rate. Public training agencies also saw an opportunity in the new policies. A number of community colleges and nonprofit training organizations began to offer generic

computer skills training, such as word processing and spreadsheet training, that could be offered profitably at the fixed fee. These agencies also found that they could create programs in which employers sent trainees to their campuses after hours and "off the clock," relieving the employer of paying wages for training time. These programs proliferated quickly and came to make up as much as 30 percent of ETP's training expenditures. This arrangement is discussed in detail in the next chapter.

Another unintended consequence of the new fee structure was an increase in the amount of SOST included in projects. Companies could collect $8 per hour for up to 20 trainees who were effectively working on production while an instructor coached and monitored them. This generated much more revenue at lower cost than classroom training, both for companies and for their training contractors. ETP responded to this by limiting the number of SOST hours allowed in a contract. Currently, ETP does not allow more than two hours of SOST (only one hour for certain types of training) for every hour of classroom training (Employment Training Panel 2000, *Regulations*, Section 4425c). In 1999, ETP made a further reform: It no longer counted trainee hours. Rather, ETP reimbursed employers $80 per hour for instructor time spent on SOST, with an overall limit on the number of SOST hours, based on the number of trainees and number of classroom hours. The logic was that a SOST instructor could not work with more than 10 trainees at a time, and the reimbursement rate for SOST was $8 per hour—hence the $80 per hour rate. This eliminated the burdensome problem of tracking trainee SOST hours.

ETP's experience to this point clearly showed that it was a major purchaser of training services, and that both employers and training contractors were highly responsive to its payment methods. ETP's responses, in turn, shaped the types of training done by employers and thus the character of the entire ETP program. Recognizing this dynamic, ETP commissioned a study comparing its fixed-fee system to the fees charged in the open market by public and private training providers. Not surprisingly, the study found that the $13-per-trainee fixed fee created incentives to use training consultants, and that the fee was higher than the usual charge for "soft skills" and substantially below the usual charge for more technical skills. For example, the median market price of TQM training was $11.88 per hour, while the

median market price for CAD/CAM (computer assisted design and computer assisted machining) training was $20.00 (Moore, Blake, Honick, and Cohen 1997). In 1997, in response to this study, all re-trainee fees were set at $13 per trainee hour, and all new hire fees at $15 per hour. These changes acknowledged that there was no benefit in creating an incentive for companies to prefer outside venders.

Recently, ETP again reviewed its fee policy to address two more unintended consequences—the fee structure disadvantaged small businesses that could not assemble a class of 20 students to generate the maximum allowable fee, and certain types of high-tech training required smaller classes and higher costs than allowed. As a result, ETP created a new fee category of $20 per trainee hour for classroom training in 2000. To be eligible for the higher fee, training must be in a high-technology area, such as multimedia, and class size must be 10 or fewer. Alternatively, small businesses may qualify if they have fewer than 100 employees and train the employees in on-site classes of 10 or fewer.

ETP's experience with structuring payments clearly shows that it is necessary to continually adjust the payment system to create incentives and controls that produce the desired policy results. Furthermore, policymakers must carefully monitor the response of employers and consultants to the payment system and make changes to it as needed to avoid the unintended consequences that appear to be an inevitable part of the process.

Note

1. Much of this history is taken from a timeline of important events in ETP's history compiled by Steve Duscha, ETP's first executive director, who remains an active consultant to many organizations on ETP and other training-related matters. Other data came from ETP's Web site, <www.etp.ca.gov>.

3
A Theoretical Perspective on the Participants in State Training Programs

State incumbent-worker programs bring together numerous agents with varying motivations and interests that shape the programs. Understanding and anticipating the behavior and interactions of these agents is essential to developing effective policies. In this section we examine—from a theoretical perspective—the behavior and motivations of several of these agents, including individual workers, companies, training consultants, and government program administrators. We then identify several policy implications for those designing state training programs. We bring to this analysis several questions:

- How do individual workers decide whether or not to get training?
- How do companies decide whether to offer their workers training?
- Why do states get involved in employee training—traditionally the domain of individual workers or companies?

INDIVIDUAL WORKERS: "SHOW ME THE MONEY!"

We begin with the individual worker who is motivated to find cost-effective training that offers a good chance of a better job with higher earnings (or perhaps, maintaining a current job in the presence of technological change). When deciding whether to train or not, our prototypical worker performs an economic cost-benefit analysis, comparing the expected benefits and costs of available training programs and considering what the best work and income alternatives are. For instance, individual workers may need to decide whether they will be better off spending the next three months in training or working at the best job they can get now (or perhaps pursuing other alternatives). Workers

only consider training programs about which they know enough to estimate potential benefits and likely costs—they reject those programs that do not offer greater expected benefits than costs, and they will more likely consider programs that offer an excess of benefits (gains in working conditions or earnings) over costs. Our prototypical worker embraces training programs that offer the greatest benefits relative to cost. What are these benefits and costs on which all depends?

The worker's perceived benefits from a training program are his or her gains from it, and an increase in earnings is one major benefit people look for in training programs. Thus, training in higher-level, more valuable skills is attractive because of the prospect of greater earnings. Workers also consider other training benefits not directly linked to immediate earnings increases, such as the work environment in certain skilled jobs and attractive career paths that enhance future earning power and promotion opportunities. Considered in conjunction with these potential benefits is the likelihood of obtaining them. For risk-averse workers, which modern financial theory suggests most people are, greater certainty of earnings increases would be preferred to less certainty. For these workers, skills offering high earnings in a technology that is widely perceived as likely to become obsolete in a few years, or skills associated with jobs that are difficult to find, would be less desirable than skills with lower but more certain earnings. Also, better earnings far in the future are discounted relative to those that are nearer. This is, in part, due to the lower degree of certainty regarding far-future earnings, but also because a more immediate earnings increase can fund more current opportunities or at least earn interest in a savings account while future earnings increases are still on the horizon. Finally, workers are unlikely to seek training in programs or skill areas about which they have little awareness because the benefits are uncertain to them. Unknown programs, then, will not be considered.

In summary, individual workers will consider the following benefits:

- Incremental earnings associated with training
- Other benefits enabled by training, such as job environment or career path
- Certainty and longevity of training benefits

- Timing of the benefits of training—earlier benefits preferred
- Knowledge of the program

The greater any of these benefits are, the more likely the worker is to participate. (Far more about the benefits of training and the economics of choosing training, whether transferable to many jobs or specific to a single employer, has been rigorously studied. A classic initial reference is Becker (1993). Most current labor economics texts [e.g., Ehrenberg and Smith 2000] will devote numerous pages to detailed models of the above.)

What are the costs and what role do they play in training decisions? Workers' costs include any out-of-pocket costs of training, such as tuition, training materials, travel costs, and parking. Training costs also include time spent locating and undergoing training, since the worker could spend that time doing something else. The value of foregone wages or income is a common measure of the implicit cost of time. If training takes place when the individual normally would not be working, the implicit cost is the value placed on activities precluded by the training program, such as watching Monday Night Football. If the benefits are approximately equal, people prefer lower costs. Obviously, training that imparts useful knowledge and skills in less time will be favored. Also, training that imparts knowledge in a more pleasant or engaging way will be preferred because, generally speaking, we all prefer pleasant to unpleasant tasks. Geographically accessible training is favored because travel-time costs are lower, and workers also favor training programs offered during time that is less valuable to them. Training offered in a "flexible time format" that lets the worker choose his own training time is preferred, however training provided while the worker is "on the clock" (being paid by their existing employer) is the most desirable.

In summary, the worker will consider the following in calculating the opportunity cost of training:

- Direct, out-of-pocket training costs
- Indirect or time costs of training
- Pleasantness of the training experience
- Accessibility of the training
- Flexibility of the training schedule

The lower these costs, the more likely the individual is to participate in a training program for any given (acceptable) level of benefits.

Significant changes in any of the benefits or costs listed might entice individuals to enroll in training programs or discourage them. For example, a significantly greater earnings increase, more certainty or knowledge about the benefits or programs, access to better career opportunities, or nearer-term benefits might induce more individuals to seek training. Likewise, training programs that offer significant reductions in the time or costs of training, better access to training sites, more flexibility or convenience, or that are simply more effective will attract more trainees. The converse is also true: if costs increase or benefits decline, workers will be less likely to enroll.

Policy Implications

State-funded training programs alter—some may say confound and twist—the economic decision-making process described here. Often individuals do not choose training themselves, but rather it is selected by their employer. With state funding, individuals need not consider out-of-pocket training costs. Indeed, when training is completed during regular working hours, as is often the case, workers need not even consider the opportunity cost of training. State programs remove training from the traditional setting described above, in which individual workers search for training, and that raises many questions. How do employers motivate individuals to work hard in training? If workers don't pay for training or even choose it, will they see value in it? How will the market separate good programs from poor programs if workers can't "vote with their feet" by choosing the program they think is best (assuming, of course, that individuals are able to distinguish between different qualities of training)? In our analysis of ETP's experience we will answer these and other questions.

COMPANIES: AN INVESTOR'S PERSPECTIVE

A company is motivated to seek training that offers a good chance of generating quick benefits at a low cost. As with any investment decision, training will be undertaken by companies if the expected

gains exceed costs. Major benefits to a company may include increased worker productivity and reduced labor turnover, either or both of which would increase profits. Costs include the value of time lost while workers are training (assuming that most training occurs during work time), plus any direct or indirect costs of the training.

Companies realize many types of benefits from training. They often provide new-hire training, usually including formal and informal elements enabling workers to become more productive, but most company training consists of retraining current workers. Some retraining is intended to move the company toward a moving target of "industry best practices" (i.e., reaching a worker productivity level comparable to the industry's most successful companies). Promising new technologies, externally or internally developed, may lead companies to retrain workers. Increased output per worker and reduced scrap rates and rework time are common objectives of company retraining. Often, retraining is required to expand into more profitable product lines. A side benefit, but one increasingly considered, is that company-sponsored training might induce workers to stay with the company longer, thus avoiding the costs of labor turnover. All of these types of training can increase the value of a company's workers and improve its bottom line.

Nevertheless, companies often have questions about the benefits to be realized:

- Will the new skills really translate into increased worker output?
- How much will scrap rates actually decrease?
- How long will new technology be relevant?
- How profitable will a new product line be?
- Is the training easily transferable to other employers or is it primarily job specific? That is, will trained workers remain with the company or defect to the highest bidder?

Greater certainty about training outcomes encourages companies to train; less certainty (or not knowing about the benefits of training) discourages it.

The risks and costs of training vary as much as the benefits. One risk is that workers might leave soon after training, leaving the company with most of the costs and none of the benefits. The more likely

this seems, the less likely a company is to mount a training effort. Direct costs include training materials, space and equipment, and the cost of instructors (whether on staff or not). There are also indirect costs such as time spent planning, organizing, and managing the training, and the cost of diverting workers from productive activities.

If training is efficiently organized and managed, it will take less clock time to teach given skills and will cost less. Obviously, if workers can be induced to train "off the clock," the cost is much less than if they train on company time. The cost of diverting workers from production varies with the timing of training; the foregone value of the workers' output is greater during very busy periods than when production is slowed to a moderate pace. The pace of the work schedule adds uncertainty to the costs of training because new orders may arrive just as training begins. More than one company has aborted a training program in response to unexpected new orders.

A company must, then, consider the following before deciding to undertake training:

- The potential productivity gains from training (i.e., the difference between the company's practices and the industry's best practices)
- The degree of certainty of training benefits
- The expected turnover rate of recently-trained workers
- The expected cost of training, in terms of workers' time
- The expected costs of foregone production and revenues
- The expected costs of trainers, training materials, and space
- The firm's capability to plan, organize, and manage training

Greater expected benefits from training at a given or lower cost will increase the likelihood of a company's decision to train.

Furthermore, a number of conditions might make companies more likely to train their workers. A large gap between the company and industry best practices, or a fast pace of technological change, would imply a greater benefit from training. Lower expected costs, whether from finding more efficient ways to train, a slowdown in production, or worker willingness to train on their own time, would also lead to more training. Hiring a manager with experience in planning, organiz-

ing, and managing training also lowers training costs. Holding everything else constant, receipt of information increasing the certainty of benefits also makes a company more likely to train workers. Depending on what strings are attached, a government subsidy often makes training more attractive by reducing employer cost. Interestingly, once a company trains its workers, the resulting in-house management capability for training makes future training more likely.

Theory suggests a fairly obvious motivation for companies to undertake training, and research shows that training does pay off for employers. Employer-provided training often benefits both employer and employee. Many studies since 1980, including several of ETP trainees, have found that employer-provided training boosts employee productivity and increases worker earnings by 5 percent to 12 percent annually (Bartel 1991; Hollenbeck and Wilkie 1985; Lillard, Hong, and Tan 1986; Moore, Blake, and Phillips 1994).

These studies lead to a broader question—are employers providing sufficient training to keep American industry competitive in the long run? After an extensive international study, the federal Office of Technology Assessment concluded: "When measured by international standards, American workers are not well trained" (Office of Technology Assessment 1990). Many critics agree with this assessment and wonder why any rational business would pass up an investment that yields significant positive returns. Researchers speculate that employers fear "poaching" of their trained employees by other employers—perhaps employers prefer to poach the skilled employees they need rather than train workers who may not remain with the company. Perhaps many employers simply are not aware of the value of training. Yet Frazis, Gittleman, Horrigan, and Joyce (1998) suggest that larger U.S. employers provide significant training to employees, and Marquardt, King, and Koon (2001) document the increasing movement worldwide toward increased training using innovative means.

The existence of state programs is predicated upon underinvestment in training by private employers—otherwise there would be no need for intervention. Evidence is mounting that American employers, from an economy-wide perspective, do in fact underinvest in worker training, even though these employers are probably training at a level appropriate to their own perceived benefits and costs. A number of researchers who have compared training investment patterns of U.S.

employers to those of similar companies in Europe and Japan have concluded that the U.S. companies are underinvesting (Lynch 1992; Bishop 1995). Underinvestment seems to be particularly acute in the training of non-college-educated workers, who are the great majority of the workforce. Lynch provides one view of the situation:

> Underinvestment in training in the U.S. appears to be of two forms. First, in certain sectors, U.S. firms may be spending less and providing more limited training to their non-technical or non-managerial employees than their competitors in other countries. Second, in other sectors the level of expenditures or hours of training may be the same, but due to lower initial skill levels, this level of investment is not sufficient to achieve the same degree of skill proficiencies found in countries such as Japan or Germany. (Lynch 1992)

Bishop examines in detail a number of specific barriers to employer investment in training and concludes that high turnover rates in most U.S. companies lower the returns on training investment and lead to less employer training than would be optimal for the overall economy (Bishop 1995).

Lester Thurow, former Dean of MIT's Sloan School of Management, reviewed the current state of the American economy and noted that both companies and individual workers underinvest in training. He explained the dynamic of underinvestment this way:

> The basic problem in the United States is that every employer wants a free ride in the training system. "You train, I'll hire" is the American way. Whenever unemployment is low, employers who themselves do no training, bitterly complain about the shortage of trained workers. They see nothing strange about their complaints. As for employees, without career ladders they cannot intelligently acquire the right skills on their own. Since they will be switching employers frequently, they do not know which skills they will need or how long those skills will be relevant to their earning opportunities. As a result—rationally—they don't invest in skills. (Thurow 1999)

Despite the clear benefits of training, an empirical look at company behavior raises questions. Company behavior is not uniform—the most recent nationwide survey of employer-provided formal training showed that in 1993, only 71 percent of employers provided any formal

training for employees (Frazis, Herz, and Horrigan 1995). The use of formal training varied systematically by employer size. Of large employers (over 250 employees), 99 percent provided formal training, but only 69 percent of small employers (under 50 employees) did so. The use of training also varied by industry. Employers in the finance, insurance, and real estate sectors were most likely to provide training, followed by service industries, transportation and communications industries, and public utilities. Manufacturing, the target of much state program training, was below average in providing formal training for employees, as were the construction and retail industries. The most common types of training, provided by 48 percent of employers, were "job skills" (technical skills directly related to a worker's job); "workplace skills" (more general skills like total quality management techniques or just-in-time production techniques) were provided by 36 percent of employers.

Generally, employers tend to underinvest in training, most particularly in training workers who are not in professional or technical jobs. Employers generally invest the bulk of their training dollars in college-educated workers. For example, a recent comprehensive survey by the Bureau of Labor Statistics found that, of workers with a high school education or less, only 60 percent received formal training from their employer in the previous year, compared to 90 percent of employees with a bachelors degree or higher level of education. The study also found that, among employees who did receive training, the amount varied substantially by level of education. Those with a high school degree or less received 10.9 hours of formal training, on average, compared to 16.1 hours for those with a bachelors degree or higher (Frazis, Herz, and Horrigan 1995).

Policy Issues

Theory, and our own field experience, suggests that employers benefit substantially from training but that, for a variety of reasons, employers may not be aware of the potential benefits (Bishop 1995). This provides a rationale for the state to tax businesses or workers and redistribute the money as an incentive to train workers. In theory, the availability of a training subsidy should tip the scale in favor of a decision to train, by lowering costs to the employer and thus increasing the

likelihood of a positive "private" return to the employer from the training investment, although not necessarily a positive "social" return to the state. Experience with state training programs shows that many programs are unable to spend all available funds during their early years because employers are unsure of the benefits—or wary of unexpected paperwork and regulatory burdens—and so resist committing to training. Most state programs find that to interest employers in the program they have to promote the benefits of training with aggressive marketing campaigns. Also, since research suggests employers are much more willing to invest in college-educated workers, it makes sense for state programs to target frontline workers who typically don't have college degrees and who, therefore, would receive much less training from employers in the absence of state programs.

THE TRAINING CONSULTANT: THE HIDDEN HAND

Most policy discussions regarding state training programs begin with the workers to be trained and the companies that employ them, but a third party—the training consultant—has become a powerful force in state training programs over time. If states allow individual companies to choose their own trainers, rather than designating providers, then training consultants (public or private, profit or nonprofit) will play a major role in the program. Consultants become, in a sense, part of an industry regulated by the state training program. Like all regulated industries, the consultants then form a powerful lobby attempting to shape the program to their own best interests. In fact, ETP's experience shows that shaping consultant incentives is one of the most powerful ways to direct the program.

Consultant motivations depend on their relationship to the primary participants—companies and individuals. If the training consultant is the company's trade organization or the individual's union, their consulting will be part of their overall "care and nurturing" responsibilities. Because their relationship is long-term and involves many other services, they want the companies or individuals to be satisfied with their training experience. The success of companies or individuals is success for the consultant.

Unrelated training consultants are generally profit-oriented individuals or companies whose business is training, but in some circumstances may be employees of not-for-profit NGOs or labor organizations. These consultants seek out clients who provide an attractive profit in the difference between charges for service and costs of providing it. Like most businesses, these consultants would prefer a large difference between fees and costs, but they provide services to companies or individuals who want to keep their training costs down. As in any market interaction, the more consultants there are making their services known to companies or individuals, the more competitive the market and the more likely that there will be only a competitive, or normal, profit. Competition also motivates training consultants to seek reputations as high-quality, low-cost providers, thereby attracting new clients and generating repeat business. Conversely, the fewer known consultants there are, the more likely it is that consultants will be able to obtain substantial profits by charging fees well above costs. Of course, high training fees will discourage many companies and individuals from seeking training at all.

Whether in a competitive market or not, consultants are interested in keeping their costs low. Consequently, they will seek out clients that cost less to serve. Lower training costs are manifest in several situations. Because there are economies of scale in training, as in most other activities, larger training groups mean lower costs for the company per trainee. Companies or individuals in industries with rapidly changing technology are more likely to offer training opportunities and are often less expensive to persuade to train. Consultants also like to train in areas with a set curriculum and readily available training materials and trainers because training costs are lower. Consultants will seek out and inform companies or individuals of available subsidies because subsidies lower training costs and make the company or individual more likely to train (and hire consultants).

In summary, consultants are more likely to offer training

- In an industry or skill with frequent training requirements
- To larger companies or groups where per-trainee costs are low
- With generic or standard, rather than customized, curriculum and training materials, and with readily available trainers
- To companies or groups eligible for training subsidies

If the training consultant has long-term relationships with its clients or is in a competitive market for training providers, then training fees are likely to be lower and received value higher. In environments with few competitors and little market information, training fees are likely to be higher and quality uneven, and there is likely to be much less training.

ETP commissioned two studies of the role of consultants because their role in the program had become so important. Both studies recommended that, to manage the program successfully, the agency must carefully consider how its policies shaped consultant incentives and what the likely effects of those incentives would be (Moore et al. 1997; Wilms and Moore 1989).

ETP has always allowed companies to select trainers. This allows companies to identify specialized training providers who have experience in the company's industry and can provide carefully customized training. The availability of ETP funding has attracted the attention of a host of training companies, ranging from individuals working out of their homes to large accounting firms who have sought ETP contracts for their clients. In addition to providers of training services to companies with ETP contracts, a second tier of consultants has sprung up to help companies secure and manage ETP projects.

Market for ETP Consultants and Subcontractors

The key finding of the two studies mentioned previously is that ETP has, in effect, created a substantial market for training and management consultants. ETP has become a major purchaser of training services, allocating $85 million to training in the 1998 to 1999 period alone (Employment Training Panel 1999). A unique feature of this market is that rather than ETP directly buying training services, the services are bought by hundreds of employers using ETP funds. In addition, a substantial group of consultants has developed a specialized practice in helping companies negotiate the labyrinth of regulations created by ETP's attempts to manage the process and protect public funds.

The study of consultants and training contractors commissioned by ETP in 1997 (Moore et al. 1997) concluded:

> . . . we find that the market in which both administrative and training subcontractors and consultants sell their services to employers is best described as an *inefficient market*—one in which prices range significantly above the competitive level and the product quality may be low (Moore et. al. 1997, p. 23).
>
> The study found the market inefficient because of four characteristics:
>
> 1. *Low levels of information among buyers*
>
>   This study found surprisingly low levels of information available about subcontractors and consultants. This is largely because so many employers did not shop for subcontractors and consultants. Half of employers considered only one subcontractor or consultant—often the one that introduced them to the idea of ETP-funded training.
> 2. *Easy entry and exit, multiple paths into the market*
>
>   Over the three years studied, there were approximately 300 subcontractors and consultants working on ETP projects—individuals and companies were constantly moving into and out of the ETP market.
> 3. *Limited likelihood of repeat purchases*
>
>   For most employers, an ETP project is a one-time event. It is unlikely that an employer will be looking soon for another ETP project subcontractor or consultant, and so subcontractors and consultants need not be as concerned about repeat business as other types of service providers whose success depends on it.
> 4. *Third-party funding*
>
>   A problem inherent in the hiring of ETP subcontractors and consultants is that employers may not be as careful consumers with ETP money as they would with their own.

An analysis of individual contractors and consultants found they could be broken into seven subgroups based on size of company and services provided. Each subgroup is listed in Text Box 3.1, with an estimated percentage of the total.

The study found that most of the employers surveyed believed that the subcontractors and consultants they hired played a key role in project success. Most employers were satisfied with their chosen subcontractors and consultants, however a group of problem subcontractors and consultants was identified. The researchers estimate that 10 percent to 20 percent of subcontractors and consultants on the projects studied did not perform up to employer expectations.

Text Box 3.1 Types of Consultants

Full-Service Companies (20 percent)
These offer a full range of ETP services, including proposal development, administration, and training programs.

Public or Nonprofit Agencies (5 percent)
This category covers a wide range of public and private nonprofit agencies.

Hollow Companies (approximately 25 percent)
These market a full range of ETP services but are actually small companies, most of whose services are subcontracted out to a network of individuals or other small firms.

Niche Trainers (20 percent)
These companies are small, highly specialized training companies, usually with few employees. They provide specialized training in niche markets.

Freelance Project Administrators (20 percent)
These are individuals, and occasionally partnerships, providing primarily administrative services, often one project at a time.

Freelance Packagers (10 percent)
Individuals and occasionally partnerships who seek out companies that may be interested in ETP training and help them to develop a proposal that will be accepted by ETP.

Project Doctors (<1 percent)
Much like Hollywood script doctors, these subcontractors and consultants become involved when projects are in trouble. They specialize in solving administrative problems and negotiating with ETP.

Interestingly, the study found that *none* of the dissatisfied employers had shopped for a subcontractor—they had considered only one. The study concluded that a lack of information about alternatives led to less satisfaction with the choice of subcontractor.

Employers reported that the most important benefit of subcontractor use was help in managing the ETP process, which employers found complex. Program management was given by 51 percent of employers as the most significant benefit of subcontractor use, while only 30 per-

cent identified the training itself as the most significant benefit. A full 25 percent of employers said that assistance from a subcontractor in keeping track of ETP's complex "rule and policy changes" was the most significant benefit. Another 17 percent said "handling ETP paper work the employer's staff could not" was beneficial, and 11 percent believed a subcontractor "made it easier to get ETP to approve the project." On the other hand, only 19 percent stated as the most significant benefit that contractors "provide trainers employer did not have in-house," and 11 percent reported that they "designed custom training."

Impact of Consultants on ETP

The study concluded with an analysis of the impact of training contractors and consultants on all aspects of ETP's operation, which clearly showed that ETP had come to rely on consultants to deliver programs to the targeted employers. In fact, the analysis implied that, to be effective, ETP must manage the program through the consultants and training contractors. The challenge for ETP is gaining enough foresight into how policies will shape the behavior of these independent, often profit-seeking organizations, so that ETP can attain its major policy objectives.

A simple example illustrates this point. ETP initiated a policy of targeting basic industries, meaning industries facing out-of-state competition. On the one hand, training contractors and consultants quickly reacted by bringing to the ETP panel many potential projects in the targeted industries. On the other hand, the efforts of consultants to get ETP funding for clients who were not clearly in a basic industry, by challenging ETP rules and pushing the limits of the definition, created a time-consuming and contentious process for ETP and its staff.

The risks and benefits of consultants for state training programs are summarized in Text Box 3.2.

Policy Issues

Experience with these ETP participants suggests two major policy issues for programs. First, how can subcontractor and consultant incentives be aligned with the larger objectives of the training program?

Text Box 3.2 Benefits and Risks of Consultants in Various Aspects of ETP

Marketing

Benefits: The strongest consensus was in this area. All groups interviewed recognized that subcontractors and consultants play a major role in marketing ETP. One senior manager estimated that they are responsible for bringing in as much as 80 percent of all ETP projects.

Risks: Subcontractors are aggressive, they will test the boundaries of ETP policies to try to qualify marginal projects by looking for loopholes for projects that may conform to the letter of ETP policy, but not to the spirit of ETP priorities.

Project Development

Benefits: Many training and management companies doing ETP subcontracting and consulting have a wealth of specialized expertise in skills, industries, and project management. Good subcontractors and consultants help companies to effectively assess needs and link training to larger corporate goals, and they deliver customized, high-quality, state-of-the-art training.

Risks: Some subcontractors and consultants, driven by powerful profit incentives, will try to shape projects for the greatest profit to them.

Project Management

Benefits: By knowing ETP procedures and promptly providing needed documentation and information, good subcontractors and consultants can save time spent by company staff monitoring the project. Subcontractors facilitate ETP policy changes by tracking them and keeping employers up to date.

Risks: By testing boundaries and seeking loopholes, subcontractors may distort and undermine the effectiveness of ETP policies in order to serve existing clients or generate increased profits.

Training Delivery

Benefits: Today, even relatively large companies may have few in-house trainers, if any. Training subcontractors and consultants can provide high quality state-of-the-art curricula and trainers for ETP programs. Without them, companies lacking in-house training capacity simply could not participate.

Risks: Training subcontractors and consultants have an incentive to skimp on training quality in order to lower costs and reap larger profits.

Policy Process

Benefits: Because subcontractors spend a lot of time working with employers and the ETP process, they have extensive and detailed knowledge of how ETP policies are implemented in the field. Tapping this knowledge source could improve the ETP's policy development.

Risks: Driven by profit incentives, subcontractors and consultants are tempted to try to manipulate the policy process for their own gain.

This is a complex issue because every policy has unintended consequences and, with many independent consultants responding autonomously to incentives, the impact on the program can be swift and profound. Second, how can programs that allow an open market for consultants ensure that the market is efficient? Employers need help to make informed choices about subcontractors and consultants. Increasing the available information about consultants is particularly important. In essence, the program must ensure that the employers spending public money are well-informed consumers of training services.

GOVERNMENT AGENCIES

The nature and motivations of government are much more complex. Government seeks to benefit the central training participants—workers and companies—but also seeks to benefit society by generating overall economic growth through increased output and productivity, increased employment stability, and reduced unemployment. If all the world is a play, government agencies are actors attempting to influence the plot by motivating other characters to act for them.

State government agencies could influence worker and company training decisions in many ways. The most obvious would be to induce more workers and companies to engage in training programs by subsidizing the cost of selected programs. If subsidized programs were less costly for individuals and companies, more of them would participate. Training consultants also approach targeted companies and workers with information on the state training program. By targeting compa-

nies or workers in various situations, the state could encourage targeted groups to engage in more training. For example, the state could offer training subsidies to:

- Companies critical to an area's economic development;
- Companies that hire certain types of workers (for example, disadvantaged or currently unemployed);
- Workers with certain personal or economic characteristics (e.g., displaced by trade, currently unemployed, or without a high school education); and
- Out-of-state companies that the state wants to attract.

The state could also simply make more information available on training programs in general—their location, costs, and expected benefits. More information would lead some previously unaware companies or workers to seek training if it appeared advantageous to them. In addition to the gains by the workers and companies who would subsequently be trained, the state would stand to gain by higher tax revenues from trainees' increased income and spending, which may more than offset the state's expenses in promoting and subsidizing the training.

4
Training Outcomes: Impact on the Trainees

This chapter examines the impact of training on worker earnings, unemployment experience, and employment stability. The objective is to determine whether, to what extent, and in what ways the trainees are better off after training. Trainees' post-training experience is compared to estimates of the results of not training. The challenge, of course, is estimating the "no-training outcomes" for the trainees. In this chapter, the issues involved in developing a likely "no-training experience" are discussed, along with the methodology used.

The reported results are compiled from four separate studies of ETP trainees. Each study identified and followed a training cohort defined by a period of ETP training contract completion. The first three studies followed trainees in contracts completed in fiscal years 1989–1990, 1990–1991, and 1991–1992, and the last study covered contracts completed in fiscal years 1994–1995 and 1995–1996. There were two types of trainees in each of the studies: retrainees and new hires. Retrainees were incumbent workers, and new hires were unemployed workers qualified for unemployment insurance compensation. The breakdown of trainees by type is given in Table 4.1.

A total of 167,415 workers were enrolled in training programs under these contracts. The retrainees accounted for an overwhelming

Table 4.1 Trainee Type Breakdown

Cohort	Retrainees	New hires	Total trainees
1989–90	45,023	1,923	46,946
1990–91	39,846	2,113	41,959
1991–92	18,118	2,919	21,037
1994–96	53,130	4,343	57,473

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

93.3 percent of the total number, and the new hires for only 6.7 percent. Because of the small number of new-hire trainees and some of the complications in estimating the "no-training experience" of unemployed versus incumbent workers, we have omitted the new-hire trainees from this analysis. Interested readers can obtain the results for the new-hire trainees from the original study reports.[1] Thus, the results detailed below pertain only to retrainees (incumbent worker trainees), hereafter referred to simply as "trainees."

THE IMPACT ON EARNINGS, UNEMPLOYMENT, AND EMPLOYMENT STABILITY

Tracking the relevant experience of trainees requires extensive earnings and employment data on workers for some reasonable period before and after training. The Unemployment Insurance (UI) databases provide extensive data on a limited number of variables. These data sets include all UI-covered workers, but include only information on worker earnings, employer, employer size, and employer's industry. The use of the UI databases to track training outcomes has become more routine with the enactment of the Workforce Investment Act and many recent state-level initiatives, which require databases of follow-up on training outcomes. Difficulties in using these databases to track workers are fairly well documented in recent literature.[2] Nonetheless, two issues are worthy of mention. One is the often overlooked requirement that all dollar-based data be adjusted for inflation so that changes in price levels over time do not bias training impact estimates. The other is that trainees appear in the available databases in some quarters but not in others. There is no standard method for treating trainees in the quarters they are missing from the database. We describe our approach below.

The greatest difficulty in estimating the impact of training is inferring what would have happened to trainee earnings and employment had they not been trained. In order to isolate the effect of training, the trainees' after-training experience must be compared with their likely experience without training. Estimating trainees' likely experience, if not trained, is a major difficulty that has plagued many researchers

and rendered the results of some training impact studies misleading or useless.

In estimating hypothetical without-training experience, the problem is selecting and tracking a comparable group of workers. The answer would seem to be the "random sample solution"—just select a random sample of workers who do not undergo training, track their experience over a comparable time, and assume that the experience of trainees would have been the same if they had not trained. Researchers point out, however, that there is some voluntary aspect to many training programs—workers "self select" themselves to enroll in training programs. The very fact of workers' self-selection shows that they are different from workers who don't voluntarily enroll in training programs. The enrolling workers may be more motivated or perceive themselves as more skilled than the average worker, and therefore may be more likely to gain by training. If self-selected trainees really are more motivated or skilled, then it is argued that tracking a random sample of workers does not reflect the experience that trainees would have had if not trained.

In evaluating the impact of the JTPA training programs of the 1980s and 1990s, researchers tried to overcome the self-selection problem by adopting the experimental method. This method overcomes self-selection bias by randomly assigning training volunteers to two groups—one received JTPA training (treatment group), while the other was denied JTPA training (comparison group). The random assignment into these two groups would seem to assure that they have identical personal characteristics. Researchers then tracked both groups and statistically analyzed the experience of those not receiving JTPA training in an attempt to estimate what the actual JTPA trainees would have experienced if not trained. This application of the experimental method is subject to some controversy because the selection process was not entirely random and many in the comparison group were counseled into, or sought out, training from other sources. This creates a problem in interpreting the experience of the JTPA comparison. Questions of exactly what the counterfactual experience of the trainees really was continue to arise.[3]

Fortunately, the self-selection problem does not apply to ETP training because its trainees are not self-selected. But while ETP trainees were not self-selected, they were "selected" by the companies in

which they worked, and the companies were also "selected" by meeting ETP's eligibility requirements. Only certain types of workers in certain types of companies were eligible for ETP-funded training. ETP trainees were incumbent workers covered by unemployment insurance (UI) whose employers selected them for training when the companies secured ETP training contracts. The trainees had to be mainly frontline workers, rather than management or other segments of the workforce. Often trainees were entire work groups such as all workers on a particular production line. Though some managers did undergo ETP training, the purpose of their presence was largely to ensure that they were well aware of the skills and capabilities that workers acquired. Prior to January 1, 1994, ETP policy also required that, to be eligible for ETP training, workers had to be in jeopardy of being laid off and the proposed retraining had to be designed to forestall the layoff. Policy changed on January 1, 1994, so that new ETP retraining contracts had to satisfy one of following three requirements: a) workers must be threatened with displacement if not retrained, b) the company must be transitioning to a high-performance workplace, or c) the company must be diversifying its product line.[4] (Only a fraction of the last of the four training cohorts were subject to the 1994 contract requirements, so that the large majority of ETP trainees analyzed here were workers whose employers were considering laying them off.) A final ETP eligibility requirement, formalized in 1994, required companies to be in competition with out-of-state producers in its product market. This out-of-state competition requirement had informal standing before 1994, so that most companies in this study met this requirement.

These ETP requirements—frontline worker status, layoff jeopardy, and out-of-state competition—undoubtedly introduce a selection bias in the type of workers trained under ETP contracts. This means that ETP trainees, compared to the average worker, are more likely to be frontline workers, are more likely to be in jeopardy of layoff, and are in companies that compete with out-of-state producers. Leaving the "frontline worker bias" requirement aside for the moment, the layoff jeopardy and out-of-state competition requirements appear to reinforce one another to some degree. Vulnerability to layoff that could be forestalled by retraining would seem to place these workers in competitive industries where new technologies or new skills play an important role; and this suggests that manufacturing industries may dominate this group. The out-of-state competition requirement also seems to favor

the manufacturing industries because manufactured products easily cross both state and national boundaries. The upshot of these two requirements is that we expected the ETP trainee sample to be skewed toward the manufacturing industries. This meant that, compared to a random sample of workers, ETP trainees would be more concentrated in manufacturing industries and less in other industries; there would be an "industry concentration effect." This meant that ETP trainees were likely to have two biases relative to the average worker: a "frontline" bias and an "industry concentration" bias. These particular selection biases have not received attention in the literature that is currently available. They also make it impractical to design experimental studies because what company manager, eligible for ETP-funded training, would volunteer to have workers randomly assigned to miss out on needed training?

In light of these possible biases, we estimated the likely result of not training by making two adjustments. First, we took randomly drawn samples of UI-covered workers for the same time period and weighted their experience to match the industry concentration bias of the trainees. We addressed the frontline worker bias by exercising caution in interpreting the differences between the reweighted comparison groups and the trainees. Essentially, we assumed that the trainees would be subject to the same economic trends as the reweighted comparison groups, but would not necessarily have the same level of unemployment or earnings.

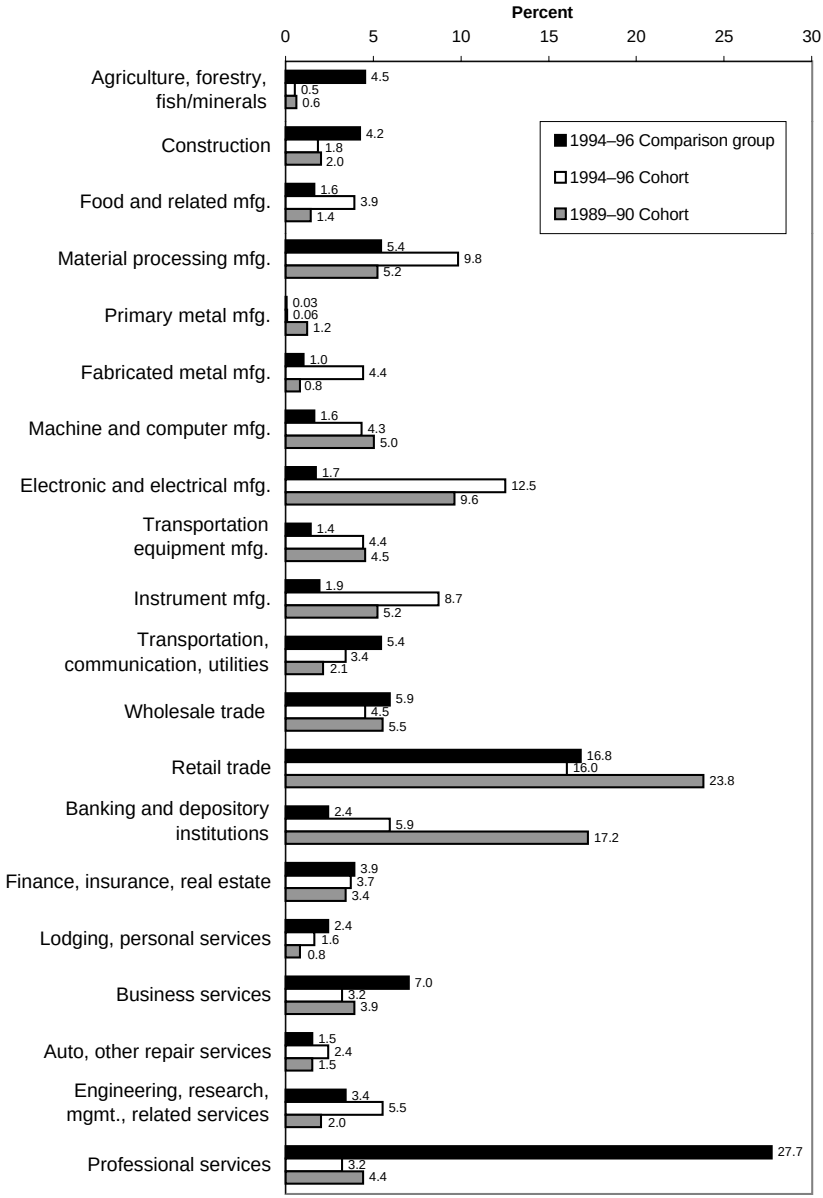
Specifically, to obtain the likely untrained experience, we drew a random sample of California UI-covered workers during a comparable period. The industry concentration adjustment was possible because the industry of employment was identified in the data sets for both trainees and comparison group workers. Unfortunately, because we could not distinguish frontline from other workers in the random samples, no simple adjustment process existed for the frontline worker bias. Hence, there was no simple procedure for eliminating this effect. Fortunately, the only bias expected from the frontline focus was that trainees' earnings might average a little higher or lower, and their unemployment a little higher, than that of workers as a whole. This would be because management workers probably earn more than frontline workers but support staff may earn less, so the non-frontline average earnings could be higher or lower. We allowed that the frontline workers could have slightly different unemployment rates than the

other workers because of their different positions in the companies. In response to these possible frontline biases, we were careful to compare the changes in the trainees' earnings or unemployment with the comparison groups' changes, rather than comparing absolute levels of earnings and unemployment. In other words, we assumed that trainees would experience the same trends in earnings and unemployment as the comparison groups, rather than assuming that trainees would have the same earnings and unemployment experience.

The extent of the industry concentration bias is apparent in Figure 4.1, which illustrates the dramatic difference between the industry distribution of all California workers and that of the ETP trainees.[5] For example, manufacturing industries employed only 14.7 percent of all California workers in the 1994–1996 comparison group, but employed nearly half (48.1 percent) of the 1994–1996 training cohort. Similarly, the Other Professional Services category accounted for less than 5 percent of the 1989–1990 or 1994–1996 training cohorts, but represented over 27 percent of all workers in 1994–1996. To eliminate this source of potential bias, the random sample of UI workers was broken into 20 to 25 industry groups (depending on cohort), and the relevant experience of each industry group was measured. The experience of each industry group in the comparison group was then weighted by the percentage of trainees in that industry group. This process resulted in a comparison group with exactly the same industry composition as the training cohort studied, and thus neutralized the industry concentration bias.

Figure 4.1 also reveals the changing emphasis of ETP training over time. From the 1989–1990 cohort to the 1994–1996 cohort, ETP increased its emphasis on training in manufacturing industries, as illustrated by the 33 percent manufacturing industries employment of the 1989–1990 training cohort compared to 48 percent of the 1994–1996 training cohort. In the same period, ETP also greatly de-emphasized training in retail trade and banking—trainees in those industries dropped from 41 percent of the total to less than 22 percent. Because of the changing industry distributions of training cohorts, we generated three different comparison group experiences from a single random sample of California UI workers. The comparison groups for the 1989–1990, 1990–1991, and 1991–1992 cohorts were all based on one random sample of California workers drawn in the second quarter of

Figure 4.1 Industry Distribution for All California Workers and Trainees

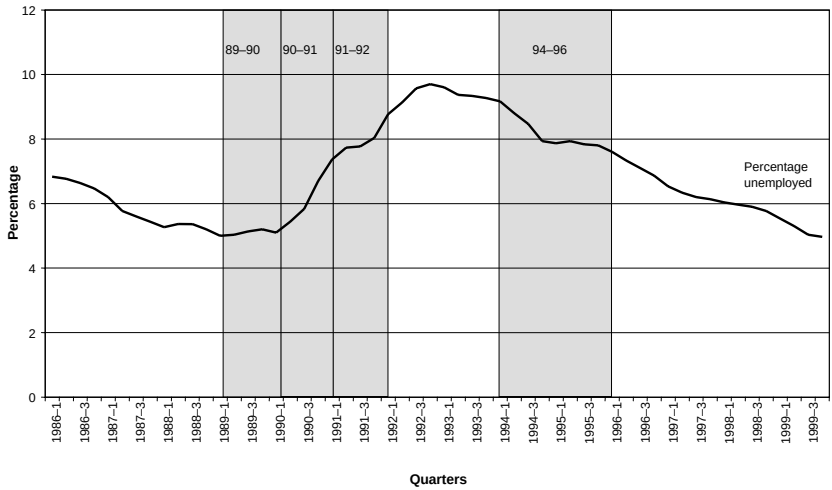


1990, but different weights were applied to the experiences of the industry subgroups to produce different comparison group experiences for each cohort. The comparison group for the 1994–1996 trainees was drawn from three samples of workers present in the California UI-covered workforce in the second quarters of 1993, 1994, and 1995. These samples were analyzed for differences and when significant differences were not found, the samples were assembled into a composite, industry-weighted comparison group.

California's Economic Environment

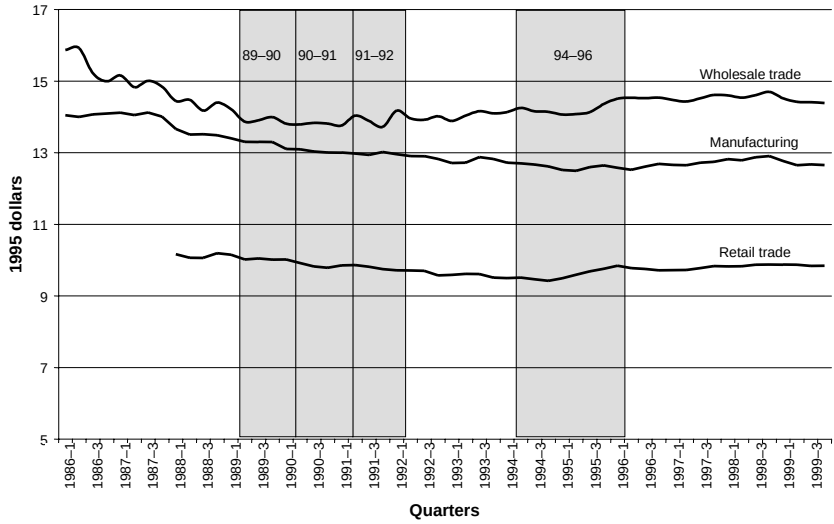
California's economic environment was marked by falling unemployment during the second half of the 1980s, as the state recovered from the 1981–1982 recession along with the rest of the country. The unemployment rate bottomed out in 1989 and began to rise in 1990, as California and the country entered the 1990–1991 recession (see Figure 4.2). While the recession was declared over for the nation as a

Figure 4.2 California Unemployment Rate, 1986–1999 (Quarterly Average of Monthly Rates, Seasonally Adjusted)



SOURCE: Authors' calculations of California Employment Development Department Data.

Figure 4.3 Real Hourly Earnings in California, 1986–1999 (1995 dollars)



SOURCE: Authors' calculations of California Employment Development Department Data.

whole in the first quarter of 1991, the unemployment rate continued to climb in California until it peaked in the first quarter of 1993 and then receded at a slower pace than the nation as a whole. In spite of decreasing unemployment in the last half of the 1980s, real hourly earnings in manufacturing and trade were falling in California and continued to fall into the early 1990s. Real hourly earnings leveled out and then began to recover in wholesale trade in the early 1990s but did not level out and begin to recover in retail trade and manufacturing until about 1995, as shown in Figure 4.3.

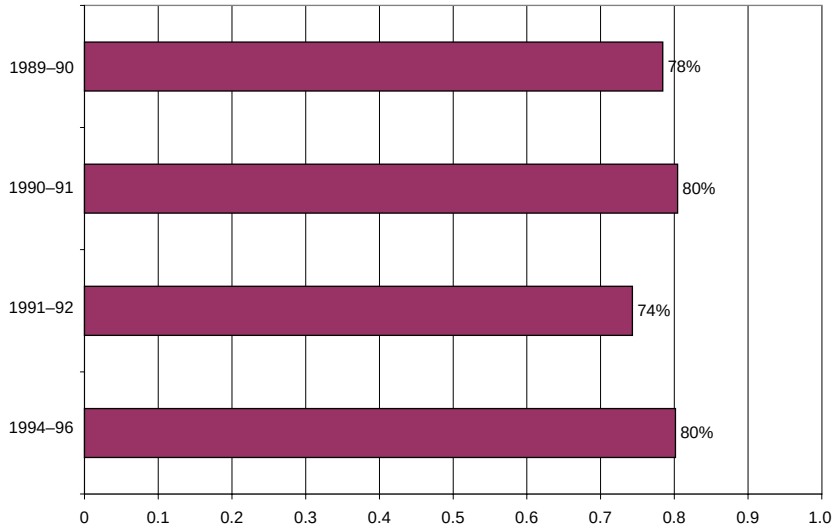
Figures 4.2 and 4.3 also show the different economic environments of the training cohorts.[6] Trainees would generally be trained during the fiscal year indicated, so the first three training cohorts were trained in a faltering economy—a period of rising unemployment and falling real earnings. In contrast, the 1994–1996 cohort was trained during a recovering economy—a period when unemployment was falling and real earnings were beginning to rise. These different economic environments led to different trainee outcomes by several measures.

The Completion Rate: A Measure of Program Success or of Economic Environment?

A training program's completion rate is commonly considered to be one measure of its success. That is particularly true in the case of ETP, where completion means being placed in a training-related job and keeping it for at least 90 days. By this standard, ETP retraining programs appear successful: roughly 80 percent of retrainees completed training in each of the cohorts, as shown in Figure 4.4. In a voluntary training program, an 80 percent retrainee completion rate would be very respectable, but does the completion rate really measure success in a training program like ETP?

ETP contracts with companies to run training programs for incumbent workers who are in training as part of their jobs. What is the meaning of the dropout rate in a training program where the trainees are not volunteers? To answer that question, we must examine the reasons for dropping out. Retrainee dropout happens in two ways: either the employer decides that the worker will not complete training;

Figure 4.4 Percentage Completing Training



SOURCE: Authors' calculations of ETP Data.

or the worker quits the job. The company might pull a group of workers out of training for several reasons:

- The company decides to lay off workers during training.
- The company decides that training is not worth the cost and drops it.
- The company gets unexpected orders and has to suspend training to fill them.

In a small percentage of cases, a worker drops out by quitting the job, but that could be for a better job, for health, or for other reasons. The upshot of this dropout discussion is that it is not immediately clear what the completion rate measures.

Presumably, companies contracting with ETP do not want to undertake the expense of developing a training contract, only to drop several workers later and receive nothing for their expense. Given that a contracting company expects the workers it enrolls to complete the training, it follows that trainee dropouts are caused by unexpected events or new information in a dynamic economy.[7] The 80 percent trainee completion rate suggests that most companies, most of the time, correctly anticipate the conditions that will exist during training, but that companies sometimes make mid-course corrections that involve about 20 percent of trainees. Intuitively, the 80 percent rate seems reasonable in a dynamic economy, but there is no benchmark for comparison. If the economy became more volatile, the completion rate would drop; if the economy became more stable and predictable, the rate would rise. The retrainee completion rate would also rise if the quality of ETP training improved (as fewer companies would stop training in midstream), or as the nature and benefits of ETP training become more widely known. Perhaps these considerations explain the trainee completion rate's slight upward drift over time.

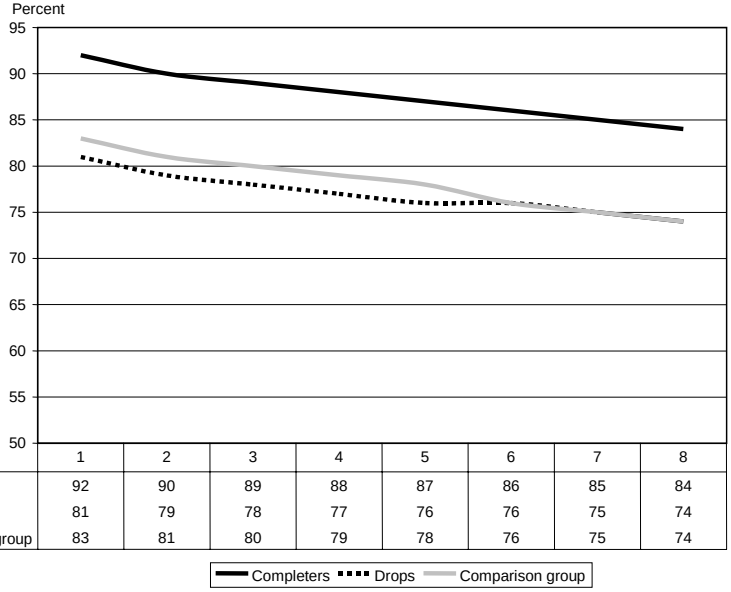
The Participation Rate: Attachment to the Labor Force

One clear measure of training program success is the trainees' attachment to the labor force after training. By this measure, the ETP program is successful. Training completers have significantly higher post-training labor force participation rates in every cohort, as illus-

trated in Figures 4.5a–4.5d. Also, while all of the depicted groups experience some decrease in labor force attachment in the "post-training" period, the percentage decrease for the comparison group is always greater than it is for the trainee completers. Greater labor force attachment is obviously a benefit to the workers (as they earn more), to the companies they work for, and to the economy as a whole.

One interesting aspect of the labor force participation measure is what happens to the training dropouts in various phases of the economic cycle. It appears that, in a slowing economy like the first three training cohorts' post-training periods, the participation rates of dropouts are about the same as for the comparison group. In an improving economy, like the last training cohort's post-training period, the dropouts' labor force participation rate paralleled that of the training completers—significantly above that of the comparison group. This finding

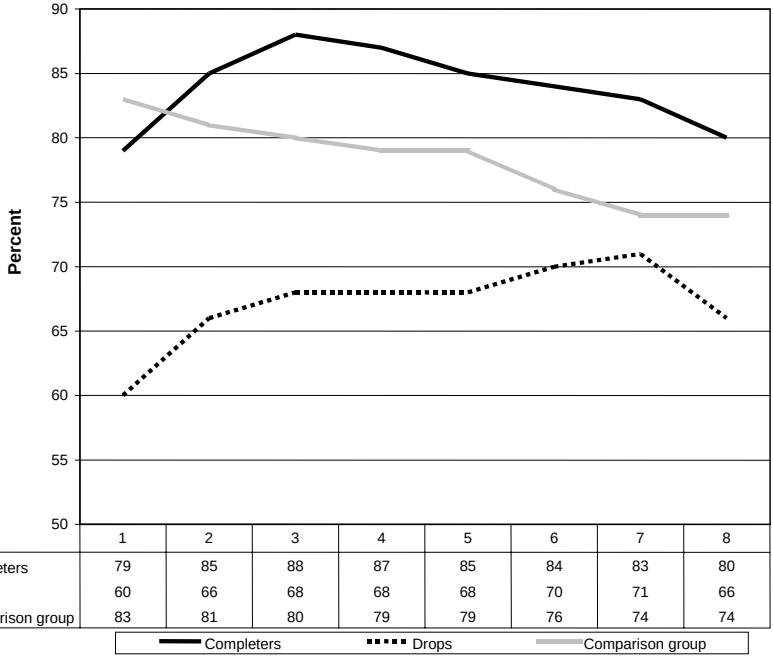
Figure 4.5a Labor Force Participation by Quarter, 1989–1990 Groups



	1	2	3	4	5	6	7	8
Completers	92	90	89	88	87	86	85	84
Drops	81	79	78	77	76	76	75	74
Comparison group	83	81	80	79	78	76	75	74

SOURCE: Moore, R.W., and D.R. Blake. 1992. *Does ETP Training Work? An Analysis of the Economic Outcomes of California Employment Training Panel Programs.* Sacramento: California Employment Training Panel. ERIC Document Reproduction Service No. ED 360553.

Figure 4.5b Labor Force Participation by Quarter, 1990–1991 Groups



	1	2	3	4	5	6	7	8
Completers	79	85	88	87	85	84	83	80
Drops	60	66	68	68	68	70	71	66
Comparison group	83	81	80	79	79	76	74	74

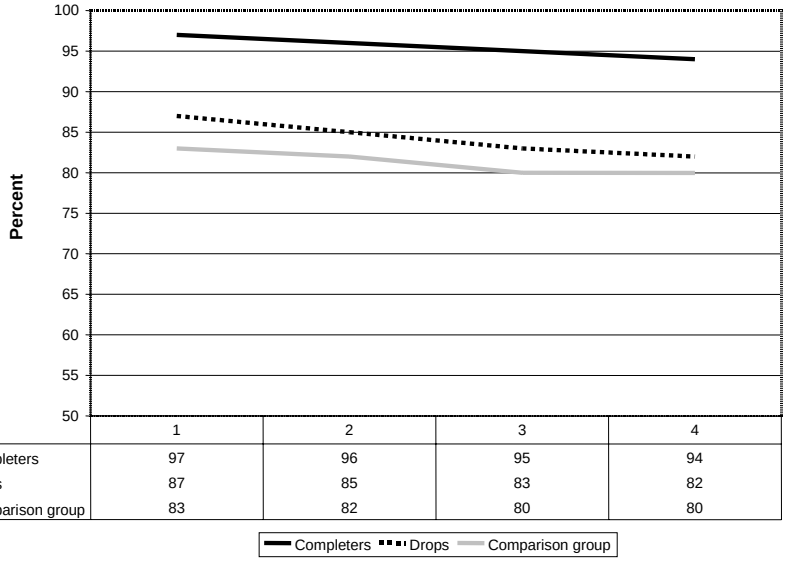
SOURCE: Moore, R.W., D.R. Blake, and G.M. Phillips, 1994. *Public Training with Private Efficiency: An Analysis of the California Employment Training Panel Programs.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 369935.

seems consistent with the variety of reasons for dropping out of training that were discussed in the last section. In a worsening economic environment, trainee dropouts are more likely to result from company layoffs. In an improving economy, dropouts are more likely to come from companies abandoning training to fill unexpected orders. Changes in trainee earnings seemed to reflect a similar pattern.

Trainee Earnings I: The Plague of the Zeroes

A critical measurement issue that complicates the tracking and comparing of trainee earnings is the question of what to do with workers who cannot be found in the UI database. (Workers are "found" in

Figure 4.5c Labor Force Participation by Quarter, 1991–1992 Groups



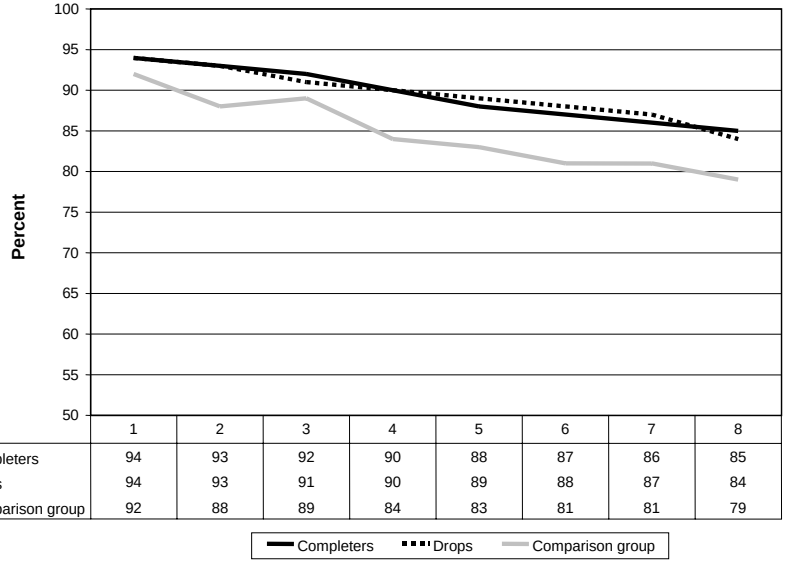
	1	2	3	4
Completers	97	96	95	94
Drops	87	85	83	82
Comparison group	83	82	80	80

SOURCE: Moore, R.W., D.R. Blake, and G.M. Phillips. 1994. *Public Training with Private Efficiency: An Analysis of the California Employment Training Panel Programs.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 369935.

the UI database if they have recorded earnings or UI claims during the quarter, they are "not found" if they have neither.) Should the not-found workers be assigned zero earnings and then compared to other workers who are found and who usually have positive earnings, or should comparisons be made only between workers who are found? Partly because of the nature of the UI database, a case can be made for either approach.

The California UI database does not cover all earnings; it does not include workers outside California, workers in California not covered by UI,[8] federal government workers, or proprietors and their immediate-family employees. Federal workers constitute about 1.6 percent of the California labor force, and the Bureau of Labor Statistics recently estimated proprietary income earners at 10.5 percent.[9] This means that if a worker takes a job in an uncovered occupation or with the federal government, that worker will not be found in the UI database, but it

Figure 4.5d Labor Force Participation by Quarter, 1994–1996 Groups



	1	2	3	4	5	6	7	8
Completers	94	93	92	90	88	87	86	85
Drops	94	93	91	90	89	88	87	84
Comparison group	92	88	89	84	83	81	81	79

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Servic No. ED 4327562.

would be misleading to assign zero earnings to the worker. This argues for earnings comparisons being made only between people who are known to be in the labor force during the periods for which comparisons are being made.

Is the limited coverage of the UI database a large problem? Perhaps not: Given that trainees are in UI-covered employment when trained, we do not expect many workers to move to uncovered or government jobs because ETP training is designed to enhance skills in common private sector industries. On the other hand, a few trainees will move into uncovered areas; and the tracking of some workers in the comparison groups could be affected, even though they were all in UI-covered employment when selected for the training or comparison group.

Another reason for limiting the comparisons to workers who have earnings is to isolate the effect of training on the pay rate of employed

workers. Training is believed to enhance worker productivity, which is usually measured by the rate of pay an individual can earn. Limiting comparison to employed workers puts the comparison more in the context of pay rate rather than a gross amount of pay (even though hours can and do vary between employed workers).

On the other hand, the case for averaging zero earnings for not-found workers into comparisons is that, for the most part, they are workers who have dropped out of the labor force and are earning nothing. If we want to compare the earnings of two groups of workers, then it seems logical to average the gross earnings of a group's workers over the number of workers in the group. Trainees or comparison group members who are not working are not contributing productive output to the economy. If the earnings measure is supposed to capture the average contribution of a group to the economy, then the zero earnings of nonproductive members ought to be included. This is particularly true if the groups have different labor force participation rates over time. Averaging only those who have earnings would compare a smaller percentage (the employed) of one group to a larger percentage of another. Average earnings would not be measured on the same basis in both groups, and would not reflect the full difference in earnings between the groups. We have shown that trainees have a higher labor force participation rate than the members of the comparison groups. This means that an average earnings measure based only on those with earnings would understate the difference between the two groups in their total contributions to the economy.

Clearly, the question of whether or not to include individuals with zero earnings in the average earnings measure is a difficult one. We have chosen to report average earnings both ways in the various studies of ETP. For the 1989–1990 cohort, the average earnings of the training completers were calculated based on all trainees in the period from four quarters before training to eight quarters after training. The average earnings for dropouts was calculated in the same way except that, in each quarter, the dropout's participation rate was brought up to the same level as that of the completers by averaging in dropouts with zero earnings. This yielded the same measurement basis for training completers and training dropouts each quarter, so that the average earn-

ings comparisons did not understate the productive contribution of completers relative to dropouts.

Comparisons of average earnings of the 1990–1991, 1991–1992, and 1994–1996 cohorts were based only on individuals who were found in the labor force[10] four quarters before training, four quarters after training, or eight quarters after training (hereinafter termed the $-4/+4/+8$ population). In these cohorts, the average earnings variable measures only the earnings of those found in the labor force, so merely comparing average earnings understates the total difference in productive contribution. To get the total differences between productive contributions of the groups, one has to factor in the various groups' labor force participation rates.

To illustrate the difference, suppose that groups A and B each have 100 people, and that A has a 90 percent post-program labor force participation rate, compared with an 85 percent rate for B. Further suppose that group A's average change in earnings is from $20,000 to $23,000 annually for those found in the labor force, while group B's is from $20,000 to $22,000 for those found in the labor force. Comparing the average percentage point changes in earnings for those found in both groups indicates a simple 5 percentage point difference—group A's average earnings increased by 15 percentage points while group B's increased by 10 percentage points. Actually, there is a much larger difference in the increased earnings of the groups. Group A's increased earnings are $270,000 for the 90 people found (the $3,000 increase in earnings times 90 people), but group B's increased earnings for 90 people are only $70,000 (85 people still working times $22,000 minus 90 people times $20,000). Factoring in the relative drop in group B's labor force participation rate means that group B's earnings only increased 3.9 percentage points ($70,000 increase in total earnings divided by the $1,800,000 initial total earnings for the 90 people). Thus, the true difference between the growth in these groups' total earnings is group A's 15 percentage points compared to group B's 3.9 percentage points, a difference of 11.1 percentage points instead of the 5 percentage points suggested by comparing only the "found" workers. This hypothetical example shows that, if there is a difference in labor force participation rates between two groups, comparing the change in

earnings of only found workers understates the true difference in earnings growth between the groups.

Trainee Earnings II: The Results

In every cohort, those who completed training increased their earnings relative to the comparison group, providing an unambiguous indicator of ETP program success. All earnings changes reported below are stated in 1995 dollars to reflect only changes in real earnings, excluding inflation.

Those who completed retraining saw their earnings grow more than the comparison groups, in every cohort. The difference was greater when the economy was slowing than during a recovery. Table 4.2 shows an earnings-change difference of over 25 percentage points

Table 4.2 Trainee Earnings Results

Retrainee Cohort		Year before	First year after ($)	Second year after ($)	Change after one year (%)	Change after two years (%)
1989–1990:	Completers	32,640	35,447	35,433	8.60	8.56
	Dropped	31,355	31,104	31,609	−0.80	0.81
	Control	36,334	30,284	30,699	−16.65	−15.51
1990–1991:	Completers	29,143	34,995	37,232	20.08	27.76
	Dropped	25,547	26,966	32,503	5.55	27.23
	Control	34,325	35,200	35,047	2.55	2.10
1991–1992:	Completers	34,369	34,740		1.08	
	Dropped	33,822	30,823		−8.87	
	Control	34,568	34,003		−1.63	
1994–1996:	Completers	24,155	26,780	27,780	10.87	15.01
	Dropped	24,760	27,150	28,409	9.65	14.74
	Control	25,642	27,183	28,667	6.01	11.80

NOTE: Earnings for completers in the 1989–1990 cohort were based on the average earnings for all completers in the California labor market each quarter. Earnings for 1989–1990 dropouts and control group were adjusted to assume that the same proportion of dropouts and controls as completers remained in the California labor market. The other cohorts' and control groups' average earnings were based on the population found in all of the $-4/+4/+8$ quarters for each group.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

for the 1989–1990 cohort, in the first year after training (the difference between an 8.60 percent gain for trainees and a 16.65 percent decline for the comparison group). In the second year, the earnings-change difference was 24 percentage points for the 1989–1990 cohort (the difference between an 8.56 percent gain for trainees and a 15.51 percent decline for the comparison group). In dollars, the average 1989–1990 trainee completer gained about $2,800 in earnings after training while workers in the comparison group lost about $5,600 in the same period. Recall that, for the 1989–1990 cohort, earnings for both dropouts and the comparison group were adjusted to reflect the same labor force participation rate as training completers. This yielded lower earnings for dropouts and completers than if average earnings had been reported only for those found in the $-4/+4/+8$ quarters, as in later training cohorts. The 1990–1991 trainee completers' earnings increase was over 17 percentage points more than the comparison group's in the first year after training, and over 25 percentage points more in the second year. The difference was much less—about 3 percentage points—for the 1991–1992 cohort, which was tracked for only one year after training. For the 1994–1996 cohort, the difference between retrainees and the comparison group was almost 5 percentage points for the first year after training, and a little over 3 percentage points for the second.

The trainee dropouts' experience was mixed relative to the comparison groups. For the 1989–1990 cohort (the participation-rate-adjusted cohort), the dropouts' earnings did not change significantly while the comparisons' earnings dropped significantly in both years after training. For the 1990–1991 cohort, the dropouts' change in earnings was 3 percentage points higher than the comparisons for the first year after training, but 25 percentage points higher in the second year (almost even with completers). The 1991–1992 dropouts did worse than the comparisons by 7 percentage points in the first year after training, but the 1994–1996 dropouts bested the comparison group by over 3 percentage points in both post-training years, and again almost matched the increase for the trainee completers in the second year. This significantly smaller difference in earnings growth between completers and the comparison group coincided with an improving California economy in the mid to late 1990s.

In summary, training completers always had higher percentage earnings changes than the comparison groups. Whether the cohort earnings were adjusted to reflect the same labor force participation rate as training completers (as in the 1989–1990 cohort), or simply based on who was in the labor force in the $-4/+4/+8$ quarters (as in the last three cohorts), the same pattern was seen. Trainee dropouts usually outperformed the comparison groups in earning change, but did worse in one of the seven cases. One satisfying result was that dropouts always did worse than completers, though they did come close to the completers in two of the seven post-training cases.

Unemployment

In before-to-after change in unemployment, training completers fared better than their comparison groups in every case, again attesting to ETP's success in achieving its goal of reducing unemployment. Unemployment was increasing in the economy during the first three cohorts, yet training completers' unemployment increased less than the comparison groups, as shown in Table 4.3. When the economy was improving in the period of the last cohort, unemployment was falling for everyone. Still, training completers' unemployment fell more than the comparison group's unemployment in this improving economy.[11]

Training dropouts' unemployment performance was not as mixed as their earnings performance. The dropouts' change in annual unemployment was usually better than that of comparison groups, and it was worse than that of completers, except during the improving economy when the unemployment claim average of the 1994–1996 cohort of dropouts actually went down more than that of the completers by one-tenth of a week per year.

The drop in unemployment for ETP training completers relative to comparisons may not be surprising, given that they must hold a job for 90 days after training to be considered as having completed.[12] However, the results are interesting for training dropouts, who range from being enrolled but never beginning training to being fully trained but not holding a job for 90 days after training. In every case we studied, training dropouts did better than the corresponding comparison groups even though they did not complete training.

Table 4.3 Trainee Unemployment Results

Retrainee Cohort		Year before	First year after	Second year after	Change after first year (%)	Change after second year (%)
1989–1990:	Completers	0.4	0.6	1.1	0.2	0.7
	Dropped	0.9	1.2	1.7	0.3	0.8
	Control	0.7	2.0	2.9	1.3	2.2
1990–1991:	Completers	0.4	0.8	1.4	0.4	1.0
	Dropped	0.6	2.1	2.2	1.5	1.6
	Control	0.9	2.2	3.3	1.3	2.4
1991–1992:	Completers	0.5	2.1		1.6	
	Dropped	1.0	5.1		4.1	
	Control	1.2	3.6		2.4	
1994–1996:	Completers	1.8	1.2	1.2	−0.6	−0.6
	Dropped	1.8	1.1	1.1	−0.7	−0.7
	Control	1.4	1.2	1.3	−0.2	−0.1

NOTE: Based on the populations in each cohort present in the $-4/+4/+8$ quarters, except for the 1991–1992 cohort, where the population is the one present in the $-4/+4$ quarters.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

In the ETP studies, we also reported data on changes in UI payments to trainees and comparison groups. Because those results parallel the results of UI weeks claimed, however, no new information would be gained by reporting on UI payments here. The payments data were very useful, however, in developing estimates of UI fund savings generated by ETP training, which are covered in Chapter 7.

Employment Stability

An important goal of ETP training from the start was to increase the employment stability of workers. Using the available data, we attempted to measure ETP's contribution to improving workers' employment stability.

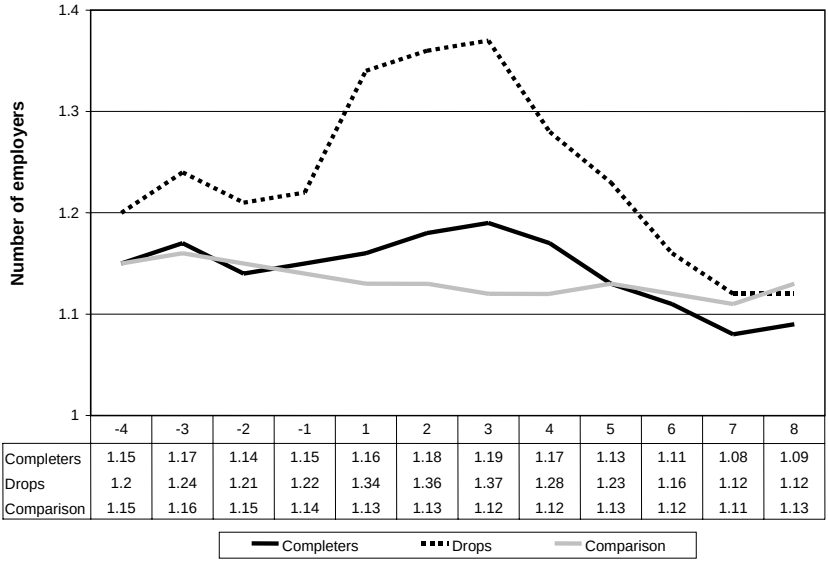
ETP training completers increased their employment stability relative to comparison groups in all but one case. In the one exception, the training completers started with the same employment stability as

the comparison group and finished the first year after training within one percentage point of the comparisons. The employment stability measure was refined in the course of the studies; the measure and its refinement are discussed along with overall results.

In the first three training cohorts, we measured employment stability by the average number of employers that workers had in a particular quarter. Generally, having more employers indicates less employment stability because it means that a worker was changing jobs or regularly had more than one job. The quarterly experiences of the first three cohorts are shown in Figures 4.6a–4.6c.

For the first two cohorts, the employment of training completers started out less stable (more employers) than the comparisons and ended up being more stable (fewer employers) after training, as shown in Figures 4.6a and 4.6b. The 1991–1992 training completers' experience was slightly different, as shown in Figure 4.6c. Their employment

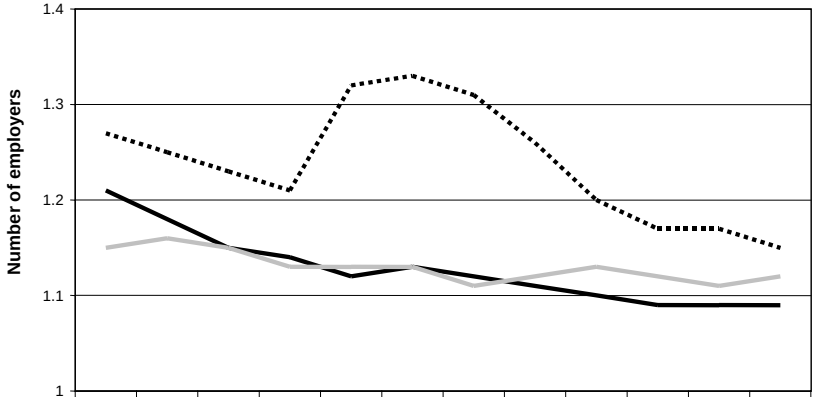
Figure 4.6a Average Number of Employers by Quarter, 1989–1990 Groups



	-4	-3	-2	-1	1	2	3	4	5	6	7	8
Completers	1.15	1.17	1.14	1.15	1.16	1.18	1.19	1.17	1.13	1.11	1.08	1.09
Drops	1.2	1.24	1.21	1.22	1.34	1.36	1.37	1.28	1.23	1.16	1.12	1.12
Comparison	1.15	1.16	1.15	1.14	1.13	1.13	1.12	1.12	1.13	1.12	1.11	1.13

SOURCE: Moore, R.W., and D.R. Blake. 1992. *Does ETP Training Work? An Analysis of the Economic Outcomes of California Employment Training Panel Programs.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 360553.

Figure 4.6b Average Number of Employers by Quarter, 1990–1991 Groups



	-4	-3	-2	-1	1	2	3	4	5	6	7	8
Completers	1.21	1.18	1.15	1.14	1.12	1.13	1.12	1.11	1.1	1.09	1.09	1.09
Drops	1.27	1.25	1.23	1.21	1.32	1.33	1.31	1.26	1.2	1.17	1.17	1.15
Comparison	1.15	1.16	1.15	1.13	1.13	1.13	1.11	1.12	1.13	1.12	1.11	1.12

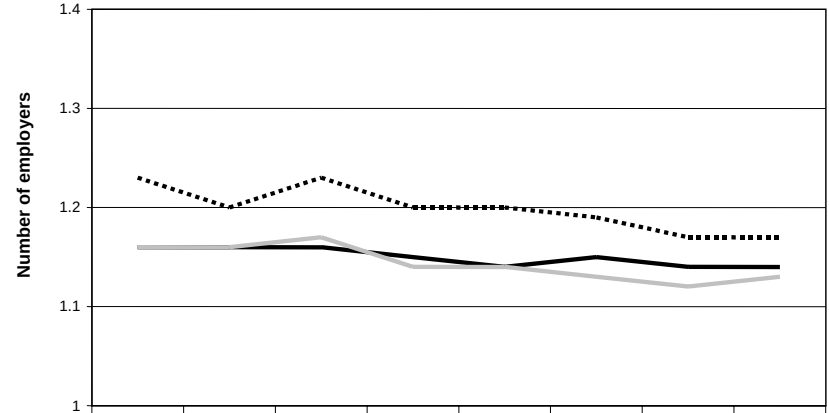
*Averages includes only trainees with earnings in each quarter.

NOTE: Averages include only trainees with earnings in each quarter.
SOURCE: Moore, R.W., D.R. Blake, and G.M. Phillips. 1994. *Public Training with Private Efficiency: An Analysis of the California Employment Training Panel Programs.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 369935.

stability was similar to the comparison group before training and slightly less afterward. We measured this cohort's post-training experience for only four quarters and, at the end, the 1991–1992 completers were closing in on the comparison group, as completers had done in the 1989–1990 cohort. Perhaps if the tracking period had been extended, the 1991–1992 retrainee completers would have become more stable than the comparison group. This brings up an interesting post-training pattern of completers—they tend to have equal or lower employment stability just after training, but then improve relative to the comparison group and become more stable in the second year.

The retrainee dropouts had worse pre- and post-training employment stability than the comparison group in all three cohorts. In the 1989–1990 and 1990–1991 cohorts, the dropouts experienced high instability immediately after training but then closed in on the comparison group in the second year. In the 1989–1990 cohort, the dropouts actually caught up with the comparison group in the eighth quarter

Figure 4.6c Average Number of Employees by Quarter, 1991–1992 Groups



	-4	-3	-2	-1	1	2	3	4
Completers	1.16	1.16	1.16	1.15	1.14	1.15	1.14	1.14
Drops	1.23	1.2	1.23	1.2	1.2	1.19	1.17	1.17
Comparison	1.16	1.16	1.17	1.14	1.14	1.13	1.12	1.13

* Average includes only trainees with an employer in the quarter reported.

NOTE: Average includes only trainees with an employer in the quarter reported.
SOURCE: Moore, R.W., D.R. Blake, and G.M. Phillips. 1995. *Accounting for Training: An Analysis of California Employment Training Programs.* Northridge, California: California State University, Northridge, School of Business Administration and Economics. ERIC Document Reproduction Service No. ED 398386.

after training. Interestingly, dropouts also had significantly less pretraining employment stability than completers.

During the course of the ETP research, we developed some concerns about the one-dimensional nature of this employment stability measure, because it might count people moving to better jobs in the same industry as being less stable. We learned from our fieldwork with the 1994–1996 cohort that more than a few workers did change jobs after training to make full use of their new skills. Therefore, we devised an index measure[13] combining workers' unemployment experience with their changes in industry of primary employer.[14] This index measure was then divided by the comparable comparison group index value to produce an employment instability indicator. Indicator values above 1.0 show the group to have less stable employment than the corresponding comparison group; values below 1.0 show more stable employment than the comparison group. Before-to-after comparisons

of this indicator show whether the training cohort's employment instability increased or decreased after training.

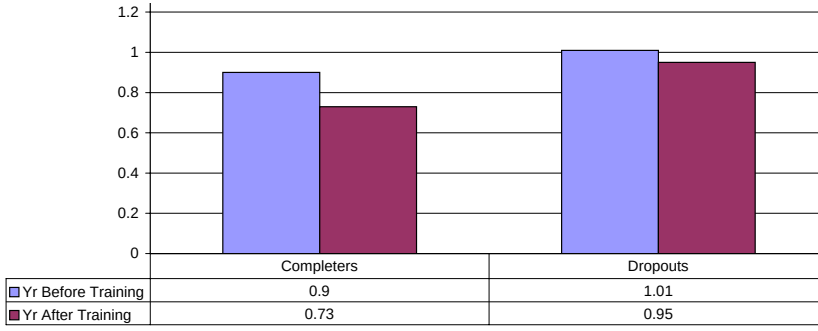
The results of applying this new employment instability indicator to the 1994–1996 cohort are shown in Figure 4.7. Bearing in mind that an indicator value of 1.0 means employment instability equal to that of the comparison group, the results show that training completers had less employment instability than the comparison group before training (their indicator is less than 1.0), and their relative employment stability improved after training. Dropouts experienced about the same employment instability as the comparison group before training, but improved somewhat relative to the comparison group after training.

In summary, training completion really does seem to improve workers' employment stability. The dropouts gain a bit of stability from training, but not very much. We think our recently developed employment instability index tells the story better and more accurately, but both measures of employment instability that we have used show the same results.

Conclusions from Comparing Trainee Cohorts to Comparison Groups

The four studies of ETP training cohorts led to straightforward conclusions:

Figure 4.7 Employment Instability in the Year Before and After Training



SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

- Training completers were significantly more attached to the labor force after training than comparison groups.
- Training completers had greater before-to-after earnings increases than comparison groups, and those gains were relatively greater in a slowing economy than in a recovering economy.
- Training completers' average weeks of unemployment increased less than the comparison group when the economy was slowing and decreased more when the economy was improving.
- Training completers experienced an increase in employment stability after training in all but one case, and there the difference was less than 1 percent.

Notes

1. Earlier studies include Moore and Blake (1992), Moore, Blake, and Phillips (1994), Moore, Blake, and Phillips (1995), and Moore et al. (2000b).
2. For example, Stevens and Shi (1996).
3. For a discussion of the issues of non-experimental and experimental design, and of some interpretation issues, see Friedlander, Greenberg, and Robins (1997).
4. ETP policy allows a set-aside of 10 percent of ETP funds that can be used to fund training contracts that do not specifically meet one of the criteria but are deemed by the Panel to advance ETP's mission.
5. Figure 4.1 only shows two of the four training cohorts and one of the two comparison groups. Showing all cohort and comparison groups would clutter the figure unreasonably.
6. Remember that the cohorts are defined by the fiscal year in which the training contract is completed, that is, when the last trainee completes training. For example, some of the trainees in the 1989–90 cohort may have actually finished training before the fiscal year starts on July 1, 1989, however, most trainees would have finished during that fiscal year.
7. A study of ETP disencumbrances (funds committed to training contracts are encumbered and paid when training is completed, or disencumbered when trainees drop out) concluded that the disencumbrance rate, and therefore the trainee dropout rate, fluctuates because of dynamic changes in the economy (Ong and Soohoo 1998).
8. Excluded from UI coverage are interstate railroad employees, the self-employed, some domestic service workers in private homes, children under 18 employed by a parent, persons employed by a son, daughter, or spouse, certain athletes during off-season training, illegal aliens, professional and non-professional employees of public and nonprofit schools during periods between academic years or terms, all school employees of public and nonprofit schools during vacation or holidays,

and certain other small groups of workers. (Labor Market Information Division of the California Employment Development Department)

9. The overall self-employment rate was estimated at 10.3 percent in 1989 and at 10.5 percent in 1996. (Manser and Picot 1999)
10. "Found in the labor force" means that they had either positive earnings or positive UI claims payments in each of the three quarters indicated.
11. There were no measurement issues in comparisons of unemployment experiences similar to the zeros problem in earnings comparisons. Any adjustments made in some groups' unemployment to reflect divergent labor force participation rates between groups would have inflated the affected groups' unemployment weeks to such an extent as to make comparisons confusing. All of the unemployment averages reported in Table 4.3 are based on the workers found in the critical $-4/+4/+8$ quarters for all cohorts except the 1991–1992, which was based on those found in the $-4/+4$ quarters.
12. The tracking of the completers' unemployment experience does not begin until the first full quarter after they completed training, which includes the 90-day employment check. Thus, the follow-up period begins in the first full quarter after the 90-day employment check.
13. We experimented with different weights for the two components of this index, but changing the weights did not affect the results of applying the measure to the trainees and the comparison group. Given that result, we assigned both variables in the index a 50 percent weight.
14. The employer that pays the largest percentage of a worker's earnings during a particular quarter is that worker's primary employer.

5
ETP at Work: A Qualitative Examination of the Delivery of ETP Training and Its Impact on Trainees

We began our series of ETP evaluations by taking the conventional approach of measuring trainees' earnings and employment. The studies clearly showed that ETP-trained workers had greater increases in earnings and more employment stability than workers in similar industries who did not receive ETP training. While these studies were powerful in that they tracked the earnings and employment experience of more than 100,000 ETP trainees for several years, they were limited, like many training program evaluations, by the method itself. One comprehensive review of the research on public training programs concluded that:

> . . . information provided by current training program evaluations is quite limited. Nearly all training program evaluations are "black boxes," indicating only whether a particular program "works," on average, for a particular sample under a particular set of circumstances (including labor market conditions and service delivery systems). Such information, although useful, may not be readily generalizable to other programs, circumstances, or populations. (Friedlander, Greenberg, and Robins 1997)

Like most training evaluations, the ETP studies left a host of other, potentially more important, questions unanswered. For example, how do projects unfold within the context of a particular company with a particular workforce? What elements make one training program more effective than another? We saw that ETP policymakers and managers needed answers to these and other important questions in order to run the program effectively. To open up the "black box" of ETP training, we conducted case studies of 23 ETP projects representing a variety of institutional arrangements. The purpose of these case studies was to answer the qualitative questions that could not be answered by simply

tracking the earnings and employment experiences of trainees. We wanted to collect data that would allow us to take managers and policymakers inside ETP projects to show what makes them tick.

This chapter presents the case study results in five sections:

1. Summary of research methods
2. Description of a model of factors influencing the impact of ETP training
3. Presentation of the results of our fieldwork, demonstrating the impact of training factors
4. Examination of the impact of ETP training on workers
5. An exploration of how institutional arrangements shape training delivery and impact

RESEARCH METHODS

Sample

We chose a purposeful sample that was designed to capture the wide variation in ETP projects that train incumbent workers. Purposeful samples are valuable in evaluation studies because they allow the researcher to capture the variety of types of cases while using a relatively small number of cases. Evaluation experts recognize purposeful samples as a valid method for describing both excellent and problematic programs, without attempting to generalize to an entire population (Patton 1980).

We selected a purposeful, nonrandom sample of companies with the intention of balancing the sample along three key variables: 1) whether the project was a consortium, training agency, or company project; 2) the reason the company sought ETP training; and 3) the size of the company served. In selecting particular companies, we also considered geography (e.g., Northern versus Southern California), contract size, and whether the company was in the service or manufacturing sector. In the case of training agency and consortia projects, we next selected three companies served by each project for a full field visit. A summary of companies included by sampling criteria is pre-

sented in Table 5.1. (To protect the confidentiality of the companies we visited, we have changed their names and, at times, their locations. All data reported, however, are completely factual.)

Evaluation Approach

We chose a case study approach because we wanted to examine some ETP contracts in depth and capture the multidimensional dynamics of the projects. The cases were selected to represent the varied types of projects that ended during the 1995–1996 fiscal year. These included training agency, consortia, and company contracts. The field study method allowed us to make qualitative observations of the com-

Table 5.1 Fieldwork Company Sample

Stand alone projects by training purpose and employer size	Number of companies
Preventing displacement:	
< 50 Employees	0[a]
50–100 Employees	1
101–250 Employees	0
250+ Employees	3
High-performance workplace:	
< 50 Employees	1
50–100 Employees	1
101–250 Employees	0
250+ Employees	2
Consortia projects:	
Training agency consortia (4 projects)	12
Business consortia[b] (2 projects)	3
Total companies in sample	23

[a]There were no projects in this category during the sample year.

[b]One contract that was listed a business consortium actually served only one business, so only one company was visited under that contract.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

panies in question and to examine each company's training experience. Each case study employed qualitative and quantitative methods to uncover the dynamics of successful and unsuccessful projects, and to explain the nature of ETP's impact on the companies.

Aspects of training

The case studies focus on five aspects of ETP training:

1. The quality of training
   This analysis looks at the quality of training delivered under ETP contracts, including the quality of instructors, training materials, and the customization of training.
2. Learning from training
   This analysis examines the degree to which trainees mastered the material taught in training, and the degree to which they were able to use it on the job.
3. Reinforcement of learning from training on the job
   This analysis looks at whether learning was effectively reinforced when trainees returned to their jobs.
4. Impact of training on companies and individuals
   This analysis measures, qualitatively and quantitatively, the impact of ETP training on individuals trained and companies served.
5. Interaction of institutional arrangements and training impact
   This analysis examines how the institutional arrangements shaped the delivery, quality, and impact of training at each site.

The complete definition of these aspects and how they were measured is described in detail in our account of the fieldwork.

Types of training delivery

The case studies carefully examine the dynamics of the three different institutional arrangements that ETP uses to deliver training:

1. Company contract
   ETP contracts with an individual company to train its workers. The company may use its own employees as trainers,

hire outside trainers, or use a combination of in-house and outside trainers.

2. Consortia contract
   Several employers may band together to contract with ETP to train their workers. Consortia are often developed around an industry association, such as the California Manufacturers Association, or a union such as the United Auto Workers. Again, trainers may come from the employers, the association or union, or from an outside vender.
3. Training agency contract
   A training agency, such as a community college or a private vocational school, contracts with ETP to train employees from eligible companies. Training may be offered on the employer's site or at training agency facilities.

Field Methods

After selecting the sample companies, ETP sent each a letter introducing our research team and project. We contacted a representative from each contract to set up interview appointments. Each company was informed of the purpose of our study, the activities we would conduct, and the amount of time needed for the visit. We provided our own Spanish translator when necessary, and translated all evaluation questionnaires into Spanish.

Interviews

We met with the managers who developed the ETP contract to discuss their motivation for undertaking training, the extent to which they felt their objectives were met, and their view of the short- and long-term impact of the training on the company. We also asked about their relationship with ETP staff. In addition, we attempted to interview the contract trainer or consultant on the project, if any. If the company had a union, we also attempted to interview union leaders who were involved in the training.

Focus groups

When possible, we conducted at least two focus groups consisting of four to nine trainees as well as individual interviews with two or

three supervisors of these trainees. The purpose of the focus groups was to capture the experience of trainees, both during and after training.

Evaluation questionnaires

Donald Kirkpatrick's *Evaluating Training Programs: The Four Levels* (1988) suggests that training may be evaluated at each of four levels:

1. Evaluating reaction
   The evaluator simply asks the trainees for their perceptions of the quality and value of the training, typically through a structured questionnaire immediately after the training.
2. Evaluating learning
   The evaluator assesses whether the trainee mastered the skills, knowledge, or behavior the training was meant to impart. This is measured by observing trainees on the job or by collecting supervisors' ratings of trainee performance.
3. Evaluating behavior
   The evaluator seeks to measure what portion of the training's intended skills, knowledge, or attitudes are actually used on the job.
4. Evaluating results
   At the highest order, evaluators look to see whether the training had an impact on the trainees' performance at work. This can be measured in a variety of ways specific to the company: scrap rates, reduced conflict on the job, reduced absenteeism, increased productivity, etc. This method can go as far as estimating a Return on Investment (ROI) for training.

In conjunction with the interviews, we administered two separate questionnaires, one to trainees and another to their supervisors. Both questionnaires were designed to gather data regarding all four levels of evaluation. The trainees evaluated training quality and commented on their resulting changes in productivity, if any. We also asked whether training led to changes in the work environment. The supervisors completed a similar questionnaire on their opinion of their trainees' learn-

ing effectiveness and change in productivity. Each company's survey results were tabulated and given back to the company so they could benefit from our fieldwork.

Observations

We walked through the manufacturing process to observe trainees at work and to note any effects of training. For example, we often saw Statistical Process Control (SPC) charting at work, team meeting areas, team notes, or the use of new technology in which trainees were trained.

Document analysis

ETP provided copies of the contract files for all clients in the sample study. We focused specifically on the number of trainees retained from the contract period, the type of training that occurred, and the industry represented by each. We also read the field reports of project monitors to get an understanding of issues that emerged during training. In addition, we examined any available curriculum or other materials related to training, such as SOST projects and quality team minutes.

Limitations

General caveats

As mentioned earlier, our research sample is purposeful and not designed to be generalized to all ETP projects. Similarly, the data generated by the evaluation questionnaires are based on the population of trainees who remained with the companies until we conducted the fieldwork. They may not be representative of all the trainees in that particular project or other ETP projects.

Cooperation problem

While the majority of companies selected for the sample were cooperative and helpful in allowing us to visit them, unfortunately quite a few companies declined to participate. Two companies in the "preventing displacement" category declined to participate. The most problematic was the high-performance workplace category. The com-

pany selected in the 101–250 enrolled size category was replaced four times. A company in the 250+ category had to be replaced twice. Though companies in their ETP contract agree to cooperate with follow-up research, our university code of ethics forbids us to use any form of coercion to get cooperation in research projects. We cannot estimate how companies who refused to cooperate may be different from companies who cooperated.

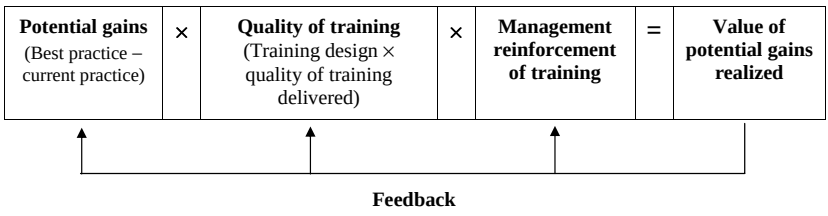
Incomplete performance data

This is related to cooperation problems. Once we were on site, we found it impossible to get all the data we desired. There were two basic causes: First, most of the companies were private and unwilling to share detailed financial and productivity information. Fortunately, they often shared enough partial information to enable us to make estimates of the impact. Second, many companies did not attempt to measure the impact of training and therefore had nothing to give us. Our own detective work allowed us to ferret out some information. This work helped alleviate the performance data problem to a certain degree. A complete discussion of how we assessed the impact of ETP on the companies we studied is included in Chapter 6.

AN ETP TRAINING MODEL

Qualitative fieldwork allowed us to capture the complexity of ETP training projects. The results of our extensive analysis of the 23 contracts studied can be summarized in the model shown below in Figure 5.1. This model illustrates the basic dynamics of ETP training programs that lead—or do not lead—to increased company performance.

Figure 5.1 Training Impact Model



There are three key characteristics of the model: 1) it is sequential, 2) it is multiplicative, and 3) it generates feedback about training. It is sequential in that each element appears in the chronological order in which it occurs in a training program. Before training, a company's production has some level of "potential gains" based on its existing relationship to the industry's best practice. The planning of training precedes the actual training. Next, the reinforcement of training must come after the training. Finally, "Potential Gains Realized" can be conceptualized as value of improved productivity in dollars. "Quality of Training" and "Management Reinforcement" can be measured on a scale of 0 to 1, or in percentages. Thus if both "Quality of Training" and "Management Reinforcement" are 1, then 100 percent of the "Potential Gains" would be realized.

The model is multiplicative in that the quality of each component amplifies or diminishes what has come before. For example, relatively poor training with strong reinforcement of what was learned will still have a significant impact. Conversely, if any of the factors are completely absent (a value of zero) there will be no impact. For example, if there is absolutely no quality in the training, there will be no impact regardless of how well planned or how much the training is reinforced by management.

The model shows that training generates feedback about training that shapes future training. For example, if training is successful, it reduces the distance between the company's practices and the industry's best practices. It also provides feedback about which aspects of training were effective, and that feedback changes how training is designed and delivered. Finally, the success or failure of training changes management attitudes about reinforcing training. Thus, we found that training that had a substantial positive impact led to more and better-quality training, while a lack of impact led to less training.

Complete Explanation of the Model

Potential gains

A company's potential gains from training are limited by the difference between its current practices and the industry's best practices (industry's best practices minus company's current practice). For ex-

ample, if the application of new quality techniques produces processes within the industry with scrap rates of only 1 percent, and a given company has a scrap rate of 10 percent, costing them $1,000,0000 annually, then the potential gain from coming up to the industry's best practice is $900,000, a 90 percent reduction in scrap rates. Incongruously, a company near the industry's best practice, with a 2 percent scrap rate for example, will only have a scrap cost of $200,000 and thus gain only $100,000 by coming up to the industry's best practice, though this is still a 50 percent reduction. While it is possible for companies to achieve even more dramatic results through innovations that improve on the industry's best practice, our fieldwork shows that, most commonly, companies served by ETP are striving to come up to the best practice level rather than make technological breakthroughs.

Quality of training

The quality of training has two components; the training design and the training delivered. We discuss each component separately. Our model implies that they are multiplicative. This means that if the training actually delivered is of very low quality, it will lead to very low quality training overall, even with good planning. The converse is also true—a poorly planned but well-executed training program will yield poor overall quality training.

Design

Decisions made in the design of training have an important influence on the ultimate impact of training. We learned from our fieldwork that key design elements include:

- Selecting workers for training;
- Selecting skills to be taught;
- Selecting the level at which skills will be taught;
- Timing training in relation to other changes such as introduction of technology, quality teams, or incentive pay;
- Planning to institutionalize training;
- Deciding to use in-house or contract trainers or both; and

- Investing in sufficient planning to reinforce the changed behavior after training.

All of these factors will be discussed. For now, one example illustrates the importance of planning the level of training. We found cases where SPC training was too advanced and theoretical, requiring math skills many trainees did not have. The trainees became discouraged and increasingly negative about training in general because of this experience. Thus, in this case we found that the training had little ultimate impact on the company's performance because the trainees were unable to master the skills. In other cases where trainees were taught basic SPC skills after receiving a math refresher course, they were able to immediately put their knowledge to use in production, and the implementation of SPC had a significant positive impact on productivity.

Training delivery

Good training delivery also matters. Our results show that high-quality ETP training has several key characteristics:

- It targets an appropriate level for the trainees.
- It is customized to the company.
- It has effective instructors.

In addition, high-quality ETP training communicates intangible messages to workers, such as "the company cares about the worker," "the worker has an opportunity to advance and improve," and "the company as a whole is moving forward." The ability of training to carry these intangible messages seemed particularly important in companies that had suffered repeated downsizing but were now moving forward.

This measure also assumes that where there is good training, there is learning. We therefore conceptualize this variable as synonymous with learning. In fact, a measure of training quality can be the amount of useful skills and knowledge that trainees gain.

One thing we observed about this variable is that, while the quality of training varied substantially, only one ETP training program's quality was so poor that it actually undermined productivity. Otherwise, all training seemed to hold at least some potential for improving productivity.

Management reinforcement of training

Many studies have found that management involvement is paramount to effective training (e.g., Lengermann 1996, and Wilms 1996). Our fieldwork provides additional insights into the critical role that management reinforcement of training played in ETP contracts. Management reinforcement occurs along three dimensions:

1. Messages about the value of training

   If management sends clear messages to supervisors and workers that training is important and valuable, then the training is much more likely to have a significant impact. Often the message is more than just words. For example, we observed a company president who taught the basic math course for SPC, sending a powerful message about the degree to which he valued training.

2. Reinforcement of skill use and techniques

   Trainees must have a chance to use skills on the job. Otherwise, no amount of learning will make a difference in productivity. If employees return from training to find that the new technology they were trained to use is not in place, the training will have no impact. Similarly, training in "soft skills" such as decision-making or other TQM techniques will have no impact unless teams are formed, assigned problems, and given an opportunity to meet soon after training.

3. Timeliness of reinforcement

   We found training has a dramatically short shelf life. Even in cases where management signals that training is important, and is willing to invest in new technology or reinforce skills in other ways, the impact of training will diminish dramatically if the reinforcement does not come promptly. For example, in one factory we found two groups of SPC trainees—one that used their SPC skills effectively and one that did not. Both groups had identical SPC training. The group that used the skill effectively had immediately implemented SPC when they returned to the production line after training. The group that did not use SPC effectively had to wait several months for SPC to be implemented in their

production process, and by that time they had lost their mastery of the skills.

Feedback

As the model shows, the company gets feedback about the training that shapes future training. We observed wide variation in the degree to which companies got feedback from the training experience and used it to improve future programs. Some companies had precise measures of the impact of training and systematic assessment data, which they used to design future programs. Other companies had only vague impressions about the impact and quality of training but still used these impressions as data for developing future programs. Thus, successful programs that were carefully assessed tended to lead to more training that was even more carefully customized. Conversely, failed training programs that yielded no positive results often caused companies to cease or reduce training.

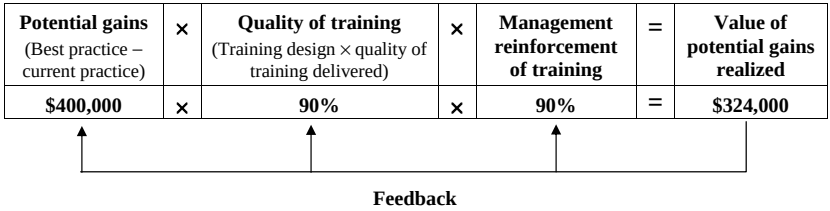
How the model works

The workings of the model are illustrated in three cases from our fieldwork. The examples include a very successful project, a partially successful project, and an unsuccessful project. First, we assumed a particular potential gain from training for illustrative purposes only. Next, based on our field observations and survey data, we estimated a percentage value for each of the variables in the model to indicate its performance in the particular project. We then calculated the theoretical impact of training based on the dollar value of the potential gains realized.

- Very successful project

  This company manufactured pumps. Its productivity was closer to the industry's best practices than most companies, but it still had significant room for improvement. Management worked hard to design customized, high quality training, and they delivered it well. TQM, SPC, and other training was followed by carefully planned implementation of TQM teams and SPC practices on key production lines. Scrap rates and warranty work dropped dramatically. Figure 5.2 illustrates the impact of this project. The positive outcome led to the creation of permanent classrooms in the

Figure 5.2 Strong Positive Feedback



plant and the development of a cadre of in-house instructors. The plant continued to require formal training in TQM and SPC for all new employees and offered periodic upgrade training to existing employees without ETP subsidy.

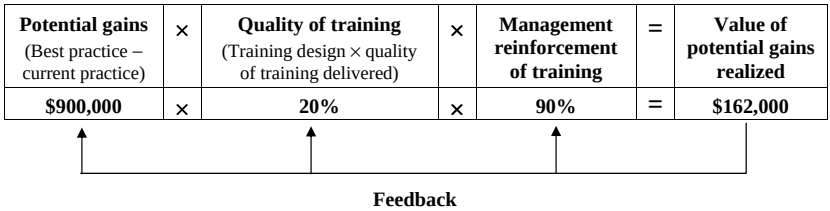
- Partially successful project

  This company made components for heavy equipment. It was far below the industry standard. It hired a consultant to deliver all of the training and, for various reasons, the quality of the SPC and TQM training was poor. After training, management did follow up, creating quality teams and allocating resources to make changes recommended by the teams. As Figure 5.3 shows, despite the poor quality of training, the large potential gains and good management reinforcement led to significant productivity gains. The positive outcome led to continued training of new workers in the TQM system.

- Unsuccessful project

  The unit in which training took place processed insurance claims and provided customer service for a large insurance company. Through a combination of in-house and contract trainers, the company carefully planned a large-scale train-

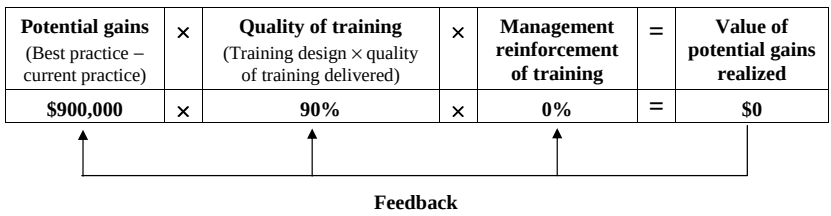
Figure 5.3 Moderate Positive Feedback



ing intervention and then provided excellent training to almost all of its employees. Immediately after training, employees were encouraged to tackle difficult quality problems and were provided resources. After a short period, however, the unit was reorganized. Most trainees were relocated, and new management stopped reinforcing the practices. Employees were very discouraged by this experience, new management perceived few gains from training, and nonroutine training ceased. The result, as illustrated in Figure 5.4, was that there was no productivity gain.

This example shows that even when management intends to reinforce training, unforeseen events can overtake and disrupt the reinforcement, destroying any potential gains and possibly undermining the effectiveness of future training.

Figure 5.4 Negative Feedback



Lessons from the model

The model briefly illustrates a few lessons from the fieldwork. First, the companies' potential gains from training vary substantially. There are limits in the degree to which companies can actually improve their productivity. Companies far down the proverbial learning curve actually have more potential to benefit from training than better-run companies that have already achieved a substantial portion of the potential productivity gains. Second, high-quality training contributes to the potential gains from training but does not guarantee productivity increases. Next, management behavior controls the degree to which potential gains are actually achieved. As the model suggests, if there is no management reinforcement (a value of 0), there will be no change in productivity. Finally, the ETP training experience shapes future

attitudes toward training, and toward the quality of training and management reinforcement. In general, positive training outcomes increase the commitment to training and negative outcomes decrease the commitment to training.

FIELD RESULTS

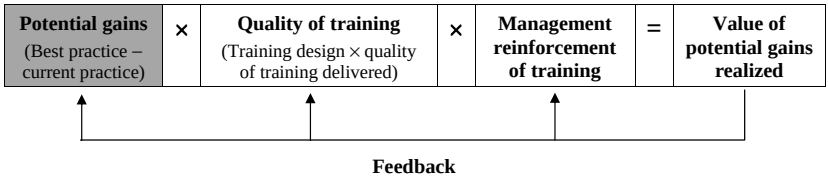
This section employs the training model to analyze our field results from the 23 companies we visited. The organization of this section follows the sequence of the components in the model, so we address the potential gains from training, as they are shown in Figure 5.5, first.

Potential Gains from Training

In the field visits, we were struck by the wide variation in companies' potential to gain from ETP training. Companies with strong management are likely to have achieved a large proportion of the potential gains available through training. These well-run companies have already improved their production process and thus have less potential for benefiting from ETP training. These same companies may best be able to obtain and execute an ETP project, however, because they do have strong management. Conversely, companies far below the best practice standard for their industry, due to weak management or other problems, have the most to gain; but they are likely to have the most problems executing an ETP-funded program and supporting changes in the production system.

A related observation is that companies that are at the best practice level will need breakthroughs to improve productivity. These breakthroughs are less likely to come from training than from technological

Figure 5.5 Potential Gains



or systems changes. Also, training investments that are intended to break through current industry practices are high risk since the ideas are new and untested. They do not have a proven track record, and thus may not yield any results.

What we observed in the field is that companies with relatively low-quality and inefficient production processes experienced tremendous gains from basic training in techniques like TQM, basic production planning, or decision making. Implementing even rudimentary

Text Box 5.1 A Tale of Two Companies

Just miles apart in a central valley city are two companies that represent the wide range of potential gains from ETP training. The first company, T-Bar, which manufactures roll bars for heavy equipment and related products, has grown rapidly. Production takes place in a dirty and disorganized open-air shed. Prior to ETP training there was little focus on improving production efficiency. Workers simply followed traditional methods and pushed the product out the door. For example, assemblers kept parts in a helter-skelter array of boxes on the floor around the assembly area. The process was obviously far below the industry best practices for any manufacturing process. After basic TQM training, management formed teams and allocated resources based on suggestions from the teams. The team of assemblers organized their parts on shelves in a container near their work area. This simple change dramatically improved their efficiency and ability to keep track of parts. T-Bar experienced significant improvements from this and other basic changes because they started far below industry standards.

A few miles across town, Flow Pumps produces stainless steel pumps in a clean, modern, air-conditioned factory. Management has invested in state-of-the-art equipment. The highly-trained human resources staff carefully selects employees for motivation and basic skills. Production is organized by an in-house staff of industrial engineers to maximize efficiency and quality. The company still wanted to improve, so through ETP, it invested in training its frontline production workers in SPC and TQM techniques. After training, teams attacked difficult lingering problems, many of which were eventually solved, leading to important but relatively small gains in productivity. The gains were relatively small because the production processes were already near optimum.

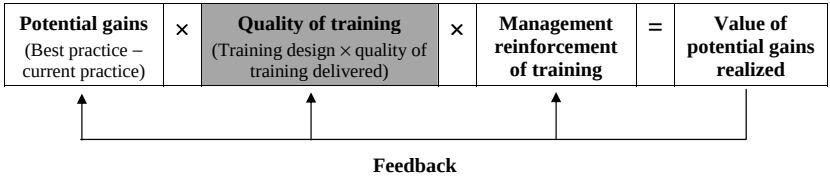
team quality practices led to substantial improvements in quality and productivity. In other companies that were much better managed and had better-trained workers, substantial training in relatively higher-order skills and careful implementation of management level reforms led to significant but smaller improvements in quality and productivity (for examples from the fieldwork, see Text Box 5.1).

To us, this dynamic is analogous to public health programs in developing countries where modest interventions can yield huge benefits. For example, getting people to boil drinking water, a relatively simple act, can have a significant impact on mortality rates in areas where waterborne diseases are major killers.

Quality of Training

Use of our model to analyze data collected from the fieldwork revealed that the quality of training had two basic elements: the quality of planning that went into the training, and the quality of the training actually delivered (as illustrated in Figure 5.6). In this section, we will first discuss the elements that make up effective planning, and then examine the quality of training delivered by the projects we studied.

Figure 5.6 Quality of Training



Planning training

From the fieldwork, we identified a series of key activities and management decisions that have a critical influence on the quality of training. These steps are listed below, with our observations about each. Text Box 5.2 provides a description of what we view as good planning.

- Clear Objectives

  As with any major undertaking, ETP training projects need clear goals to be effective. The fieldwork confirmed that

companies with clear, explicit goals were more likely to complete their ETP contract in a timely and effective manner. In some cases external forces drove the goals. For example, we saw several cases where companies had to train to achieve quality certification from a third party, such as Boeing or some other major contractor. In these cases, the projects were clearly focused and had top management's attention, although they sometimes lacked the customization needed to be optimally effective. In cases where goals were either unstated or vague (for example, "we want to train to improve quality"), training suffered when conflicts occurred between training and other goals (such as production).

Similarly, if the goals were not understood or shared by all managers, conflict often erupted when the resource requirements of training became clear. We observed that if trainees did not understand the overarching goal that drove training, they were less motivated and were unable to put training in context. Clear goals also help companies make other essential training decisions such as which training topics to cover and whether or not to use in-house trainers.

- Assessing Basic Skills

  Assessing the current skill levels of trainees is a key factor in planning appropriate training, but this step was commonly overlooked in the projects we visited. For example, we found several instances where companies attempted to teach SPC techniques to frontline workers who lacked the basic math skills to grasp or use the techniques. Companies believe that they know their workers well, but we found they often misjudged employees' skills because they did not use systematic assessment of individual workers. Some consultants use systematic needs assessment and some do not. Sometimes the experience in training leads to improved skills assessment. For example, after having difficulty teaching SPC to its existing workforce, one company began screening new hires for basic math skills and added a course in basic math skills to the training received by all new hires.

- Consultant versus In-house Training

  Whether to hire training consultants or use in-house trainers is a major strategic decision in the training design. The

issues surrounding the use of consultants and contract trainers are complex and explored in an earlier study (Moore, Blake et al. 1997). The fieldwork revealed many consultants and contract trainers with industry-specific expertise, who knew ETP well, and delivered high-quality programs. Some trainers took the time to familiarize themselves with the company's processes and then customized instruction to the company. Unfortunately, we also found trainers who provided poor delivery of generic training to unprepared trainees.

The earlier study of consultants and contractors showed that most employers do not shop effectively for consultants and training contractors. ETP's continued efforts to encourage employers to carefully evaluate consultants and contract trainers should eventually improve the planning of projects. The value of choosing to do training in-house was our most telling observation. Companies received many benefits when they chose to do the training in-house or teamed employees with outside trainers. First, the inside trainers' intimate knowledge of the company appeared to improve the quality of training. Next, by using senior employees as trainers, the company sent a powerful message that training was valued and important to upper management. In cases where frontline workers were teamed with managers to serve as trainers, the cooperation between workers and management modeled the new cooperative environment the training was to produce, again sending an important message. Also, in-house trainers speed up and improve the feedback cycle. In-house trainers are around to observe whether the skills taught in training are used on the production floor, which provides ongoing feedback that can be used to improve future training. (Lengermann 1996)

Finally, we observed that training is much more likely to persist beyond the ETP contract when training was provided by in-house trainers. There are some simple reasons for this: With in-house training there is more likely to be a customized curriculum owned by the company. Though in-house trainers must take time away from regular duties to

train (if they are normally production workers or managers), it is less expensive than hiring outside contractors. In-house trainers often teach multiple cohorts of employees over time, helping to infuse training into the culture of the company. In general, using in-house trainers seems to increase the company's commitment to training.

- Intact versus Mixed Training Classes

  A key planning decision is whether to train intact groups of workers or mixed groups of workers. We found that successful projects had a conscious strategy of forming groups that would reinforce larger project goals. For example, one company whose core process was processing insurance claims knew it had a communications problem between units that was undermining quality. The company deliberately created training classes with employees from multiple departments. In class, trainees built inter-departmental relationships and learned how others saw problems and barriers. Back on the job, these new relationships and perspectives led to a major improvement in communication. Conversely, in another project, the focus was on creating quality teams to solve problems within various production areas. Classes were made up of entire work units, and teams were formed that began to work on production problems. When training ended, the workers were already functioning as teams, which enabled them to begin solving problems and improving quality immediately.

- Planned Reinforcement

  We discuss the importance of management strategies for reinforcing training at length later in the report. Here, we note that we were surprised at how few companies consciously plan to reinforce what was learned in training. It is well known that changes in behavior promoted by training will not persist unless they are reinforced after the training is over. For instance, if training teaches a variety of group problem-solving techniques and quality strategies, but groups are not given authority to take on problems, time to meet, and required resources, training will yield few quality

improvements. Most companies we visited that eventually developed effective reinforcement strategies did so in an ad hoc manner after the training was over, and managers realized they needed to do something more to make training pay off. In the few cases where systematic reinforcement was planned, we found the effects of training to be potent and the payoff immediate.

- Importance of Creating Just-In-Time Training

  The fieldwork impressed on us the importance of training that is delivered "just in time." Any experienced teacher knows that the shelf life of new learning is short. No matter how good the initial training, new skills and knowledge are lost if not used promptly. We saw many examples in which companies provided good training under ETP, but when workers returned to the production line, the systems in which they were to use these skills were not in place. For example, when a group of production workers in one company was trained in SPC, there were no gauges or charts for them to use to implement SPC when they returned to the production lines. Only after six months was an SPC plan ready for their part of the production line—by that time, most trainees had forgotten the SPC they had learned and they had a great deal of difficulty getting the SPC system going. Much of the benefit of the original training was lost. Similarly, training workers on new technology, long before the technology is in place, is futile.

- Planning SOST to Expand and Reinforce Training

  We will discuss SOST[1] (Structured On Site Training) at length later. For now, we note that the planning of SOST was much more problematic than planning classroom training. Many projects included substantial SOST hours, but the planning needed to ensure the quality of SOST was often absent. Too often, trainers did not design SOST assignments specific to the production process or provide coaching while trainees worked on the assignments. We also found that supervisors often lacked commitment to allowing employees time away from production to complete SOST.

Text Box 5.2 Good Management Planning Leads to Effective Training

In 1994, the managers at PHA Insurance (not real name) wanted to become NCQA-certified (this is similar to ISO 9000 quality certification). They went through the certification process but did not pass. "It was a big blow to the company," according to the managers interviewed.

As a result of this failure, managers "wanted to improve the staff's ability to make decisions and make change." According to the managers, training had three goals:

1. Make a visible improvement in the business process.
2. Achieve a "clear" NCQA accreditation in three years.
3. Improve customer service.

The managers also recognized that to be effective in the long run, they needed to increase communication across various departments and institutionalize training. "We wanted to establish relationships we wouldn't normally have." "Training was to create an opportunity for dialog; [employees] discovered who was a customer and who was a supplier." PHA submitted a proposal to enroll 600 trainees and complete training for 500. Training would be in three areas: Management skills, SPC, and office automation.

Management selected a widely recognized industry organization to provide a tailored curriculum for the project. This organization offered a wide array of training modules. Based on the managers' experience with a failed attempt to achieve quality certification, they selected modules that would eliminate the organization's deficiencies. The modules were then tailored to PHA's particular processes. The organization also trained existing staff to serve as trainers so that after the ETP training was over, new-hire and refresher training would still be available. The managers also believed that trainers who knew the organization's culture would be better able to reshape it through training. Within six months after the training, PHA achieved NCQA certification.

Not all projects are successful. The example in Text Box 5.3 illustrates how poor planning can lead to an unsuccessful project.

Text Box 5.3 Wavelength: When Badly Planned Training Gets Worse with Management Apathy

Wavelength manufactures precision radio components and subsystems for the military, intelligence, and commercial sectors. As the defense industry contracted, Wavelength was forced to move into the commercial communications market, where the profit margins are lower and customer demands for quality, service, and response time are much higher. In response, the management set out to establish a "high performance workplace." They decided to train their 200+ workforce in vocational English as a second language, statistical process control, management skills, and manufacturing resource planning. The result, they hoped, would be that front-line employees would be empowered and managers would be equipped to adapt to the changes.

Managers and supervisors filled out questionnaires asking what they felt was needed in terms of training, and a senior human resources manager selected a contractor. Trouble began when the trainees lost interest during classes. Part of the problem was that the curriculum was "over their heads." Also, managers had not realized how greatly training would disrupt their work. The resulting production delays were further exacerbated by SOST, which was perceived as having little value and had to be completed during working hours.

The situation did not become catastrophic, however, until management lost interest. Instead of working with the instructors to adjust the curriculum, the managers began leaving in the middle of class or stopped attending altogether. Employee morale began to plummet. TQM became the least useful component of training, simply because the managers never gave the workers an opportunity to practice it.

On questionnaires, trainees expressed strong positive responses to the opportunity to learn new skills and increase their motivation. Thirty-four percent agreed and 34 percent strongly agreed that they "feel more motivated and involved" because of the training.

However, their worst memories of the training included the poor match between what was taught and what they could apply to their work, and the abandonment of training by their apathetic management.

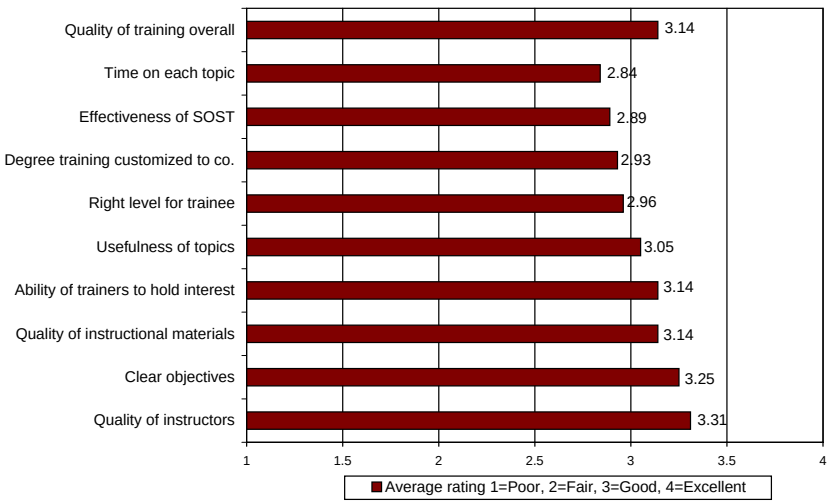
Quality of training delivered

We begin this section by summarizing data from our evaluation survey, which was administered to trainees at every project we visited to provide an overview of the quality of ETP training. Next, using both the survey data and the fieldwork, we examine three quality issues that emerged as critical to the successful delivery of training:

1. Effectiveness of trainers.
2. Customization of training.
3. Effectiveness of SOST.

As noted earlier, we asked trainees to rate the quality of the ETP training they received on a standard evaluation questionnaire. As shown in Figure 5.7, trainees rated the overall quality of training as slightly better than "good," giving it a rating of 3.14 on a 4-point scale. The trainees rated nine aspects of training. The highest-rated aspects were the quality of instructors and their ability to hold the trainees'

Figure 5.7 Trainee Ratings of Quality



SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

interest, along with the clarity of the training objectives and the quality of instructional materials. Lower-rated aspects included the degree to which the training was customized to the company, the effectiveness of SOST, the time dedicated to each topic, and the level of training.

Results varied substantially from one company to another. For example, at some sites, trainees were very pleased with the effectiveness of SOST and very critical of the instructional material. Overall, field interviews and observations confirmed that the quality of instructors tended to be good, while the effectiveness of SOST and the degree to which training was customized to the company varied substantially.

To explore the relationship of the different aspects of training quality to the impact of training, we used regression analyses. The impact of training was measured three ways: the amount learned, how often new skills were used, and the impact of training on productivity. The results are summarized in Table 5.2. The coefficients measure the strength of the unique relationship between quality measure and outcome measure. The significance measures show the probability that the measured relationship is due to chance or random error. A relationship is only considered statistically significant if its significance measure is 0.05 or less, indicating a 5 percent or smaller probability that the relationship is due to chance or random error. Significant relationships are shown in bold type. Finally, the overall R^2 measure indicates the proportion of the variance in the impact measure accounted for by all the measures of quality. This measure shows the degree to which the measures of quality predict the impact of training. The higher the R^2, the stronger the quality measures are as predictors of training impact.

Overall, the analysis shows that the quality of training was significantly associated with how much of the material was learned, the use of skills after training, and the self-reported impact of training on productivity. Interestingly, the strongest relationship ($R^2 = 0.343$) was between the quality of training and the impact on productivity, indicating that better-quality training leads to larger increases in productivity. Relationships between quality and how often new skills were used ($R^2 = 0.310$), and between quality of training and amount learned ($R^2 = 0.284$), were significant but weaker. Overall, these results support the training model we introduced earlier. Individual measures of quality that had strong relationships with all three measures of training

Table 5.2 Regression Results for Quality Measures and Training Impact

	Amount learned		How often skill used		Impact on productivity	
Quality Measure	Coefficient	Significance	Coefficient	Significance	Coefficient	Significance
Clear objectives	.048	0.481	0.028	0.701	0.044	0.527
Usefulness of topics	**0.159**	0.013	**0.311**	0.000	**0.249**	0.000
Length of time on topics	−0.034	0.620	−0.059	0.409	0.041	0.566
Quality of materials	0.065	0.315	0.067	0.316	0.001	0.983
Degree of customization	**0.127**	0.043	−0.060	0.356	0.086	0.166
Quality of instructors	−0.145	0.056	−0.124	0.126	−0.028	0.712
Effectiveness of SOST	**0.306**	0.000	**0.344**	0.000	**0.258**	0.000
Ability to hold interest	**0.164**	0.032	0.039	0.624	0.082	0.283
Right level	−0.037	0.554	−0.055	0.391	−0.089	0.161
Quality overall	0.040	0.612	0.101	0.220	0.093	0.240
Adjusted R^2	0.284		0.310		0.343	

NOTE: Statistically significant relationships appear in bold type.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

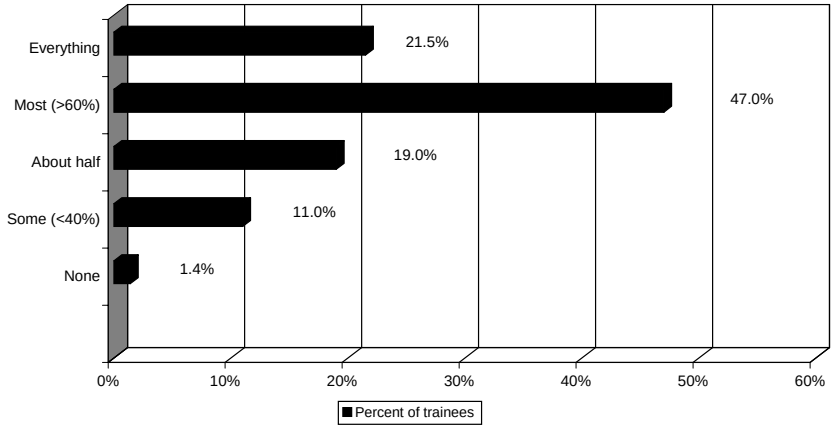
impact were the usefulness of the topics covered in training and the effectiveness of SOST. We discuss SOST at length later, but it is important to note here that these results show that when the "effectiveness of SOST" is rated highly by the trainees, they also report larger positive training impact. Conversely, when SOST was rated poorly, the impact of training was also rated lower. The degree of customization and the ability of training to hold interest were also significantly associated with the amount of learning reported by trainees.

Trainee learning

A second key indicator is whether or not trainees learned what was taught in training. Again, the results show that overall ETP training was successful—over two-thirds of the trainees report that they were able to learn "most" or "everything" of what was taught. Less than 2 percent of trainees said they learned none of what was taught. Trainee responses are graphed in Figure 5.8.

Again the results varied substantially from company to company and from one skill area to another. For example, trainees trained in

Figure 5.8 Amount Trainees Reported Learning



SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

TQM reported mastering a larger proportion of what was taught than trainees who took CAD/CAM (computer-aided design/manufacturing).

Effectiveness of trainers

As anyone who has ever taken a class knows, the effectiveness of the instructor is a key to class success. In these projects, the quality of instructors was the highest-rated item on our survey (3.31 for instructors versus 3.14 for overall training). We found many instructors (both contract and in-house) to be motivated, skilled, and highly committed. We found many instances where, even though trainees criticized the training, they praised the instructors. When confronted with a generic curriculum or materials that were pitched to an inappropriate level, the skilled instructors often attempted to change the instruction to make it more effective. Trainees responded well to instructors who were knowledgeable about their company's industry and took an interest in the trainees as individuals. The individual trainer's sensitivity was particularly important to trainees who had limited formal education and who were very anxious about being in a classroom situation.

Customization

The fieldwork convinced us that customization of training was critical to creating effective ETP training. Customization needs to occur on three levels. First, as we noted in the planning section, the level at which a topic is taught needs to be adjusted to the level of trainees. Teaching college-level SPC techniques to trainees with limited math skills is futile. Next, the training needs to be customized to the unique processes used by the company. Examples pulled directly from the trainees' daily experience are much more powerful teaching tools than generic examples. Finally, training needs to be in tune with the company's culture (see Text Box 5.4). If a company operates as a rigid hierarchy with a great social distance between workers and managers, training that "models open informal communication" will fail because these approaches will not be used on the job.

As previously shown in Figure 5.7, trainees rated the reported customization of training below their overall quality ranking (2.93 for customization versus 3.14 overall). The lack of customization in many ETP projects has roots in several factors. First, managers often do not

Text Box 5.4 Trophies Galore: Customized Training Is High-Quality Training

Trophies Galore is a manufacturer of plastic components for trophies. In order for this family-owned business to remain successful in the face of low-priced international competition, it had to maintain its product innovations and improve its service.

Trophies Galore's management knew it needed to upgrade the skills of all employees to remain competitive. Management had considered hiring a training consultant to design a curriculum, but after learning about a business association's consortia program, they chose to join that instead. The association connected them with a consultant who was also a trainer. Before committing, however, a company executive sat in on one of the consultant's classes at another site. This executive also reviewed the curriculum and arranged for the trainer to tour the plant and learn the processes, so that an understanding of the company's processes and culture could be built into the training. In short, management wanted to make sure training would be customized to the company's needs.

Fifty percent of the trainees rated the quality of training as excellent. Fifty percent also rated the quality of instructional materials as excellent. "Jim (the instructor) added a great deal of interest. Even the exercises were like games."

Over 75 percent of the trainees rated the customization of training as "good" or "excellent." "The instructor was able to customize to our company." "He got to know us on an individual basis and he also learned the manufacturing process." "It was a very well-put-together program, and equally important, the selection of the trainer was exceptional."

understand the importance of customizing training or how training can be customized. To simplify the process for themselves, they purchase a standard training package including a set curriculum and outside instructors. An earlier study of consultants and training contractors reports that many employers are sold on the training package and the ETP program by the same consultant (Moore et al. 1997). Thus, some employers have little exposure to training models other than those offered by the training consultant. However, we also found that skilled consultants can quickly customize training for individual employers.

In several examples, consultants or training contractors spent time studying a company's processes and culture, and then incorporated that knowledge into the training with examples, tools, or materials from the company.

A second factor that leads to lack of customization is an outside mandate to use a standard curriculum. This requirement may come from a major customer (e.g., Boeing) that requires a standard quality-training curriculum (such as ISO 9000), or it may come from a corporate parent. Again, if these curricula are not at an appropriate level for the individuals to be trained, or do not provide specific examples from the company's process, they are often ineffective. Text Box 5.5 provides a clear example of the problems that can occur with generic curricula.

A final factor that has diminished the customization of ETP training is the growth of training agency projects where individuals from many different companies, and even several different industries, are

Text Box 5.5 TAC Aviation: Standard Curriculum Makes for Little Learning

TAC Aviation is a small aerospace company that makes parts for Boeing and other prime contractors. Its ETP training provided vocational English as a second language (VESL), TQM, and SPC training to about 50 workers.

The project operated under a significant constraint in that their biggest customer, Boeing, mandated use of the Boeing TQM/SPC curriculum. All parties agreed that the curriculum was too technical and too detailed for the needs of these employees. According to the training consultant, "the Boeing curriculum is a major problem." For example, managers, supervisors, and trainers agreed that there were far too many SPC charts in the curriculum and that the SPC was too technical for the trainees, who were involved in very small production runs. There was also a perception by all parties that there was too much material to be covered in the time allotted.

Data from our trainee survey showed that while 25 percent of the trainees reported they learned "all of what was taught" in the areas of TQM, and 38 percent in production techniques, only 7 percent reported that they learned "all of what was taught" in the SPC area.

mixed together in a single class. In these situations it is impossible for even a skilled instructor to customize the training. For example, an office automation class may include technical workers who are there only to learn how to manipulate data in a spreadsheet, clerical workers wanting to learn advanced word processing functions, and production workers wanting to learn basic database functions so they can maintain inventory. In such a situation, all trainees are subjected to substantial periods of instruction on topics of little or no immediate value to them. We discuss this problem at length in our section on consortia and training agencies.

Effectiveness of SOST

Structured On Site Training (SOST) is ETP's term for what is commonly referred to as on-the-job training. After trainees are introduced to concepts in the classroom, they practice their skills on the job with some sort of supervision from the training instructor or a company supervisor assigned as an SOST instructor. During the 1995–1996 program year when these projects were operating, ETP reimbursed employers for each trainee hour of SOST, but at a lower rate than for classroom training. Since SOST generated revenue for the training program, and was less costly to deliver for both training contractors and for employers (since workers were not away from production), there were powerful incentives to design substantial amounts of SOST into projects. ETP found it had to limit the number of SOST hours allowed. It is important to note that the projects we studied operated under an SOST policy different from the one in operation today. At that time, payments were based on trainee hours spent on SOST assignments. The policy allowed 10 trainees per instructor for SOST training, and each trainee had to document every hour spent on SOST training. The current policy pays only for instructor time spent on SOST and only requires documentation of the instructor's time.

We found that the quality of SOST varied widely across the projects we visited. SOST is a powerful instructional approach when applied correctly, but all too often we observed that SOST activities had limited relevance to training, were poorly supervised, and contributed little to the effectiveness of training.

Good SOST has a number of key characteristics. First, the assignments follow the topics covered in a timely manner. Next, the tasks

assigned deal with immediate, work-related problems. In many cases, we found that instructors assigned generic problems or had trainees develop their own problems to work on. For example, in a case where trainees were learning problem-solving skills, they were given generic "life problems," such as planning a home remodeling project, rather than problems germane to their job. Finally, trainees need attention from instructors while they complete SOST assignments. Employees need to be able to receive help promptly when they "hit a road block"

Text Box 5.6 SOST at Correct Disk: Problems in an Otherwise Successful Training Program

Correct Disk (CD), a maker of disk-drive parts in Silicon Valley, experienced savings of over $5,000,000 from actions and plans started during ETP-funded training. CD employed over 1,500 workers in California and trained 950 of their workers at a cost of $1,700,000 paid by ETP, and about $1,200,000 more paid by CD. The immediate improvements in performance more than covered the costs of training, and the impact of training has gone a long way to enable CD to survive and prosper in an increasingly competitive and ever more commodity-driven market. CD contracted with an industry association for the training, which was done on-site by two training consultants.

In spite of the overall success of the training, the trainees commented that the SOST was not effective. The contract called for a total of 68 hours of class, 11 hours of lab, and 107 hours of SOST for which ETP paid $9.69 per hour. From our interviews, it seems that the actual time "spent" was 4 hours of SOST and 1 hour of lab per week for the 13 weeks of training. For the SOST component of the training, the trainees had to devise problems to solve. Trainees reported that the problems became quite contrived and were often not applicable to their jobs. It was difficult for the instructors to assign appropriate SOST homework because they lacked familiarity with the company's processes. SOST took time away from more productive work and resulted in trainee dissatisfaction with the entire SOST process. Given a 40-hour workweek, the lab and SOST took an eighth of their time for a quarter of a year. More than one worker, torn between being productive and trying to fulfill the SOST requirements, signed off on the SOST even though the hours were not spent on it, so that the contract could be fulfilled.

Text Box 5.7 Basic Batteries: The Right Way to Do SOST

Our questionnaires showed that 56.3 percent of the trainees at this site rated the effectiveness of SOST as "good" and 31.3 percent thought it was "excellent." SOST worked well here because the company used in-house trainers who knew the production processes. The trainer was the union shop steward, so the company had the cooperation of the union. Furthermore, the supervisors were extremely cooperative in helping the trainees as they completed their SOST assignments. One trainee we interviewed felt encouraged to use the new skills and knowledge, because of "the on-site training that we received."

in their assignment. They also need immediate feedback on the quality of their work so that they know when they are using the new skills effectively.

We found that SOST was often poorly delivered. This observation was confirmed by our questionnaire, on which trainees across the projects rated the quality of SOST as substantially below the overall quality of training (SOST was rated 2.89, versus 3.14 for training overall). It appears that SOST is added to a number of contracts to increase the value of the contract without increasing the hours that employees are off the job, and as such, the program seems to be implemented half-heartedly. Trainees often complained about the seeming waste of time associated with SOST. In interviews about SOST the topic that came up most often was the difficulty of completing the paperwork required to document SOST, and the pressure employees felt to complete assignments. Consequently, when we asked them to recall their SOST experience, learning was seldom the first thing that came to the trainees' mind. Text box 5.6 illustrates one project in which the SOST component contributed very little, and Text Box 5.7 shows another project where it was done well.

Management Reinforcement of Training

Management reinforcement of training (and good management in general) maximizes the positive impact of training, and no reinforcement (or generally poor management) negates the impact of even good

training (see Figure 5.9). Based on our fieldwork, we identified five categories of management intervention that contribute to the impact of training on a company's quality and productivity: 1) shaping the meaning of training, 2) creating opportunities to use skills, 3) creating rewards and incentives to use skills, 4) establishing levels of participation, and 5) institutionalizing training.

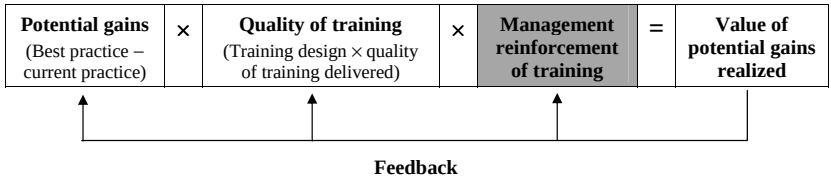
Shaping the meaning of training before and during training

Most frontline manufacturing workers have little formal education, and have often had negative experiences in the classroom. Not surprisingly, we found that most ETP trainees reported that their first reaction to any announcement of training included anxiety and resistance. Uncertainties about what the training would involve, fear of embarrassment in front of co-workers, and worries about changes in their work life as a result of training were reasons given by workers for their initial negative impressions of training. Such anxieties are not unique to production workers—few middle-aged managers are eager to have their math skills tested.

In successful projects, managers anticipated these reactions and worked hard to answer employees' objections to training. It became apparent to us that it was important that both top managers and immediate supervisors send a positive message about training along with enough specifics about the company's plans to reassure anxious workers. Text Box 5.8 provides an example of how one company did this well.

Workers perceive that training carries important messages about the future of the company and their role in it, and these messages can be very powerful. One worker in a small aerospace company told us, "When I learned about the training program, I thought: At last . . . after

Figure 5.9 Management Reinforcement of Training



all the layoffs something positive [is happening], something that is moving us forward." Another trainee said that training told her that ". . . the company cares about me, and I have a future here." Our survey data clearly showed that after training, most employees had much more positive attitudes about their companies and their futures in them. They attributed the attitude change to training.

Workers may also perceive training negatively. Some workers believe that training will be used to speed up production at their expense, or that training classes will be used to sort out some workers for less desirable jobs. Some workers fear that they will be laid off if they cannot master the training material.

Communicating effective, positive messages about the training program should involve the use of symbols and ceremonial events, in a very direct and public way, to show employees what training is all about. The more successful companies did this by giving the training programs upbeat names, holding dramatic kick-off meetings, having important executives or union leaders address employees about training, or using company newsletters, posters, or banners to reinforce the key messages about training. These symbolic events emphasized to workers that the company valued the training and its employees.

Creating opportunities to use skills

Newly-learned skills have a very short shelf life. If employees do not soon put to work the skills they learned, most of what was learned will be forgotten and trainees will grow cynical about the value of training. Effective programs ensure that trainees have the opportunity to put skills to work during or immediately after training. For example, one small manufacturer of printed circuit boards had a policy that, as trainees moved through the course in printed circuit board design, they were systematically assigned more difficult tasks. As they neared the end of the program, they were allowed, for the first time, to talk directly to designers and engineers at client companies to resolve design problems. Each step allowed trainees to use newly-acquired skills and gain prestige in the eyes of their co-workers and customers, cementing the learning that had taken place in the classroom.

One small aerospace supplier provided an example of effective reinforcement of skills immediately after training. During training,

Text Box 5.8 Fret Musical Instruments: Shaping the Meaning of Training

Fret manufactures internationally-known musical instruments employing a mostly Spanish-speaking workforce. In 1986, Fret only had about 50 employees at the site. After a management buyout, the company grew rapidly and committed to producing high-end instruments.

To achieve the quality levels necessary to compete, Fret had to dramatically upgrade the skills of its workforce. It was faced with training a workforce that had little formal education. The managers anticipated that employees would be anxious about training and resistant to it. Further, the managers recognized that it would be difficult to motivate the trainees to complete the training and use their new skills on the job. Therefore, Fret created a program called Qual + to be a visible symbol of the company's commitment to quality and employees. Training began with an all-company meeting where the Manufacturing Vice President introduced both the training and the Qual + program. Interestingly, he did not emphasize the value of the program to the company but rather the value to the individual worker. "I told them this was their chance to improve. They could learn valuable skills that would help them here, in their personal lives, or in another job."

"I measure the success of the program by the smiling faces when employees become members of the Qual + team." "We use the training not just to build skills but to build a sense of membership and family at Fret," said the Vice President for Production. Training is tied to the Qual + program in that when employees complete training there is a formal ceremony where graduates get a pin and diploma, which makes them a member of the Qual + team. The only meeting room in the factory is called the Qual + room. In our fieldwork, we found that Fret's employees valued their membership in Qual + and bought into the idea that the problem-solving and decision-making skills learned in training benefited them individually and not just the company.

employees were told about the new quality system and how it would work. As soon as the training was over, management formed quality teams and created a process where teams could request time to meet to work on problems. When the teams generated plans for quality improvements, they were allowed to make formal presentations to a management committee. If the committee accepted the plans, re-

sources were allocated for the process changes and the team was given public recognition. Management's quick action on the first proposals from quality teams sent the message that the training was important and that the quality program was for real.

We also saw examples of what can go wrong in this process. We found two major barriers to the immediate reinforcement of skills after training. The first barrier is that necessary technology or programs are not in place when training is completed. The second major barrier is the lack of buy-in from line managers and immediate supervisors. Top management often works hard to "sell" training to frontline workers, but they often overlook first-line management and supervisors, whom they assume will see the value of training. We found several cases where supervisors who had to struggle to maintain production while workers were away at training became very negative about the training and did little to reinforce it once workers returned. Part of the resistance to reinforcing training was simply that implementing new techniques or programs initially slowed production, which was already behind schedule. These supervisors had been put into the double bind of having to maintain production while resources were taken away from production for training and implemention of production innovations.

Creating rewards and incentives

The companies we visited held widely varying views on how to provide incentives to employees to get them to complete the training and take it seriously. We found we could split the companies' strategies into four categories:

1. Explicit incentives

   In some systems, employees receive immediate rewards for completing training (see Text Box 5.9). These rewards come in the form of guaranteed promotions or pay raises, or at least eligibility for promotion. This was the approach taken at Basic Batteries.

2. Implicit incentives

   In other systems, trainees expect they will eventually be rewarded for completing training, but the timing and nature of the reward is not explicit. This is illustrated by the case of Sports Brace (see Text Box 5.10).

Text Box 5.9 Quid pro Quo at Basic Batteries: Explicit Reinforcements to Training

Basic Batteries (BB), located in Southern California, is a major producer of lead-acid batteries for automobile and marine use. They have three facilities in the LA area. The ETP project studied was in the main manufacturing facility. The batteries are sold under a number of private labels. About half the workers are Hispanic and half are Vietnamese. BB has long had an interest in employee training and development—for example, they began providing ESL training in 1991–1992. BB workers can make an above-average living for the semi-skilled work they perform and, as a result, turnover is very low. BB is certified for QS 9000, which is stricter than ISO 9000, to satisfy the Original Equipment Manufacturers they supply.

All training was done in-house with in-house trainers. A consultant trained the trainers. Their goal was to reduce costs, especially through lower scrap rates. They were successful: the scrap rate fell by 50 percent, dropping from over 4 percent to 2 percent of the cost of goods sold.

Halfway through the training, to reinforce its importance, BB instituted performance-based pay for key activities valued by management. The idea was that the workers would value the new methods more if they were paid for using them. Average wages were $13 per hour, plus benefits. This was above-average pay in this area, considering that workers only needed to be semi-skilled and semi-literate. Nevertheless, management decided that they still needed to emphasize the importance of the lessons of training by offering monthly bonuses. The monthly bonuses could add up to about $250, in the form of "Sam's Dollars" redeemable at Sam's Club or Wal-Mart, for meeting a variety of goals. The first was relatively simple: $50 per month for attending weekly health and safety meetings. They could receive another $50 a month for above-average productivity and quality. They could receive $5 per day as an individual productivity bonus and an extra daily bonus of $10 if they exceeded 5,650 batteries per shift.

Text Box 5.10 Sports Brace: Implicit Incentives for Training

At this company, managers do not have an explicit policy of giving employees a raise or a promotion when they complete training, but we found that both managers and employees had unstated "implicit" expectations that there would be rewards from training. The company was served by a training agency consortium using ETP funds to train machinists in CNC technology.

Sports Brace is a small, dynamic company that makes knee braces and a few other healthcare-related products. They appear to encourage employee initiative. If employees are able to do more or innovate, they are encouraged and rewarded. We interviewed two trainees—both seemed to work with very little supervision and talked with pride about being recognized for being able to do new and more complex tasks after completing training.

One machinist reported that he was consulted on the purchase of a new $500,000 CNC machine. The company bought the same brand and type this machinist had been trained on in the program, in part so he could be more productive right away. The second employee reported that he was given "more interesting work to do" and received a pay raise. Both employees insisted that they had not been promised any explicit rewards when they entered training, but because of the culture of the organization, they were sure it would pay off in the long run.

3. No individual incentives

   Some employers are opposed to the idea of individual rewards. Often they see training as a company-wide effort to improve rather than the development of individuals. Others simply have pay systems that tie pay to job categories and seniority and don't want to violate the system with special incentives for training. Fret Musical Instruments took this view (see Text Box 5.11).

4. Disincentives

   We also found that managers sometimes inadvertently create a system that punishes workers for participating in training, and thus provides negative reinforcement. For example, we found instances where trainees returned from training to find angry and hostile supervisors who had scrambled to

Text Box 5.11 Fret Musical Instruments: No Individual Incentives

It was interesting that Fret, though it put a great deal of effort into defining the meaning of training, did not believe in explicit individual rewards. This nonunion company ran on a very traditional compensation system. Individuals were paid based on their job classification and seniority only. Management was committed to a clear, orderly compensation system and believed that special raises or incentives would be disruptive.

The production manager believed strongly that being allowed to work on interesting problems, spend time with managers and engineers, and receive recognition created enough intrinsic motivation to sustain the quality program.

cover for them while they were absent for training (see Text Box 5.12).

Text Box 5.12 Wavelength: Punishing Workers for Training

Managers at Wavelength had not realized how much training would disrupt their work. After the first week, they stopped attending training and never supported it. Employee morale began to plummet. There were reports that managers opposed the TQM approach, which became the least useful component of training because managers never gave the workers an opportunity to practice it.

"Follow-up" consisted of managers cursing and threatening workers if they didn't catch up on work missed when training. As a result, nothing was implemented and training had to be stopped because of production disruptions. Workers were discouraged because they had learned valuable skills only to be denied the opportunity to use them. Overall, the company was worse off because of training that was, in the words of the Vice President of Human Resources and Administration, "a catastrophe."

Establishing levels of participation

One question this study tried to answer was whether there is an optimum level of participation in training programs. We explored this

issue and found that the needs of companies varied so widely that no general conclusions could be drawn about participation levels. In some companies, employers viewed training a handful of specialists as very valuable, whereas other employers deemed it essential that all employees be trained. We did encounter one important finding about participation in quality programs that bears some exploration.

The conventional wisdom in most TQM/SPC-type quality programs is that all employees should be involved, and this was reflected in many of the TQM/SPC projects we studied. In interviewing managers, however, we found a strong belief among many of them that they could achieve significant improvements in quality with only a minority of employees participating. One manager at Fret Musical Instruments described the dynamic this way: "Thirty percent think the training's crap; 30 percent just don't care; and 30 percent really get it and will lead us to substantial improvement."

In general, this manager does not support the TQM model in which all workers are on teams and involved in quality improvement. Rather, he thinks that about 25 percent of the workers have the skills and motivation after training to identify and solve problems, and he wants to work with them. He says: "I give motivated people something meaningful to do. I give them praise and time to work on their problem with management." Membership in quality teams is voluntary and no cash bonuses are paid to groups or individuals for solving quality problems. This company reported dramatic increases in quality improvements, yielding substantial cost savings, and the company is currently making a major expansion, lending considerable weight to these views.

We found several other companies where, after training everyone in TQM techniques, the management made membership in teams voluntary and again reported significant quality and productivity improvements. In general, managers seemed to believe that innovations would only come from employees who voluntarily took on quality problems. Other employees who wished to remain in a traditional production worker role would be allowed to do so. This contradicts earlier research, particularly from the auto industry, where universal participation in quality teams was deemed essential to program success (Wilms 1996). The implication for ETP seems to be that different production systems likely require different levels of participation. Employers are

likely to be the best judges of how much participation, and thus how much training, is sufficient.

Institutionalizing training

One goal of ETP is to serve as a catalyst for additional investments in training. The idea is that if companies have a successful experience with ETP training, those companies will be more willing to invest their own money in additional training. Our fieldwork shows that successful training often does lead to additional investment in training. For some examples of this phenomenon, see Text Boxes 5.13 and 5.14.

One important observation we made was that the more involved in-house staff was in the training, the more likely it was that the training would be institutionalized. The logic of this is simple—if the company owns the curriculum and has easily available trained instructors, it is likely to continue training new employees or upgrading existing ones. Continual training is less likely to happen if a company must hire outside consultants.

Text Box 5.13 Techno Tubs: Integrating Agency Training into Organizational Development

Techno Tubs is a small manufacturer of lightweight hot tubs made of foam rubber. When a new CEO arrived five years ago, only one employee was computer literate. To catch up to the competition, the new CEO launched a drive to computerize the company's paper-based marketing, finance, customer service, and personnel systems, and to install CAD/CAM in its production areas. The company began sending one to three employees at a time to the ETP Training Agency's office automation training program and continued at that rate until a sufficient number of employees were trained. Both the company and the employees were pleased with the results of the training. Techno Tubs subsequently built an office automation and computer literacy requirement into its promotion process so that people in many of the company's departments could not progress beyond a minimal level without these skills. Workers now attend office automation training as needed in response to evolving industry practices, normal worker turnover, and company expansion.

Text Box 5.14 Flow Pumps: Successful ETP Project Leads to Permanent Training System

Flow Pumps, the pump manufacturer described earlier, had no formal employee training prior to the ETP training. Their ETP training project led to a substantial increase in quality and a positive change in the organization's culture. Because of these positive outcomes, the company established a systematic training program for both existing employees and new hires. The company now has two permanent classrooms and considers some of the courses developed under ETP "core to the company's culture"—all new hires take them. Courses include basic math, SPC, problem solving, open book management (how to read company financials), and interpersonal and team skills. To reinforce the importance of training, the company mandated that employees must complete training and pass related tests to get promoted.

One important reason that training became institutionalized was that managers decided early on to use in-house trainers for most of the training. Their trainers were managers and quality engineers who received some training in being trainers. Initially, Fresno Community College supplied two instructors, but they played a minor role, teaching the first classes of basic math and safety. Another factor supporting institutionalization of training was that many of the in-house instructors enjoyed the teaching experience. In fact, Ralph, the company president and an engineer by training, taught basic math. This was a powerful experience for him. Reflecting on the experience, he noted, "I'll never make fun of teachers again; it's a tough job." He was delighted with the outcome. He now knows a number of production workers personally, and they know him. He continues to teach sections of the basic math course.

In the case of training agency projects, in which classes take place away from the work site with trainees from various companies, we found a different type of institutionalization. In these cases, we found that if companies sent an employee to the training and had a positive outcome, they would send additional trainees. Eventually, participating in the agency training would be built into the company's human resource practices. Again, the logic is apparent—this type of ETP training is "off the clock," does not disrupt production, and is free; there is virtually no cost in institutionalizing the training.

Impact of ETP Training on Workers

The impact of ETP on the performance of companies, in terms of productivity and finances, is covered in Chapter 6. Here, we examine the impact of ETP training on the workers trained and analyze the characteristics of ETP training associated with positive outcomes.

OVERALL IMPACT OF TRAINING ON TRAINEES

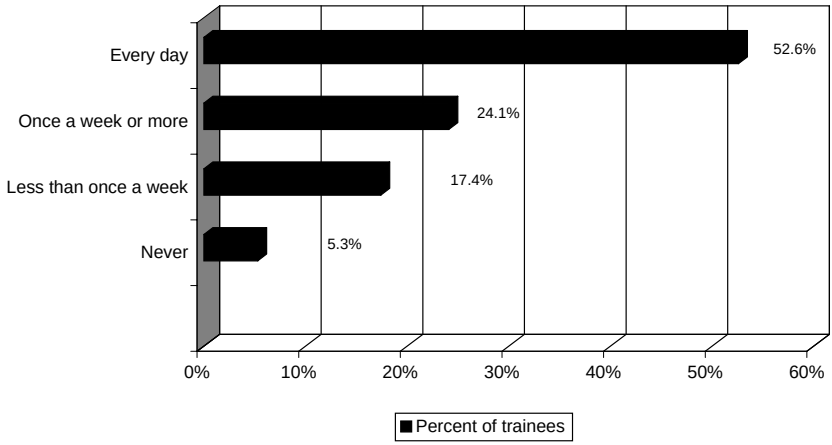
Before we look at the impact of training in individual companies, we want to explore how the trainees, as a group, perceive the impact of training. In the methods section, we described the evaluation questionnaire that we administered to as many trainees as possible at each site visited. The evaluation questionnaire asked each trainee three questions to assess the impact training had on them:

1. How often did they use the skills they learned in training?
2. What impact did training have on their individual productivity?
3. How had their work environment changed since training?

Skill Use

For training to have an impact on productivity, trainees must use the skills they learn. Almost all trainees, 95 percent, report using the skills they learned in training at least occasionally. As Figure 5.10 shows, slightly over 50 percent of the trainees reported that every day they used at least some of the skills they learned in training. For example, office workers trained in office automation were likely to report daily use of the software applications they learned. About 25 percent of the trainees reported that they used the skills they learned once a week or more. One example of this response came from a production worker who had TQM training and was a member of a quality team that met weekly to work on problems. Only 17 percent said they used the skills less than once a week. An example of this skill use is the production worker who learned SPC techniques, but only used it occasionally to deal with specific quality problems as they occurred. Only a very few trainees, 5 percent, reported that they never used what they

Figure 5.10 Frequency Trainees Reported Using Skills



SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

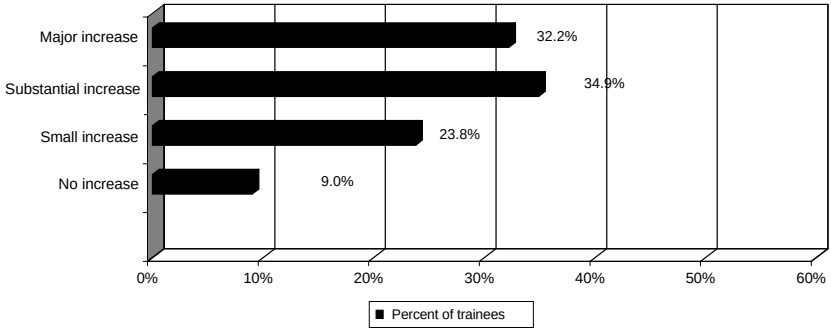
learned in training. As we noted in the section on management reinforcement, one reason skills are not used after training is lack of management action to ensure that reinforcing processes are in place when trainees return to the job. For example, a trainee who receives SPC training will not use the skills if an SPC system does not exist on the production line.

We also examined which types of training the trainees reported using most often. This analysis was restricted to skill areas where we had at least 60 respondents. Skills used more frequently than average included skills directly related to improving production, like TQM and Production Techniques, and basic computer skills including MS Office and General Windows. Skill areas used least, such as SPC, tended to be more technical.

IMPACT OF TRAINING ON PRODUCTIVITY

Overall, ETP trainees believe that their training has led to higher productivity. As Figure 5.11 indicates, two-thirds of trainees reported

Figure 5.11 Impact on Productivity Trainees Reported



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that training led to either a "substantial increase" or a "major increase" in their productivity. Slightly less than a quarter of respondents reported a "small increase," and less than one-tenth said training led to "no increase" in productivity.

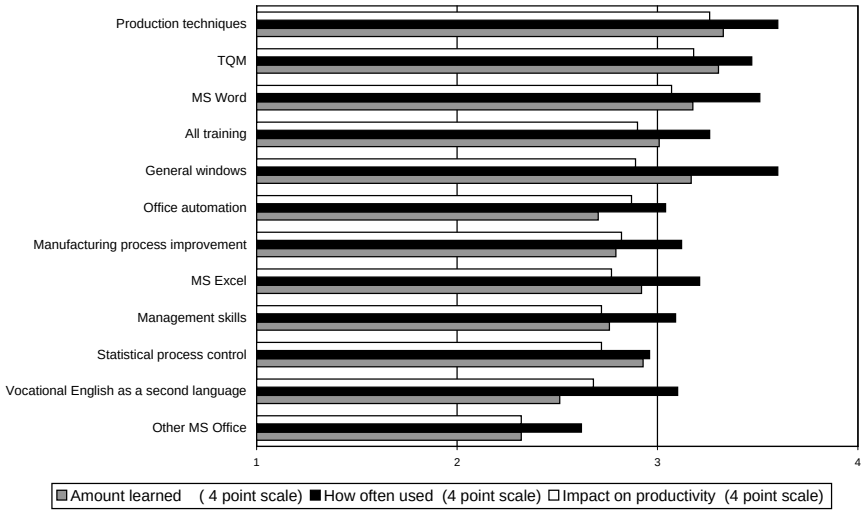
Differences by Type of Training

Using a regression analysis, we identified the factors that were associated with trainees who reported increased productivity. Clearly, the more of the material trainees mastered and the more they used what they learned, the more productivity impact it had.

A similar pattern occurs when we look at the amount learned, skill use, and impact of different types of training on productivity. Figure 5.12 illustrates the types of training most commonly found in the sites we visited. (We included all categories of training with more than 60 respondents.) We then ranked the types of training based on the impact of productivity reported by trainees. The graphs reflect an overall pattern of increase in training impact as the amount learned and skill use increases.

Three types of training had an above-average impact. The highest-rated impacts were "Production Techniques" and TQM, both of which deal directly with improving quality and productivity. The only other

Figure 5.12 Relationship of Amount Learned and Skill Use to Impact on Productivity



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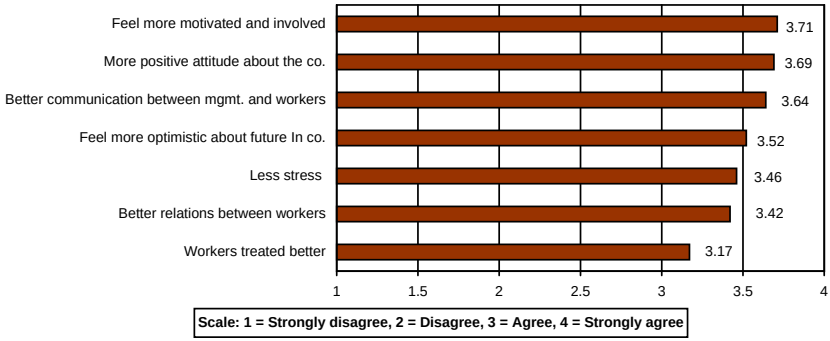
type of training that came in above the overall average was training in MS Word, which is a very commonly used skill. These three were also the training types rated above average for amount learned and skill use.

IMPACT OF TRAINING ON WORK ENVIRONMENT

As we began our fieldwork, we were struck by the fact that when we asked trainees and managers about the impact of training, they talked first about its qualitative impact. Rather than discussing scrap rates or labor productivity, they mentioned improvements in communication, motivation, or stress reduction. Figure 5.13 illustrates that trainees reported dramatic improvements in many aspects of their work life. More than half the trainees surveyed "strongly agreed" that they "felt more motivated and involved at work," "had a more positive attitude about the company," and felt that "there is better communica-

Figure 5.13 Work Environment Changes Trainees Reported



SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

tion between management and workers" since the training. These results confirm what we saw in the field. The decision to provide training is a powerful message and it is important for management to shape the meaning of training, so that trainees see it in a positive light.

We expected positive qualitative outcomes from TQM and related training, because of improvement in communication, reductions in hierarchical barriers, and involvement of frontline workers in decision-making. However, it came as a surprise when we found similar positive results from technical training. The company's decision to invest in training apparently leads workers to see the work environment in a more positive light.

We also found a relationship between qualitative outcomes and increased productivity. Regression analysis revealed that when workers more strongly agreed that stress had been reduced, that they felt more motivated, or that they had a more positive attitude towards the company, they also reported a greater increase in productivity.

Overall, the regression analysis showed that changes in workplace environment caused by training were significant predictors of worker-reported changes in productivity. The results indicate that positive changes in work environment variables accounted for almost 40 percent of the variance in the productivity variable. Table 5.3 shows that "experiencing less stress on the job after training," "feeling more mo-

Table 5.3 Regression Results for Work Environment and Productivity

Work environment variable	Standardized coefficient	Significance
Better communication between supervisors and workers	0.014	0.364
Less stress	**0.228**	0.002
Workers treated better	−0.032	0.663
Better relationships at work	0.132	0.064
Feel more motivated and involved	**0.242**	0.003
Feel more optimistic about my future in the company	0.067	0.403
More positive attitude about the company	**0.155**	0.037
Adjusted R^2	0.397	

NOTE: Significant relationships in bold.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

tivated and involved," and "having a more positive attitude about the company" are variables that were significantly associated with reported increases in productivity. The data do not allow us to assume that changes in work environment variables caused increased productivity, but they do indicate that when workers report an improved working environment, they also report improved productivity.

INSTITUTIONAL ARRANGEMENTS

ETP delivers training through a variety of institutional arrangements that have evolved over the 18 years the program has been in operation. We used data from the 23 case studies to assess each institutional arrangement's potential to achieve ETP's goal of providing customized training that improves worker productivity.

ETP enrolled 57,485 trainees in contracts that were completed in the study period—fiscal years 1994–1995 and 1995–1996. Though the training contracts differed in a variety of ways, there were three basic types of delivery arrangement: individual company contracts, consortia contracts, and training agency contracts.

The most common type of ETP training contract was the "individual company" contract in which ETP contracted with a single company

to provide training for its own workers. In these contracts, the training might be done by employees of the company (in-house trainers) or by outside trainers working under a subcontract (subcontractors or consultants). About 60 percent of the trainees were trained under individual company contracts during the study period of 1994–1996.

The "consortia" contracts accounted for about 10 percent of trainees and were the smallest group. Consortia may be large companies training their own workers and some from their suppliers, Private Industry Councils (PICs) training workers for a group of companies, or industry associations training workers for a group of member companies. Consortia contracts are similar to individual company contractors in that there is a given set of workers who will be served, but unlike the individual company contractors, these workers are employed in more than one company.

Training agency contracts were the second largest group of contracts and accounted for an increasing percentage of trainees during the study period. Training agencies served just over 20 percent of trainees in fiscal year 1994–1995 and just over 30 percent in fiscal year 1995–1996.

Training agency contracts can be divided into two categories:

1. Industry specific

   These agencies provide training in skills used by a single industry or narrow cluster of industries (for example, CNC machining).

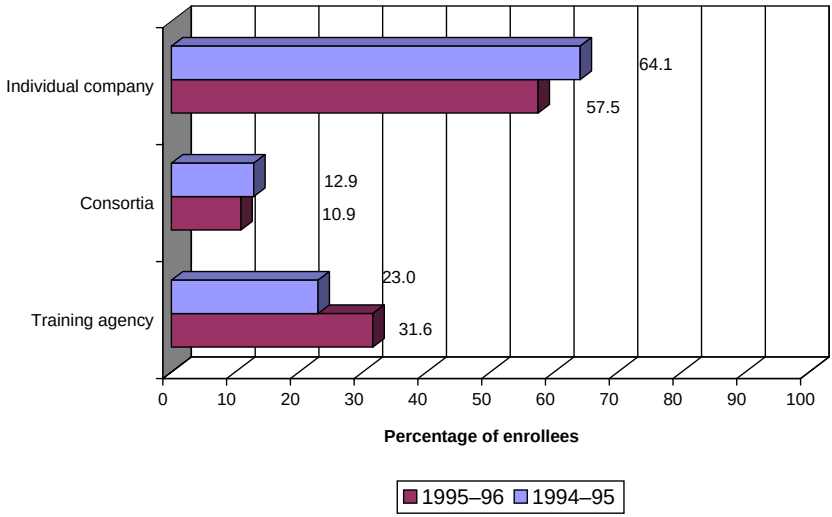
2. Generic skills

   These agencies provide training in skills used in almost all industries (for example, word processing).

Training agencies are often community colleges, private training organizations, or industry associations that contract to provide a certain type of training to workers in ETP-eligible businesses. These training agencies market ETP-funded training to nearby businesses and bear the risk that recruited trainees might not complete the required placement and retention on the job (90 days), in which case the trainer would not be paid for the training.

As Figure 5.14 shows, ETP is moving away from "individual company" projects, and toward "training agency" projects. In one year,

Figure 5.14 Distribution of Trainees by Contract Type



SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

ETP moved from serving 64 percent of trainees through "individual company" projects, to about 58 percent; during that time, trainees served by "training agency" contracts rose from 23 percent to almost 32 percent.

Both consortia and training agencies help ETP to serve smaller businesses that would not find it worthwhile to undertake the cost of an individual company contract. Consortia serve a specific group of businesses; training agency contractors market their training to a wide array of businesses, limited only by the businesses' interest in the particular type of training offered and the convenience of the training site.

We visited all three types of training contractors during the fieldwork, apportioning our visits in rough approximation to the extent they are used. Given the shifting pattern of contracts, we decided to look at each type of contract in some detail, using our training model to conduct the analyses. The matrix in Table 5.4 sums up the key characteristics of training contracts and their implications.

Table 5.4 Training Effectiveness by Type of Training Contract

		Training model components and outcomes by contract type			
Type of training contract	Key characteristics	Potential gains (high to low)	Quality of training potential (excellent to poor)	Management reinforcement potential (excellent to poor)	Potential gains realized (high to low)
Individual company	• Fully customized to employees and jobs • Focus on both the employees and the jobs • Trainers are subcontractors or in-house trainers • Full involvement of company management • Company assumes risk	Unlimited	Unlimited	Unlimited	Unlimited
Employer consortia	• Customized to jobs and employees • Trains intact groups from single companies • Strong ties between employers and trainers • Consortia buffers companies from ETP • Heavy consultant involvement • Risk sharing between consortia and company	Unlimited	Unlimited	Unlimited	Unlimited

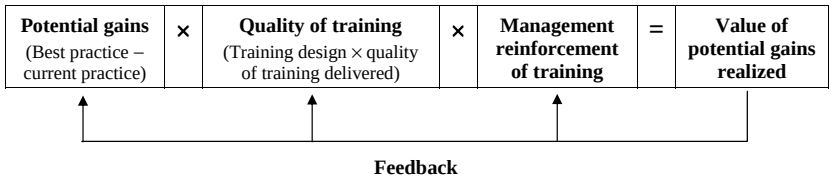
Table 5.4 (continued)

Type of training contract	Key characteristics	Training model components and outcomes by contract type: Potential gains (high to low)	Quality of training potential (excellent to poor)	Management reinforcement potential (excellent to poor)	Potential gains realized (high to low)
Training agencies: industry specific skills	• Focus is more on the individual than on the company • Not customized but skills taught are industry-specific • Industry involvement in training • Particular skills, or quality of training, not readily available in market • Multiple companies in a class • Training is mostly off-the-clock • Efficiently managed; high completion rates	Unlimited	Somewhat limited by the ability to customize training to account for initial skills and specific job skill requirements within the industry	Somewhat limited by the extent to which industry companies use all of the applications covered in the training	Somewhat limited
Training agencies: generic skills	• Focus on individual, not company • Completely un-customized to trainee and to job • Train in widely available generic skills • Multiple companies in most classes • Trainees off-the-clock • Efficiently managed from trainer's perspective; high completion rates	Unlimited	Limited by the ability to customize training to account for initial skills and specific job skill requirements across all industries	Limited by the extent to which companies across many industries use all of the applications covered in the training	Limited

POTENTIAL TRAINING EFFECTIVENESS BY CONTRACT TYPE

The type of contract affects the potential impact and effectiveness of ETP training. The training model introduced earlier (and repeated in Figure 5.15) identifies two critical components: "quality of training" (training design and quality of training delivered), and "management reinforcement of training." Together, training quality and reinforcement determine how much of a company's potential training gains are realized. Both the quality of training design and the extent of management reinforcement are likely to vary systematically with the different types of contracts because of the nature of the contracts. Individual company and consortia contracts are more likely to help companies achieve their full potential gains because they do not have the limits inherent in training agency contracts. Training agency contracts—particularly those teaching generic skills—have structural constraints on their ability to deliver the potential gains of training.

Figure 5.15 Training Impact Model (Repeated)



Individual Company and Consortia Contracts

Individual company and consortia contracts can achieve all the potential gain inherent in the companies they serve. Individual company contractors have great flexibility to shape the training to the unique characteristics of the companies and trainees. Similarly, consortia contractors have virtually the same flexibility in their approach because, ideally, the contractor assembles a group of businesses that share the same training requirements. For example, one large consortia contract trains auto mechanics from many different small service centers to use computerized diagnostic equipment. These mechanics need the same skills and will use them in similar work environments. In this case,

training can be customized almost as much as it could be in individual company projects. Projects are customized by taking into account the initial skill level of the trainees, and then providing the specific skills they will need to perform on the job. Similarly, management can interact closely with trainers and make sure that the already customized training is reinforced on the job.

Clearly, both individual company and consortia curricula can be poorly designed, with poor training delivery and little management reinforcement, and consequently have little impact. Another potential pitfall is putting together a consortium where the training requirements are different for the various companies in the consortium. In this case, it is difficult to customize the training when there is wide variation in the trainees' initial skill levels or in the skills they are expected to have after training. The consortium should be constructed so that the initial skill and expected skills would be similar among the consortium members. Hence, both individual company and consortia contractors have the potential to provide excellent training design, delivery, and reinforcement, thus producing highly effective training.

Training Agency Contracts for Industry-Specific Skills

The ability of industry-specific training agencies to help companies achieve all of their potential gains is somewhat limited by the nature of the contract. These agencies provide a particular type of training to employees of a single industry or a narrow cluster of industries. If trainees entering the program have fairly standard initial skill levels, and standard skills are expected after training, then designing and reinforcing training will be relatively easy. However, to the extent that the initial skills vary widely among the trainees, or the tasks to be performed by the trainees after training are different, the training design will serve the trainees poorly. If the entry-level skills of the trainees differ and the contractor aims for some average-level competency, then some of the trainees will not be able to master the instruction at the outset while others will waste time being instructed in areas they have already mastered. Also, it will be difficult for trainers to select training exercises that are germane to all the trainees' tasks. This is particularly problematic in the use of SOST. It is interesting to note how one industry-specific contract we visited, which taught CNC machining,

dealt with this problem. First, to ensure uniform skills upon entry, they began the program with a math unit to bring all trainees' math skills up to an acceptable level. Next, it decided *not* to use SOST. Rather, it provided extensive lab time on the training center's machines to be sure class skills were reinforced.

Management reinforcement of training can also be difficult in industry-specific training agency contracts. The training is designed and implemented by the training agency, but on-the-job skill reinforcement is in the hands of the individual companies where the trainees work. There are bound to be variations in the extent to which different companies reinforce the training, especially since company management does not necessarily know the exact nature of the training. For example, in the same CNC training program, we found that some companies kept careful track of what trainees were learning and gave them more challenging tasks as they progressed. Other managers had very limited awareness of the learning that was going on and made no attempt to upgrade the trainee's job to match his or her skill. Again, if the training involves skills that are fairly standard throughout the industry, companies will know what the skills are and can more easily reinforce the training on the job. However, if the tasks the companies expect the trainees to perform vary widely, then many trainees will waste time being instructed in skills they will not use and management cannot reinforce. A final barrier to close ties between training and the employer is the fact that much of this training takes place "off the clock." Not paying for the trainees' time, the employer is less motivated to ensure that new skills are put to use promptly to boost productivity. We note that, despite these barriers, the opportunity for close ties between trainers and employers are better in this case than in the generic skills contracts. This is because close ties between the training agency and the industry tend to develop over time, particularly if the training agency is formally affiliated with the industry, which appears often to be the case.

In summary, industry-specific training by agencies will have a higher impact on companies and will be more effective for workers if the trainees' entry skills are relatively standard and the tasks they are expected to perform upon completion are uniform. Also, the impact is more significant the closer the ties between trainers and employers. The potential gains realized under these contracts are somewhat lim-

ited, primarily because of the management reinforcement issue, but also because of the difficulty of designing an appropriate training curriculum for a diverse group of trainees.

Training Agency Contracts for Generic Skills

Training agency generic skills contract programs are less able to customize their curriculum for individual employers. Also, it is less likely that there will be effective management reinforcement of training after these programs have been completed. By their nature, generic skills are applied across a large number of industries, and one expects to find many different types of applications of the skills among those industries. The initial skill levels of the trainees also vary widely, which makes it difficult to customize instruction. For example, we interviewed one instructor who taught office automation in a generic skills contract. He pointed out that some of his students were computer literate and knew the keyboard well, while others had never worked on a computer. This made it very difficult to find an appropriate level at which to teach. Inevitably, appropriate starting points will be beyond the grasp of some and a waste of time for others. Classroom applications that are relevant to some will not be to others. Very few trainees will use all of the skills covered in a generic skills program. In another case, we found several trainees in generic office automation training who were engineers or accounting clerks. They took the training to learn advanced spreadsheet applications, but to get to that section of the training, they had to sit through many hours of word processing instruction that was of little value to them.

Management's on-the-job reinforcement of generic skills training is more difficult. Managers in the companies to which the workers return are distant from the trainers and unlikely to have much knowledge of the skills taught. This creates various impediments to effective reinforcement. First, because the trainers and managers are in different organizations, the trainers have to coax the managers to reinforce the training. Second, lack of knowledge of the training content makes it difficult for managers to reinforce the training. Finally, the post-training job is unlikely to make use of all of the skills, which eliminates any possibility of reinforcing the unused skills. In addition, trainees are most likely attending generic skills training on their own time,

which, as noted previously, does not motivate employers to become involved.

The training impact model implies a limited ability of generic skills training to realize the full potential gains from training. The limitations derive from the difficulty in designing training that is appropriate to workers from a wide range of industries with a wide variety of skills, in selecting training exercises relevant to most of the trainees, and in persuading the managers of disparate companies to reinforce the training.

Interestingly, one of the difficulties faced by the generic skills training agencies reduces the importance of ETP-funding for this type of training. Generic skills training agencies must isolate some skill areas that are useful to many industries and employees, and then design a curriculum appropriate to a large number of prospective trainees that work in various industries. To the extent that such skill areas exist, the market for training has already recognized the demand for training in these areas, and training opportunities are widely available without ETP funding. This means that much of the ETP-funded training in generic skill areas may replace training that would have occurred anyway.

Another phenomenon we observed in the field is that training agencies, which began by providing industry-specific or consortia training, are moving quickly into generic training. There appears to be two reasons for this trend: First, the market for generic training is larger because the skills taught stretch across many industries. Second, generic training is easier and less costly to deliver because it is standard and not customized. Thus, instructors do not need specialized industry knowledge and a single curriculum can be used for many classes. Our impression is that generic training is generally easier to manage and more profitable than specialized training.

Generally, both the companies and the trainees thought that generic skills training was beneficial to the company and made the individual workers more productive. Of course, this means that the company and the individuals would likely seek out this type of training in the market even if ETP funding were not available.

The training model implies that it will become increasingly difficult to achieve excellent training as we move from consortia training to agency training for industry-specific skills, and finally to agency

training for generic skills. In Table 5.5, we compare trainees served by consortia and training agencies, showing the percentage that rated various aspects of their training as "excellent." Because most of the consortia and training agency projects we visited were well-designed given the nature of the training that was undertaken, we believe that the relative percentages of "excellent" responses speaks to the inherent limitations on training effectiveness by the type of provider. Overall, we were impressed by the quality of training provided by some of the generic trainers, given the challenges they faced.

These trainee responses generally confirm the limitations on training effectiveness implied by the training impact model.

WHAT WE LEARNED

Our goal in the qualitative analysis was to crack open the "black box" of ETP training and look inside at what made projects successful

Table 5.5 Trainee-Reported Quality and Amount Learned, by Contract Type

	Percentage responding "excellent"		
Aspect of Training	Consortia	Industry-specific	Generic
Overall training quality	61	60	37
Clear training objectives	42	67	42
Usefulness of topics	40	53	32
Length of time on each topic	5	27	7
Quality of instructional materials	50	64	40
Degree training customized to company	36	15	8
Quality of instructors	100	73	55
Effectiveness of SOST	26	46	27
Ability of trainers to keep interest	86	53	47
Right level for trainee	50	53	23
How much of all training was actually learned (Percent reporting learned 60% or more)	74	90	68

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

or problematic. Our analysis of 23 projects does not provide a definitive description of what determines success, but it does shine a strong enough light on the shape and outline of a successful model. Paradoxically, the companies who seem least prepared to design and deliver an ETP-funded training program are also those that have the most to gain. Clearly, actions companies take before and after training shape the success of training as much as the actual training delivered. Companies that invest the time and effort to customize training to their own employees and processes, and who invest in developing in-house trainers, are more likely to reap the benefits of training.

Institutionally, the closer training is to the employer, and the greater the employer's direct investment, the more effective it is. Hence, programs that train employees "off the clock," away from the work place and in generic skills will not yield the same benefits as arrangements closer to home.

The challenge to policymakers and program managers is to find ways to fuse these lessons into the design and management of their programs—an issue we will address in the final chapter.

Note

1. Structured On Site Training is the component of training where trainees practice, on the job under supervision, skills learned in class. It is a component of most ETP-funded training.

6
Impact on Companies

Like most incumbent-worker training programs, ETP strives to improve the position of both workers and the companies that employ them. Part of ETP's mission is to be "a significant economic development tool for business attraction and business retention," and to "provide funds for training California's workforce in the skills necessary for businesses to remain viable and compete in the global economy." To evaluate ETP's performance, therefore, one must look at both the impact on workers and the impact on companies. (Employment Training Panel 1998)

In this chapter, we examine the impact of ETP training on companies in two ways:

1. Case Studies

   We first examine individual companies through case studies. Case studies make use of the information given by the managers interviewed. This allows the investigator to view training impact from the company manager's point of view, rather than imposing performance measures of interest to researchers. Using this information, we examine the impact of training on the company and then perform a cost-benefit analysis of the training project, using the information provided.

2. Cross-sectional Statistical Analyses

   We compare the growth of a sample of ETP-trained companies to the growth of similar companies without ETP-funded training. Cross-sectional statistical analyses use information common to all examined companies. Because most of the companies we studied are private and detailed financials were unavailable, we were limited to two performance measures: growth in number of employees, and growth in total wages paid. These data are uniformly available from the California Employment Development Department because they are collected quarterly as part of the

unemployment insurance system. To derive industry-adjusted performance measures for the ETP-trained companies, we compared ETP-trained companies to 10 industry peers and then compared performance before training to performance after training. The methods used are discussed in more detail below.

An evaluation of ETP-funded training impact should try to identify and measure training benefits. Training benefits must be judged in some context. We used training cost as the measure of training effectiveness. Given the disparate nature of the companies visited and the kinds and qualities of data obtained, the cost-benefit approach allowed us to make meaningful inferences and comparisons. State agencies that consider funding training may want to consider the potential gains and compare these with the costs. Some type of cost-benefit assessment underlies all business investment evaluations. Public policymakers, too, are concerned about the costs and benefits of public investment. The case studies show that training benefits exceeded costs in almost every case. Consistent with this, we found that ETP-trained companies grew more rapidly than similar companies not using ETP-funded training.

Before proceeding, we provide the reader with an overview of the industries studied. Table 6.1 compares the industry group breakdown of ETP trainees to that of the overall labor market in California. The most heavily represented groups were: electronic and electrical equipment and component at 12.5 percent; measuring and related equipment and miscellaneous manufacturing at 8.7 percent; and retail trade, excluding food and automobiles, at 7.9 percent. In general, manufacturing, food stores, and financial institutions were overrepresented compared to the California business profile, whereas professional services including motion pictures and amusement were the least represented.

CASE STUDIES OF THE IMPACT OF ETP-FUNDED TRAINING ON COMPANY PERFORMANCE

Overview

The first phase of our investigation on the impact of ETP-funded training was fieldwork consisting of site visits to a representative sam-

Table 6.1 Trainees and Controls by Industry

SIC groups	Trainees (percent)	Controls (percent)
Agric., forestry, fisheries, mining	0.5	4.5
Construction	1.8	4.2
Food and kindred manufacturing	3.9	1.6
Textiles, lumber, petro. chem., rubber, leather, stone, etc.	5.5	3.9
Paper and allied products	2.1	0.3
Printing, publishing, and allied products	2.2	1.2
Primary metals	0.6	0.3
Fabricated metals	4.4	1.0
Industrial/commercial machinery and computer equipment	4.3	1.6
Electronic/electrical equipment and components	12.5	1.7
Transportation equipment	4.4	1.4
Measuring and related equipment, misc. manufacturing	8.7	1.9
Transportation, communications, and utilities	3.4	5.4
Wholesale trade	4.5	5.9
Retail trade (excluding food stores, auto, and related)	7.9	12.7
Food stores, retail	5.6	2.4
Auto dealers and gasoline retailers	2.5	1.7
Depository and credit financial institutions	5.9	2.4
Financial bankers, insurance, and real estate	3.7	3.9
Hotels, lodging, and personal services	1.6	2.4
Business services	3.2	7.0
Auto repair and misc. repair services	2.4	1.5
Professional services (including motion picture and amusement)	1.6	21.3
Health services	1.6	6.4
Engineering, research, management, and related services	5.5	3.4
	100.00	100.00

SOURCE: Authors' calculations from California Employment Development Department Data and ETP Data

ple of companies that received training. (Complete details on how the sample was selected are presented in Chapter 5.) Site visits generally included a tour of a company's operations. If training was confined to only some of the company's employees, we conducted a detailed examination of the processes or operations actually affected by training.

As we proceeded, it became clear that analyses of the benefits of training would have to be tailored to the companies studied. Most companies did not set concrete goals for training, and so did not sys-

tematically track the impact of training on the company. This, in itself, was a surprising finding. There are three possible sources of management's failure to track training's performance impact: 1) difficulty of measuring the impact (the most likely source), 2) management certainty that training is beneficial and so measurement unnecessary, or 3) a management view that training is a personal benefit to the employees only. In the context of a cost-benefit analysis, it can be assumed that companies that undertook training assumed the benefits exceeded the costs, however considered.

Because companies did not keep records quantifying the effects of training, or kept idiosyncratic records, we found the case study method was the best way to observe the impact of ETP-funded training on company performance. We also realized that, because there was no universal performance measure or impact factor usable for all companies, assessing training's financial impact would require persistent detective work—questioning managers and workers in creative ways. It was also clear that the financial impact of training might not show up on the corporate "bottom line." The cost savings from training might instead go to higher pay, better employee benefits, better quality products, better work environment, or job creation or retention, or it might simply ensure company survival. It would be simplistic and inaccurate to think of the financial cost savings as "corporate welfare" that would be reflected in profit margins.

Also, because most private companies were reluctant to share financial information, we had to work with incomplete, piecemeal financial information in whatever form they were willing to share. Sometimes this was in the form of reduced scrap rates, cost savings on a particular production line, production increases for a product, lower rework levels, or reduced absenteeism. Even for publicly-owned companies, where accurate financial information is readily available, we were not able to find a measurable bottom-line impact. These companies were too large for training at one small part of the company to have observable effects on the consolidated financial statements of the whole company; so we still had to work with the case study data.

Individual Company Training Projects

Under individual company contracts, training is more likely to be customized to companies' needs and should result in a greater impact.

As one might expect, the impacts of individual company training programs were greater and lasted longer than with consortia or agency training. We also observed that with "in-house" trainers, the impact tended to be greater and was more likely to lead to further training. We attribute this observable success to a greater "buy in" by top management due to their involvement in the design and execution of the training. These companies often incurred additional expenses in employee training time and out-of-pocket cash expenditures for employees not covered by ETP funding, or for additional training to round out the program in a customized manner.

While interpreting these results, it is important to remember that ETP training is a joint investment by the company, the state, and the trainees. One can view ETP's funding as a leveraged investment taking advantage of additional investments by the client company. ETP funds generally pay the direct costs of training, including instructors' salaries, materials, and equipment. The companies typically pay for the employees' time and the cost of lost production, and often provide training facilities. A full cost-benefit analysis would have to document all of these costs. We were unable to estimate all employer costs, but we did have an accurate figure for the public's investment in the form of ETP funding. Thus, the results of this analysis will be of interest to policymakers interested in leveraging the public's investments in training.

TQM training improves quality and reduces per-unit costs

Basic Batteries ("BB") is a major producer of lead/acid batteries, primarily for automobile and marine use, with three facilities in the Los Angeles area. We visited the main manufacturing facility. BB's major competitors are large, multinational companies. The company produces batteries under a number of private labels. Average wages were $13 per hour plus benefits. This wage was above average pay in the local area, considering that workers only needed to be semiskilled and semiliterate—as a result, turnover was low. Unlike many of the firms we studied, BB kept detailed records of quality and productivity. By looking at the performance before and after training, we could infer the impact of training on the company in terms of dollars (see Text Box 6.5).

Text Box 6.1 Basic Batteries ("BB")

Trained 619 workers
ETP cost: $500,876
Estimated benefits:
- Scrap reduction: $1,230,000 (one year)
- Additional cost reductions: $1,040,000 (one year)
- Benefit-to-cost ratio: over 450 percent for the first year

BB had on-site training in SPC and TQM, using in-house trainers, and they trained 619 workers. According to their own records, the company achieved both scrap rate reductions and unit volume production increases, resulting in an annual benefit to the company of about $2.27 million. Before training, daily production was 8,500 units per day; after training, production rose to 10,300 units per day. This 21 percent increase was not due to greater investment in machinery or labor, but reflects an increase in operational productivity after training. They saved about $250,000 in "assembly junk." Because of the TQM emphasis, QC tests now destroy only 2 percent of units tested compared to 38 percent before training. Scrap costs have declined from $0.61 to $0.27 per unit. These savings add up to $3,502 daily and $1.23 million annually, based on a 350-day work year—about half of the total cost savings achieved.

Overall manufacturing cost per unit dropped to $6.87 from $7.50 in 1994 and was expected to drop further to $6.34 in 1999. Average production is currently 10,300 units per day, which translates into savings of $6,489 per day and $2.27 million per year in a 350-day work year. Compared to ETP's $500,876 investment in training, the $2.27 million from cost-saving improvements amounts to a 453 percent cost-to-benefit ratio in the first year after training. Even if as much as three-fourths of the benefits were attributable to other factors, the return on ETP's investment would still be over 100 percent. Moreover, unit production rose 21 percent.

Fret is a premier manufacturer of musical instruments and accessories. The company underwent a management buyout in the 1980s, and growth has been rapid since then. From about 50 employees at the Southern California site in 1986, Fret has grown to over 400 employ-

Text Box 6.2 Fret Instruments

Trained 350 of 350 workers
ETP cost: $677,968
Estimates of benefits:

- 95 percent reduction in scrap rates
- Rework savings of over $400,000 per year
- Increase in 'subassembly efficiency' from 63 percent to almost 100 percent
- Elimination of 20 percent planned overproduction for scrap
- Creation of more than 300 jobs
- Retaining hundreds of jobs in Southern California
- Benefit-to-cost ratio of at least 100 percent per year

ees. In addition to making musical instruments, the company has added an electronics factory that produces amplifiers. Fret considered moving its operations to Texas or Tennessee in the late 1980s, but a state "Red Team" of government officials got involved and the company decided to stay. It was during this involvement with the "Red Team" that Fret learned of ETP and decided to do ETP training. Fret used their independent safety-training consultant to design the program and to help with the ETP application process. Trainees consisted of managers, supervisors, and hourly workers. The first ETP training, consisting of TQM and SPC modules, was a success, and Fret has another ETP-funded program under way.

The training had a significant impact on the company (see Text Box 6.2). The production manager commented that the training improved people's ability to solve problems: "Now they have tools to bring closure to problems." He also noted that there is improved communication between departments. The trainees also had many positive comments. An instrument tuner claimed that scrap rates declined from 12 racks of instruments every 2–3 days to one rack a week—approximately a 95 percent reduction. A lead person commented that they went from "63 percent efficiency in subassembly up to 100 percent in the past eight months." Interestingly, trainees commented that they miss the overtime they got for reworking bad product. Another commented that he had "developed a system to avoid rework." The

head of instrument production had the most revealing information regarding the benefits of training. He said that rework was 25–30 percent before training and has now declined to 5 percent. They now have only one rework person instead of four. On average, it takes 40 minutes to do rework at a total cost of $40 per hour. Assuming the more conservative estimate of improvement from 25 percent to 5 percent, and the current production of 325 instruments per day (actually lower than in the recent past), this works out to a savings on rework alone of $1,733 daily, $8,665 weekly, and $433,250 annually (50 weeks). He also commented that they no longer schedule a 20 percent overproduction in order to produce enough quality instruments.

To summarize, annual savings were at least $433,200 from reduced rework alone. This does not include obvious increases in other areas of production efficiency, such as improved scheduling and higher output. In spite of the fragmentary financial and production information we obtained, it is not unreasonable to assume that there were other savings at least as great as the rework savings (as with Basic Batteries in Text Box 6.1). Annual savings around $800,000 is a reasonable estimate and the benefits can be expected to continue well beyond the first year after training, further increasing the impact of ETP training. In addition, Fret stayed in California, providing several hundred jobs that would otherwise have been lost at great expense to the local economy.

Relative to ETP's $667,968 investment, the benefits have been enormous. By our estimates, the first year benefits alone exceeded the state's one-time cost of training. Finally, not only were jobs retained in California but new jobs were also created when Fret moved its Oregon production to California to capitalize on the trained workers and improved processes. State-funded training can improve a state's ability to attract business.

Training triggers TQM innovations for both low tech and high tech companies

TQM training's universal applicability and its power to change company cultures is most impressive. TQM training seems to be a catalyst for high-quality production. It fosters an interest in quality and instills an attitude of problem solving, independent thinking, and

collaboration for improvement. Taught in individual company training programs customized to company needs, its impact is significant on companies that are high- or low-tech, large or small.

T-Bar, located in Fresno, is a small manufacturer of roll bars, tractor cabs, and bulldozer-type blade extensions. The products are decidedly low-tech and unglamorous, but are used all over the United States and the world. The company did not measure training impact in any way. However, in discussions with workers and managers, it was clear that TQM training had an important impact. The workers now meet twice a month in quality and problem-solving groups. They are represented at top management meetings where their suggestions and requests receive moral and material support. Workers are now able to get the equipment they need to do their jobs better and work as a team to train new workers. They report that TQM and SPC training helped them qualify for a quality certification from Case, the multinational heavy equipment maker, and that the ETP training helped them pass Case's quality audit. Case certification is a valuable and well-known credential that qualified them to work for other quality-conscious and demanding customers. They are also SQA approved. They wrote a new ISO 9000-based quality manual and established an in-process inspection system. The training created momentum and structure that enabled them to more than triple sales since training, from $6 million to $20 million, with a concomitant increase in well-paid workers (see Text Box 6.3).

Correct Disk is a large, publicly-traded Silicon Valley company producing state-of-the-art components for computer disk drives. It competes head to head with industry leaders in the global marketplace.

Text Box 6.3 T-Bar

Trained 55 of 55 workers
ETP cost: $118,276
Estimates of Benefits:

- Sales, employment, and quality increased dramatically
- Sales increased from $6 million to over $20 million
- Widely-recognized quality certification received from Case, the global heavy equipment manufacturer

Text Box 6.4 Correct Disk

Trained 463 of 1,600 workers
ETP cost: $834,051
Estimate of benefits:
- Over $5 million saved
- Cost of down time for tooling changes reduced by $500,000
- Machine costs reduced by over $4 million per year
- Time reduction on one process provided over $650,000 of additional annual revenue
- Immediate benefit-to-cost ratio: over 400 percent (not including long-term repeated gains)

Correct Disk's ETP-funded training had an impact on both production workers and professional engineers (see Text Box 6.4).

Correct Disk used ETP funding to train 463 workers on-site in SPC and TQM. Immediate savings due to training exceeded $5 million dollars. The full-time TQM coordinator supplied us with the following quotes from TQM teams on what they achieved during training:

- Reduced HGA inventory discrepancies from 16 percent to 9 percent by October 31, 1995.
- Reduced average monthly Comptech tooling shortages; consequent downtime reduction resulted in more than $500,000 annual savings by December 6, 1995.
- Reduced R2A-D defects from 5.4 percent to 2.7 percent by June 2, 1995.
- Reduced Phase 1 MR Slider Fab from 2 percent to 0.5 percent by the third fiscal quarter of 1995.
- By May 1, 1995, reduced scrap due to plating parameter input errors—went 11 weeks without error and have maintained a lower error rate.
- Reduced cost of HGA by 14 percent by the end of the 1995 fiscal year.
- Reduced pallet treatment cycle time by 44 percent in RRC, from 136 minutes to 76 minutes, resulting in $18,000 savings in RRT setup and even more savings from reduction in treatment time.

- Reduced "material starts" from 62 percent to 40 percent by August 24, 1995.
- Reduced down time on the Mini JIT UV cure systems from 0.4 percent to 0.0 percent. Assuming that this down time created an output bottleneck, the reduction added $667,000 to annual revenue.
- UPII went from 97.4 to 116.7. This equated to savings of $864,000 per quarter and $4 million in machine costs.

This company made TQM a part of its culture—years after the training, a TQM coordinator continues to track the impact of TQM practices, follows up with training, and encourages TQM teams to meet to solve problems. The immediate benefits of this training amounted to over $5,000,000, which compares favorably to the $834,051 cost. Long-term effects should amplify the benefits.

Not all ETP-funded training was successful. We observed that managerial involvement and support are absolutely vital for a successful training experience. Without top management's involvement, the workers are unable to apply the training, and the time and money spent is mostly lost. Managers first need to carefully assess whether they want to invest in training, and then they have to plan for it. Training can fail, even in the hands of a high-tech, global technology leader located in Silicon Valley, when management does not support the training. The failure discussed below vividly illustrates the need for top-management involvement in individual company training, and shows what happens when management withdraws its support.

Wavelength makes a wide variety of high-tech electrical devices for commercial and defense purposes. Formerly, the company was primarily a defense contractor, but the early 1990s reduction in military spending forced the company to change its focus. Wavelength stands in stark contrast to Correct Disk.

Text Box 6.5 Wavelength

Trained 212 of approximately 365 employees
ETP cost: $115,029
Results: "Catastrophe"

The training began as a consortia project and then changed to an individual company contract. The training became, in the words of the Vice President of Human Resources and Administration, "a catastrophe." The on-site training served about 212 of about 365 full-time employees (see Text Box 6.5). After about a week, the managers stopped attending training and never supported it, and there were even reports that managers opposed the TQM approach. "Follow-up" consisted of managers cursing and threatening workers if they didn't catch up on work missed when training. As a result, nothing was implemented. In fact, the training had to be stopped for a while because of production disruptions, some of which were attributed to excess paperwork, SOST, and "homework" associated with the training. Overall, the company was worse off because of the training. Workers were discouraged because they had learned valuable skills only to be denied the opportunity to use them. ETP's $115,029 could have been better spent elsewhere.

In-house trainers have a big impact

We found that the impact of training was greater with in-house trainers. This is not surprising because training can be better customized to the company, and training expertise is retained in the company. Also, spending money to train an employee-trainer who becomes the resident expert better communicates to workers that management considers training important. Interestingly, our review of related research uncovered a study done from Department of Labor (1993) survey data that also found that employer-provided training raised earnings 5 percent, whereas increases were insignificant with vendor-provided training (Lengermann 1996). Below, we discuss the main findings regarding individual company training.

We have already discussed the very successful Basic Batteries training, which used in-house trainers trained by an outside consultant. Another example, Flow Pumps, shows a company that took the in-house trainer idea to the limit—the president of the company did some of the training.

Flow Pumps is a company that makes high-end stainless steel pumps (see Text Box 6.6). The project trained 190 workers in a variety of areas including production techniques, basic math, and SPC.

Text Box 6.6 Flow Pumps

Trained 190 of 320 workers
ETP Cost: $215,880
Estimated Benefits:
- 25–30 percent improvement in "Direct Labor Productivity"
- 75 percent reduction in scrap rates

Among the 190 were 24 managers and 24 supervisors who received training in management skills. Initially, the company used a few community college instructors for basic math training, but most training was provided by supervisors, engineers, and workers who had trained as trainers. The president, an engineer by training and profession, taught basic math to a number of trainees.

The president sent us a graph showing "direct labor productivity." This important measure varied between 75 and 80 percent of baseline expectations before training; since then, it has varied between 80 and 120 percent, hovering mostly around 100 percent. This suggests that productivity rose by one-fourth to one-third. Overall, the president believes "the teams have done a good job on what they can control." He claims there has been a 75 percent reduction in scrap rates, from 10 to 2.5 percent, and believes that return and warranty work has declined dramatically. In addition, turnover and absenteeism have declined significantly, but no hard numbers were available to support this claim. About half of the trainees (47 percent) reported that training led to a "substantial" or "major" overall increase in productivity. They further report that SPC and production techniques had the greatest impact on productivity. Trainees also agree that training led to positive changes in the work environment.

Training by an outside party may be a customer requirement. Some companies were required by major customers to train their workers; in order to survive, they had to train. Such training may not have the performance impact seen in companies that undertake training to address production or quality problems. This raises the issue that training may have little noticeable impact beyond allowing the company to retain a major customer or to simply stay in business. It also illustrates that training benefits are not always easily quantifiable in terms of be-

fore and after performance. Needless to say, the impact may be large even if it cannot be easily and objectively quantified.

TAC Aviation is a small, privately owned union shop engaged in sheet metal fabrication for the aerospace industry. SPC and TQM training was required by Boeing, one of the company's major customers. TAC trained 92 of its workers but was not forthcoming with financial data on training impact (see Text Box 6.7). The workers commented that TQM was beneficial and improved communications with managers and engineers. There was little attempt to keep records of training impact. However, the head of Human Resources said that TQM-inspired ideas are providing direct savings in the neighborhood of $25,000 per year. She also commented that some trainees left for higher paying jobs after their training. If the above estimate is correct, the benefits from ETP funding paid back the $50,150 spent in two years. An additional impact is the increase in wages of trainees who left for higher pay elsewhere.

Text Box 6.7 TAC Aviation

Trained 92 of 150 workers
ETP cost: $50,150
Estimated benefits:
- $25,000 per year
- Retained a key customer
- Benefit-to-cost ratio: about 50 percent per year, over and above survival

Conclusion

The case studies from the fieldwork indicate that ETP-funded training has beneficial impacts on the companies it served. ETP's investments may be viewed as leveraged in the sense that client companies and individuals also invest in the training. This leveraging of ETP funds appears to provide high rates of return to the ETP funds invested.

Training Agency and Consortia Training

During the fieldwork, we probed the companies' managers for any indications they could provide of the overall impact of ETP training

and combined these indications with what we could glean from standard financial sources. Determining ETP's impact proved particularly difficult for training that occurred in consortia and training agencies for a number of reasons associated with the size of the companies involved and the nature of training agency and consortia contracts. Also, we only visited three companies in each training agency or consortia project when, in fact, the workers trained often came from dozens of companies.

The advantage training agencies and consortia had in reaching small companies became a distinct disadvantage in our assessment of the impact of training on those companies. Smaller companies generally have less formal record-keeping systems and generally engage in less financial analysis and planning. This meant that less insight, data, and analysis were at the fingertips of the managers who were queried about the impact. Furthermore, smaller companies are less likely to show up in the financial databases that were searched for companies' financial histories. In consequence, neither management nor the standard financial databases could provide much reliable information about the financial impact of training.

Even if financial data were available for the companies involved, the nature of training agency and consortia programs militates against detecting the financial effects of training on a specific company. Especially under training agency contracts, training tends not to be a single event in calendar time. Rather, companies send one small contingent at a time (1–3 workers) to more or less ongoing training agency sessions. This spreads the training of employees over a number of years so that any financial impact is also dispersed. The fact that employers send a small contingent of workers at any one time also limits the immediate impact on the company at any one time. The absence of the "training event," as it occurs in large individual company ETP contracts, makes before-and-after financial comparisons impossible because there are no distinct before-training or after-training periods.

With those cautions in mind, our fieldwork and financial analyses revealed a general pattern of more notable training impacts on companies involved in training agency or consortia training for specific industries. These impacts were detectable because workers trained in industry-specific skills and "made things," so changes in scrap rates, shop capabilities, and production time were noticed and tracked. Con-

sortia training generally involved intact work groups that worked in notably different ways after training, so the results were more likely to be noticed by management.

In contrast, generic training by agencies produced few detectable impacts on companies. The small contingents of company workers who were trained tended to be in support roles where changes in productivity could not be conveniently measured. Also, these support activities were likely to be small relative to overall company activity, diminishing any measurable impact of the training. In one case, where a significant number of company workers were trained on new software, the company was simply switching from one type of software to another, which was a change that did not materially alter the trainees' capabilities or productivity.

To summarize our findings on training agency and consortia training, we detected the greatest impact on companies that trained under consortia or industry-specific training contracts. The results of this training tended to be measurable and tracked (though not always precisely) by management. Training in generic-skills, training-agency contracts produced little discernable impact on the companies involved. This may be due to various factors, such as the companies' usage of the training availability (over several years), the small number of employees involved, or the trainees' support roles where the training did not much affect the company's capabilities or productivity.

STATISTICAL ANALYSIS OF THE IMPACT OF TRAINING ON COMPANY GROWTH

Overview

This section examines the cross-sectional impact of ETP-funded training on companies that received training, and presents a statistical analysis of the employment and wage growth of companies served by ETP during the 1995–1996 period. The statistical analysis supports the fieldwork observations reported in our case studies above—ETP-funded training is indeed beneficial to companies.

The analysis compares total employment and wage growth in companies with ETP training to the growth in similar California-based

companies without ETP training. We chose these two factors as the only uniform data available for all companies served by ETP and a comparable group of other California companies. We assume that greater growth in these factors is a proxy for company success. This approach is similar to Bartel's paper (1992), where she measures wage growth for individual workers in a single company.

Our analysis found that:

- Companies with ETP-funded training grew faster, in terms of total employees and total wages paid, than similar companies in the same industry (based on 3-digit SICs).
- Companies that had ETP training through direct contracts (employer contracts) grew faster than companies that received ETP training through either consortia or training agencies.
- Employee growth varied with the proportion of employees trained. Companies in which 10 to 50 percent of workers were trained grew faster than companies in which less than 10 percent of workers were trained. Training more than 50 percent of workers seemed to yield about the same growth as training 10 to 50 percent.

Research Approach

Growth as a performance measure

ETP's mission is to provide training that helps California businesses "remain viable" and "compete in the global economy." As a concrete measure of ETP's ability to achieve these goals, we tried to determine if ETP-funded training promoted company growth. We assumed that companies that grew more than others in their industry were more viable and better able to compete. Specifically, we focused on percentage growth in the number of employees and total wages paid before and after training. Percentage growth was used because it is more informative than raw numbers—an increase of 100 employees would represent a 100 percent increase if there were 100 employees before training, but only a 1 percent increase if there were 10,000 employees before training.

Industry-adjusted growth

To better understand growth numbers in context, we compared them to industry norms. For instance, a company that increased employment by 25 percent did poorly if its industry averaged employment growth of 50 percent, but its growth was impressive if the industry's growth rate was only 10 percent. Therefore, we examined industry-adjusted growth as well as simple growth rates, because industry adjustments filter out broader economic and industry changes to provide a more meaningful measure of training impact.

For each company receiving ETP training, we created a comparison group by selecting nine similar California-based companies that did not receive ETP training during the period and were closest to the trainee company in size and industry (3-digit SIC code). The industry average used in each case was the average of the nine control companies for that trainee company, and it provides a benchmark for the trainee company's characteristics. Because ETP training was the difference between trainee companies and their industry peers, cross-sectional differences between them should reflect company-specific "abnormal performance" associated with training.

Industry-adjusted measures were calculated by subtracting the average industry value from the trainee company's value. Industry-adjusted performance is informative because it discounts many factors that might affect the performance of similar companies. For instance, for industry-adjusted wage growth, we would subtract trainee company wage growth from industry-average wage growth so that the difference would reflect the trainee company's performance with general industry factors removed. If a company's wage growth is 15 percent and the industry average is 25 percent, then 15 percent looks poor when shown as an industry-adjusted growth of -10 percent. On the other hand, if industry wage growth was 5 percent, then a 15 percent growth rate gives a $+10$ percent industry-adjusted growth.

Event time

We examine company performance in terms of event time. This allows us to view ETP-funded training as a "treatment." Given the treatment, we want to determine whether it affected the trainee companies. Because treatments occurred at different times, we standardize

time relative to the training period, which is considered to be time zero. All other time is measured in quarters of a year, both before training and after training. The periods of special interest are the first year prior to and the first year after training. The prior period shows what companies were like just before training, and the period after reflects the impact of training, if any. We examine impact on the company by comparing company characteristics before training to the same characteristics in the year after training, and by comparing companies' experience to that of peers not receiving ETP training during the corresponding period.

Event Time Model								
Q–4	Q–3	Q–2	Q–1	Training	Q+1	Q+2	Q+3	Q+4

Data

Because of the data problems noted in previous sections, we were limited to two performance measures: number of employees and total wages paid. These data are uniformly available from the California Employment Development Department and are collected quarterly as part of the unemployment insurance system.

The trainee company sample is drawn from the group of all companies in which 10 or more employees received ETP-funded training in 1995–1996. We did not believe it was reasonable to expect companies to show a significant change in their overall growth as a result of training fewer than 10 people.

The following definitions include the calculation methods used for variables:

- Total Earnings
  Average quarterly total wages paid to all employees by the company, calculated both for the four quarters before and the four quarters after training, from data reported quarterly to EDD
- Total Employees
  Average quarterly total number of employees of the company, calculated both for the four quarters before and the

four quarters after training, from data reported quarterly to EDD

- Total Earnings per Employee
  Total Earnings divided by *Total Employees* for the company, using the above variables for the four-quarter periods before and after training
- Total Earnings Growth
  Total Earnings before training compared to *Total Earnings* after training
- Total Employee Growth
  Total Employees before training compared to *Total Employees* after training
- Total Earnings per Employee Growth
  Total Earnings per Employee before training compared to *Total Earnings per Employee* after training
- Employer Contract
  Training for which there was a contract between the individual employer and ETP; this is also referred to as 'individual company' training
- Consortia Contract
  Training in which ETP contracts with an industry association or major employer to train employees of several companies
- Training Agency Contract
  Training in which ETP contracts with a training agency to provide training to employees of several companies

For each company, growth rate measures were calculated as change from the year before training to the year after training. Growth is calculated as:

$$\text{Growth} = \frac{\overbrace{(Q+1+Q+2+Q+3+Q+4)}^{\textit{Year after}} - \overbrace{(Q-1+Q-2+Q-3+Q-4)}^{\textit{Year before}}}{\underbrace{(Q-1+Q-2+Q-3+Q-4)}_{\textit{Year before}}}$$

Earnings were adjusted for inflation to 1995 dollars.

We dropped trainee companies showing a 100 percent decline, as this suggested that they no longer existed or the data were missing.

We also dropped 3 companies showing employment growth over 600 percent, as this suggested that they likely underwent a merger or acquisition and were, therefore, not comparable to their past or their industry peers.

Company characteristics

Table 6.2 details the characteristics of the average company before beginning ETP-funded training. The data show that, despite matching ETP companies to the nine companies in their industry that were closest in size, ETP companies were substantially larger on average. That is because a few ETP companies are much larger than any other company in their industry. This pattern makes the median statistic a better comparison than the mean. Examining the median figures, we see that the typical ETP company employed 200 people and had a quarterly payroll of about $1.8 million—about $9,100 per employee. On a median basis, the control companies were similar—if somewhat smaller—overall.

Comparison of ETP Companies and Industry Controls

Companies using ETP-funded training grew faster than similar-industry companies not using ETP training. Table 6.3 shows that ETP-trained companies grew faster in number of workers employed and total earnings paid out, but were about the same in earnings per employee. The average ETP-trained company's *Total Employees* in the year after training was 14.3 percent higher than the year before training. This is highly favorable compared to the 0.8 percent decline in the control companies over the same period. Similarly, comparing year before training to year after figures, ETP-trained companies increased wages paid by 25.8 percent compared to the control companies' 10.2 percent increase. *Total Earnings per Employee* in ETP-trained companies rose 11.9 percent; this varied little from the 11.7 percent of control companies because the control companies' work forces declined slightly. The trainee companies, experiencing more rapid growth, spread their rising payrolls over more people. Furthermore, companies that grow rapidly tend to add more lower-paid, entry-level workers to the workforce base, which reduces average employee wage.

Most ETP companies grew faster than their non-ETP counterparts in the manufacturing industry. We found that, of the 169 trainee com-

Table 6.2 Pre-Training Comparison of ETP Firms and Industry Controls

	Number of companies	Mean	Standard Deviation	Median	Maximum	Minimum
Quarterly average employees in year before ETP training:						
ETP-trained firm	177	851	2,346	200	24,527	10
Industry average	—[a]	429	920	163	7,860	11
Quarterly average wages paid in year before ETP training:						
ETP-trained firm	177	$8,973,298	$28,393,400	$1,849,860	$322,626,000	$79,194
Industry average	—[a]	$4,202,157	$10,668,100	$1,489,045	$104,169,000	$110,424
Quarterly average earnings per employee in year before ETP training:						
ETP-trained firm	177	$9,487	$3,640	$9,111	$25,711	$1,698
Industry average	—[a]	$9,251	$2,696	$9,110	$17,084	$3,311

[a]Industry average is calculated as the average of the nine California-based firms closest to trainee firm based on size and industry (3-digit SIC). Hence, industry figures represent an average of averages.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

Table 6.3 Growth of ETP Firms and Industry Controls Through First Year After Training

	Number of companies	Mean (%)	Standard Deviation (%)	Median (%)	Maximum (%)	Minimum (%)
Growth in employees:						
ETP-trained firm	169	14.3	49.1	7.4	260.0	−80.9
Industry average	—[a]	−0.8	24.4	−0.8	74.5	−68.3
Growth in wages paid:						
ETP-trained firm	169	25.8	50.8	15.0	241.9	−73.2
Industry average	—[a]	10.2	28.2	9.0	107.9	−57.0
Growth in earnings per employee:						
ETP-trained firm	169	11.9	15.1	8.8	63.7	−35.1
Industry average	—[a]	11.7	12.9	11.9	61.2	−35.1

[a]Industry average is the average of the nine California-based firms closest to trainee firm, based on size and industry (3-digit SIC). Hence, industry figures represent an average of averages.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

panies, 57 percent had employee growth rates that exceeded their industry peers by more than 1 percent, and that 40 percent had growth rates at least 1 percent lower than their industry peers. About 3 percent of the trainee companies were within plus or minus 1 percent of their peers' growth rates. We observed almost the same results for growth in earnings paid: 56 percent experienced more than 1 percent higher growth, 41 percent experienced growth at least 1 percent lower, and about 3 percent experienced similar growth. With respect to earnings per employee, only 41 percent experienced growth exceeding their industry peers by more than 1 percent, while 53 percent experienced growth rates at least 1 percent less than industry peers, and 6 percent experienced similar growth rates.

The employee growth results deserve more comment. Much of our sample was composed of manufacturing companies, which have experienced very little employment growth and are expected to grow only slightly in the near future, according to a recent forecast by UCLA (Lee 1999). The 0.8 percent decline of the control companies from the before-training period to after-training period is consistent with this. ETP-trained companies' employment levels grew at a 14.3 percent rate over the same period, in spite of an overall no-growth trend in manufacturing, providing strong evidence that ETP is doing its job. Though we cannot ascribe causality, two possible explanations come to mind for the high growth of ETP companies, either of which suggests that ETP is effective. Either ETP training is causing these companies to grow, or else ETP has targeted companies poised for growth. In all likelihood, there is some truth to both explanations. In either case, ETP is contributing to overall economic growth in the state.

Company Impact by Type of Contract

We also examined the relationship between types of ETP contracts and the impact these had on the company. Table 6.4 shows that there were differences between the characteristics of companies served under different types of contract. The average company using training agencies had almost $11.9 million in payroll during the four quarters before training and employed 1,107 workers, for an average of $10,067 in quarterly earnings per employee. (It is important to remember that companies training fewer than 10 people were dropped from the analy-

Table 6.4 Pre-Training Comparison of ETP Firms by Contract Type

Type of contract	Average total Quarterly earnings ($)	Employees	Earnings per employee ($)	Number of firms
Employer	8,418,795	794	9,685	68
Consortia	3,138,463	354	7,668***	32
Training agency	11,887,854	1,107	10,067†††	77

***Significantly different from Employer at the $p < 0.01$ level (2-tailed).
†††Significantly different from Consortia at the $p < 0.01$ level (2-tailed).
SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

sis.) Training agencies often serve small groups from many companies, so the data here do not represent all companies served by agency contracts. Companies served by consortia were smaller, with an average payroll of $3.1 million per quarter and 354 employees, for an average of $7,668 in quarterly earnings per employee during the four quarters before training. Companies contracting directly with ETP were between the other two groups with quarterly average payroll of $8.4 million and 794 workers earning an average of $9,985 per quarter before training. The companies in the three groups, taken as a whole, provided well-paid jobs averaging annual pay per worker from $30,000 to more than $40,000.

Table 6.5 shows that employers contracting directly with ETP were associated with the greatest industry-adjusted growth from the year before training through the year after, in terms of wages paid out (21.0 percent growth) and number of people employed (19.1 percent growth). Then came companies using ETP-arranged consortia contracts, with payroll growth of 16.9 percent and employee growth of 18.0 percent, followed by companies using agency contracts, with payroll growth of 7.6 percent and employment growth of 8.1 percent. These results suggest that companies contracting directly with ETP benefit most. This supports the findings discussed in Chapter 5, indicating that employer projects had greater potential for improving productivity and growth, consortia projects had somewhat less potential, and training agency projects had the least. We drew these conclusions

Table 6.5 Growth of ETP Firms Through First Year After Training by Contract Type

	Growth			
	Earnings (%)	Employees (%)	Earnings per employee (%)	Number of firms
Employer	30.1	17.5	12.1	66
Consortia	31.7	16.7	14.0	31
Training agency	19.4	10.3	10.7	72
	Industry-adjusted growth			
	Earnings (%)	Employees (%)	Earnings per employee (%)	Number of firms
Employer	21.0	19.1	0.5	66
Consortia	16.9	18.0	−2.1	31
Training agency	7.6	8.1	0.7	72

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

by observing that with all trainees in the same company, employer contracts had greater potential for customization of training and greater organizational change associated with on-site training. We also found that a deeper management commitment to the goals of training was associated with employer contracts. Conversely, there was much less potential for improving productivity and affecting growth in training agency projects, where workers from several employees are taught generic skills, often on their own time, in a class drawn from many different companies and industries. These results are consistent with Lengerman (1996), who found that training is associated with higher wages and that training of a generic kind ("vendor" training) had the smallest impact and this impact seemed to depreciate rapidly.

The Impact of the Proportion of Workers Trained

Only employer contracts allow us to observe directly the relationship between growth and the proportion of workers trained. This is because, with consortia and agency contracts, we do not know how

many employees came from a particular company, and so the number of workers covered by a contract is the sum of workers from many companies. Table 6.6 divides employer contracts into three groups, based on the percentage of employees trained. The smallest intervention was in companies training fewer than 10 percent of their workers. Next were those training 10 to 50 percent of their workers, and the largest intervention was in companies training over 50 percent. Not surprisingly, smaller companies trained the largest proportion of their workers.

Table 6.7 examines the impact that the proportion of workers trained has on company growth. Generally, the greater the proportion of workers trained in a company, the higher the growth from the year before training to the year after. This is especially striking for companies training more than 10 percent of their workers. However, the marginal benefits are not proportionate to the increase in the share of workers trained. Training 10 to 50 percent of the workers does not result in two to four times the amount of growth that training less than 10 percent does. Moreover, training above 50 percent does not result in much more growth than training 10 to 50 percent of the workforce at a single time.

Summary and Conclusions

The cross-sectional analysis reinforces what the case studies showed; namely, that worker productivity rose after training. Our re-

Table 6.6 Pre-Training Comparison of ETP Firms by Percent Trained

Percent Trained	Earnings ($)	Employees	Earnings per employee ($)	Number of firms
Less than 10%	19,380,300	1686	10,731	19
10–50%	6,201,000***	666***	9,196	29
More than 50%	1,222,000***	666***	9,401	20

***Significantly different from "< 10%" at the $p < 0.01$ level (2-tailed).

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

Table 6.7 Growth of ETP Firms by Percent Trained Through First Year After Training

	Growth			
	Earnings (%)	Employees (%)	Earnings per employee (%)	Number of firms
Less than 10%	12.5	−3.2	15.7	19
10–50%	37.5	25.0*	12.5	27
More than 50%	35.5	27.0*	8.5	20
	Industry-adjusted growth			
	Earnings (%)	Employees (%)	Earnings per employee (%)	Number of firms
Less than 10%	13.1	8.4	2.1	19
10–50%	24.9	21.6	2.1	27
More than 50%	23.4	25.9	3.0	20

*Significantly different from "< 10%" at the $p < 0.10$ level (2-tailed).

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

sults are consistent with Bartel (1992), who finds that training is associated with greater wage growth on the individual employee level and at the company level (Bartel 1991). Likewise, Lengermann (1996) finds that training is associated with increased wages. He notes that training is "far less prevalent than what is socially optimal" (p. 378). The statistical studies presented in this chapter show that companies with ETP training grow faster than similar companies without ETP training. Growth rates vary by type of contract and proportion of workers trained. Employer contracts are associated with the greatest growth, perhaps because they are more customized and usually train a larger proportion of the workforce. Also, training a larger proportion of workers has a greater (though not proportionally so) impact on growth. We cannot prove causality, but two things may be at work: Either ETP training causes greater than expected growth, or companies with the greatest growth potential choose to use ETP. In either case, ETP provides companies with services they need to expand workforces and payrolls. This has positive implications for Californians and the California economy.

7
The Economic Impact of ETP Training

The ETP program has two primary economic goals that are shared by many other state programs—saving UI funds and serving as an economic development tool for the state. Any evaluation of the program's economic impact should focus on these goals. UI funds can be saved if retraining incumbent workers who are about to lose their jobs actually reduces unemployment, and thus saves UI payments. ETP is an effective economic development tool if by educating the workforce, it increases workers' productivity and thereby increases California's competitive advantage, particularly in companies engaged in national or international trade. Enhanced competitiveness reduces layoffs and promotes the expansion of California's businesses and economy. In this chapter, we assess ETP's effectiveness in achieving the goals of saving UI funds and promoting economic development through increased productivity. As in the previous chapters, we confine our estimates to the impact of the incumbent-worker portion of the training program.

This section presents estimates of UI fund expenditure reductions and California economic impact attributable to ETP's 1994–1996 incumbent-worker cohort. The underlying methodology and assumptions are detailed in the context of the estimates' development. The methodology and procedure presented also pertain to similar estimates made for earlier training cohorts. In both the earlier and the current estimates, UI fund savings are treated as one portion of ETP's overall impact on the California economy.

For the 1994–1995 and 1995–1996 ETP contracts, the total impact on the California economy was estimated at over $400 million in the first year after training. Components of that estimate are itemized below. Although only $62.8 million of ETP training contract funds were directly invested to achieve the $400 million impact, this should not be taken as a return on investment as there are substantial costs and returns omitted from the estimates.[1]

The estimated impact of ETP training is the difference between economic benefits that occurred with ETP's training programs in place and those that would have occurred without them. This suggests that the key to benefit estimation is using the non-ETP comparison group to estimate what would have happened had the trainees not been trained. The estimated economic benefits of training will derive from positive training outcomes relative to the non-ETP comparison group. In this chapter, we identify several training outcomes and their associated economic benefits. For the reader's convenience, we have first summarized the estimated magnitude of those benefits to the California economy, and we explain why those benefits are expected and detail their empirical derivation. In each case, we have been careful to include only net benefits to California, excluding benefits to California workers or companies that come at the expense of other California workers or companies.

THE TRAINING OUTCOMES AND THEIR ECONOMIC BENEFITS

Benefits for trainees can lead to economic benefits for the state as a whole. For example, training that increases employment stability reduces UI claims, while training that increases productivity adds to workers' earnings and may boost economic activity. Table 7.1 lists the three types of ETP training outcomes with their primary economic benefits. Estimated payoffs for the first year after training are given to the nearest million dollars.

These ETP training program outcomes and associated benefits to the California economy are cross-referenced in Table 7.2. We estimate that the ETP cohort's training had an impact of about $413 million on the California economy in the first year after training. Saving jobs threatened by out-of-state competitors was the greatest benefit, totaling over $360 million in UI fund savings, trainee earnings impact, and indirect (or multiplier) effects. The largest component was the earnings impact. Increasing productivity was the second largest benefit, totaling nearly $50 million from $31.8 million in earnings impact and $16.8 million in indirect effects. The smallest benefit was increased

Table 7.1 Training Outcomes and Economic Benefits

Training outcomes and benefits	Payoff ($)
Increase in trainees' employment stability	
Savings to Unemployment Insurance fund	2 million
Increase in trainees' productivity	
Increase in trainee earnings	32 million
Increase in employment at other California businesses	17 million
Saving of California jobs	
Savings to Unemployment Insurance fund	61 million
Prevention of trainees' temporary earnings losses	167 million
Prevention of other California businesses' losses	134 million

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

employment stability, which saved a little under $2 million in UI funds during the first year after training.

Table 7.2 can also be read to determine which ETP training outcomes are the sources of a particular type of economic benefit. For example, the source of UI fund savings, totaling over $63 million, was both increased employment stability and saved jobs. ETP's earnings

Table 7.2 ETP Impact on the California Economy

Outcome	UI fund savings ($)	Earnings impact ($)	Indirect effects ($)	Total ($)
Employment stability	1,978,000	NC	NC	1,978,000
Productivity increase	NE	31,803,000	16,766,000	48,569,000
California jobs saved	61,115,000	167,305,000	133,845,000	362,265,000
Total	63,093,000	199,108,000	150,611,000	412,812,000

NC: Not calculated separately. Improved employment stability would lead to higher trainee earnings by lowering unemployment. We did not net this number out of the productivity increase for trainees; employment stability effect is included in productivity increase or indirect effects.

NE: Not estimated. Because UI taxes only apply to the first $7,000 of annual earnings, and annual earnings already averaged about $25,000, any effect on UI funds would be both small and difficult to estimate.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

impact, totaling just under $200 million in the first year after training, derived from both increased productivity and saved jobs. Indirect effects, totaling over $150 million, resulted mainly from saving jobs and only secondarily from productivity increase.

Some may find the indirect effects suspect, given that claims of indirect or multiplier effects often have little logical justification and even less empirical basis for the multipliers used. However, the multiplier effects claimed here have been carefully justified and meticulously tracked and estimated. Further evidence of their existence can be found in Chapter 6, in the section on the impact of ETP training on companies. In that section, companies with ETP training programs show faster growth than similar-size companies in their industry. It is reasonable to expect that as these ETP-contracting companies grow faster, they will order more from their California suppliers, creating a multiplier effect. Further discussions of the estimated multiplier effects are presented in the following sections, which detail the analysis leading to the estimates in Table 7.2.

Outcome 1: Employment Stability—$2 Million

A major goal of ETP is providing workers with "secure employment." Achievement of this goal can be measured in unemployment claim reductions and lower UI payments. As shown in Chapter 4, trainees experienced a decrease in unemployment after training relative to the comparison groups (measured in average UI weeks claimed). An improving economy during part of the study period also produced lower unemployment in the comparison group, but the trainee claims rate fell significantly more than that of the comparison group. UI Fund savings are a result of lower UI claims associated with relatively low post-training unemployment.

We estimated the reduction in UI payments by tracking the unemployment and UI claim experience of ETP trainees relative to the comparison group. Because we were interested in estimating total UI savings associated with ETP training, we tracked the experience of all trainees relative to all members of the comparison group. We did not restrict the analysis to a subset of trainees in the labor force during certain quarters before or after training, or to comparison group members in the labor force in corresponding quarters. Our analytical proce-

dure first determined the percentage of trainees expected to experience unemployment if not trained and then compared that percentage to their actual rate of post-training unemployment. The trainees' UI payment rate was then applied to the estimated difference between trainee and comparison group unemployment rates.

We used the comparison group[2] experience to estimate the likely unemployment experience of ETP trainees had they not been trained. However, because ETP contracts' selective requirements imply that trainees might differ from average California workers, we could not simply apply the comparison group's unemployment percentages to the trainees. ETP contracts require that trainees must be workers threatened with displacement, transitioning to a high-performance workplace, or in a company that is diversifying its product line. Because of these selective contract requirements, ETP trainees may not have the same unemployment levels as the random sample of California workers that was used as the comparison group. What can be expected is that ETP trainees will experience the same trend in unemployment as the comparison group, because that trend is produced by the general conditions and dynamics of the California economy. We therefore assumed that without training, the ETP trainees would have experienced the same unemployment trend or change as the comparison group. Tables 7.3 and 7.4 show the calculations resulting in estimates of this source of UI fund savings for the trainees.

Table 7.3 details the procedure for estimating UI savings due to training. The first two rows report the average quarterly percentage of trainees and comparison group members making UI claims during the year before training and the two years after. The "normalization ratio" in the third row is the ratio of the average quarterly percentage of trainees that made UI claims in the year before training to the average quarterly percentage of comparison group members that made claims. The normalization ratio indicates that in the four quarters preceding training, the claims rate of the trainees was 0.954—or 95.4 percent—of the claims rate of the comparison group. The normalization ratio was applied to the comparison group's after-training claims rate to estimate the expected claims rate for the trainees, shown in the fourth row as the estimated quarterly average of claims that trainees would have made had they followed the same trend as the comparison group. The trainees' after-training expected claims rate was then divided by their

Table 7.3 UI Savings Attributable to Retraining

Item	Year before	Year after	Second year after
Trainees: average percentage making quarterly claims	6.82%	5.29%	4.42%
Comparison group: average percentage making quarterly claims	7.15%	7.04%	6. 43%
Normalization ratio[a]	0.954	0.954	0.954
Trainees: expected percentage making quarterly claims	6.82%	6.71%	6.13%
Trainees: expected claim rate as percent of actual claim rate	100.00%	126.96%	138.79%
Trainees: actual UI payments	$9,303,400	$7,338,217	$6,020,201
Trainees: estimated UI payments without training	$9,303,400	$9,316,600	$8,355,437
Trainees: estimated UI savings		$1,978,383	$2,335,236

[a]Note that the normalization ratio is the retrainees' year-before claims divided by the comparison group's year-before claims. Applying this ratio to each of the comparison group's claims rates produces the *expected* claims rate for the trainees. The trainees' year-before expected claims rate is just what it actually was, because of the definition of the normalization ratio. The trainees' year-after expected claims rate is the comparison group's rate times the normalization ratio and is what the trainees would have experienced if their claims rate had followed the same trend as the comparison group.

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Gheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

actual claims rate to obtain the expected rate as a percentage of actual rate. This was applied to the actual trainees' UI payments to obtain estimated total UI payments to trainees had they not been trained. The trainees' actual UI payments were then subtracted from expected payments to obtain estimated UI savings due to training. In other words, this procedure assumes that the trainees would have continued to experience unemployment claims at 95.4 percent of that of the comparison group had they not been trained. This procedure also assumes that any difference between the trainees' expected and actual unemployment claims was due to training.

Table 7.4 Earnings Impact

Item	Year before	Year after	Second year after
Trainees: total earnings	$999,135,817	$1,060,014,095	$1,051,697,931
Trainees: earnings percentage of year before	100.00%	106.09%	105.26%
Comparison group: earnings relative to year before	100.00%	102.91%	105.33%
Trainee's expected earnings based on comparison group pattern		$1,028,210,670	$1,052,389,756
Trainees' excess growth in earnings		$31,803,426	$(691,825)

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

The total UI fund savings associated with the lower UI claims rates from ETP trainees in the study period is estimated to be about $1,980,000 in the first year after training. As indicated in the preceding tables, we estimated another $2,335,000 in UI fund savings for the second year after training, but this is not included in our subsequent calculations because our estimates only pertain to first-year impact of ETP training.

Outcome 2: Productivity Increase—$48.5 Million

Earnings impact: $31.8 million

The productivity of ETP trainees may increase either because they produce more per hour or because they work more hours. Any training program that increases the marketable skills of participants adds production capacity. ETP programs may have an advantage over other training programs because of the placement requirement in ETP contracts. Other training programs create the potential to produce more, but that potential is only realized when the newly-trained workers are placed in jobs. ETP contracts require placement as a condition of training, so when ETP training is completed, the economic potential of enhanced productivity is realized and manifested immediately in

increased economic output. Also, trainees' new skills may allow them to work more hours by avoiding the periods of unemployment associated with less marketable skills.

Direct measurements of productivity changes are difficult and expensive, requiring accurate data on physical input and output for periods before and after training. Such data are generally not available, and ETP projects are no exception. Even if data were available, direct measurement of individual productivity is complicated in that newly trained workers typically work with different equipment, different materials, and differently skilled co-workers than they did before training. It is difficult to separate a single worker's change in productivity from the contributions of new equipment, new materials, and differently skilled co-workers.

In our analysis, as in most studies, change in earnings is used as an indicator of change in worker productivity. Standard economic theory implies that workers are paid the value of their contribution to production (their marginal product). Accordingly, an increase in productivity should result in an increase in workers' earnings (Becker 1993). The advantage of using earnings as an indicator of productivity is that earnings data are much more readily available than physical output data and are reported for individual workers. Lacking uniform records of physical change in production levels for ETP projects, we used earnings change data as the productivity change indicator.[3]

Worker productivity can be influenced by a variety of factors other than training. These factors include investment in capital equipment (new machinery, computers, or software), improvement in infrastructure (usually transportation, utilities, and communications systems), growth in technology, more efficient regulation, or simply an increase in the value consumers place on the products produced. In view of that, to estimate the increase in worker productivity attributable to ETP training, we need to adjust for the productivity increases due to other factors. We used the comparison group's pattern of earnings change to adjust for changes other than ETP training.

The increase in productivity attributable to ETP is the difference between trainees' actual earnings growth and the earnings growth they would have had without ETP training. We used the comparison group's earnings as an indicator of the average rate of productivity increase for workers not in ETP training.[4] Again, because we were

trying to capture the total impact of ETP on productivity, we used the experience of all trainees and all comparison group members in these estimations.

Table 7.4 shows the before-and-after earnings patterns for trainees. Earnings patterns are shown in dollars and as percentages of earnings in the year before training. The before-and-after percentage earnings patterns of the comparison group are then provided for comparison. Trainees' pretraining earnings are multiplied by the comparison group's percentage change to show what trainees would have earned had they followed the comparison group's earnings trend, and then the dollar difference between the expected and actual patterns is given. The trainee productivity increase, attributable to ETP training, is estimated to be about $31,803,000 in the first year after training.

The estimated productivity difference in the second year after training is given to illustrate a major finding of this analysis: the effects of ETP training in a recovering economy appear to be substantially different from its effects in a slowing economy. Table 7.4 shows that the positive productivity effects of ETP training disappeared in the second year after training. This result is quite different from the results of earlier ETP studies, where productivity gains persisted for at least three years. Other studies, more or less consistent with the earlier ETP study results, have suggested that training-related productivity gains last about 12 years (Lillard, Hong, and Tan 1986). Unfortunately, additional years of data were not available for the trainees we studied, so we could not determine whether any productivity-enhancing effect returned during the third or fourth year after training. We have omitted any projection of long-term ETP training effects because of the near equality between trainee and comparison group earnings growth in the second year after training. Without earnings growth data for later years, we are unable to determine whether there is a long-term enhancement of trainee productivity in an expanding economy with falling unemployment.

Indirect effects—$16.8 million

ETP training programs have a potential economic impact beyond the direct effects these programs have on program participants and their companies. These indirect or "multiplier" effects are transmitted

from companies experiencing growth to supplier companies through increased orders. Realization of these indirect effects of training depends on the nature of the companies in which the trainees are placed. Specifically, to realize the potential indirect economic impact, the trainees must be in basic industries. We explain the reasons for this after a brief explanation of regional multipliers.

In standard economic theory, regional multipliers are derived from the distinction between "basic" activities and "service sector" activities. Businesses that compete in and "export to" national and international markets are the region's "economic base." Besides these regional export-oriented activities, the economic base includes the visitor-serving portion of local hotel, restaurant, entertainment, and retail trade; governmental activity funded by nonlocal sources; and interregional financial, insurance, transportation, and utility networks. According to the regional theory, these "basic" activities generate the "service sector" jobs in the local economy through local suppliers and household demand generated by payroll expenditures. The services sector includes all businesses supplying local industries and households—in other words, businesses that respond to locally generated demand for goods and services. These would include retail trade, local business services, most personal services, local government activities, and any local suppliers of exporting firms. Regional theory postulates that variation in basic industry output spawns variation in local orders and payroll, which in turn causes variation in demand for the local service sector products. Regional multipliers show the relationship between change in a region's basic industry output and its overall output (basic plus service sector). Basic industries with a high proportion of local suppliers and high local payrolls relative to output have larger multipliers, and those with weaker linkages to the local economy have smaller multipliers (O'Sullivan 2000).

The bottom line is that basic industries are those that compete with out-of-state businesses. Whether a particular retraining program has a multiplier effect in the California economy, then, depends critically on the location of the business's competitors. If the company's competitors are out of state, then increased sales of the company and its suppliers come mainly at the expense of out-of-state firms and suppliers. This produces a net gain in production and jobs for California. Similarly, if the company loses its competitive position, out-of-state compa-

nies and their suppliers will likely pick up its lost sales, resulting in a loss of economic activity in California. On the other hand, if a California company competes only with other California businesses, then its gains or losses and those of its suppliers would generate offsetting effects in other California businesses, yielding no significant net gain or loss for the California economy.

For example, a computer printer manufacturer is in a basic industry because it competes with companies that are out of state or in other countries. A gain by this company likely would come at the expense of an out-of-state company. On the other hand, most restaurants do not compete with out-of-state restaurants but with other local restaurants and so restaurants are not in a basic industry. A newly opened restaurant's business is likely to come at the expense of existing restaurants.

ETP training projects that enhance the competitive advantages of "basic" California businesses are likely to produce economic impacts beyond the direct effects on those businesses and workers. Because ETP retraining programs upgrade both workers' skills and the jobs they fill, ETP training strengthens California businesses' advantages relative to their out-of-state competitors. California companies will experience increased production and ETP training will increase sales and jobs for in-state suppliers, to the extent that California businesses with ETP training programs either gain sales or preserve sales they would otherwise have lost to competitors. The impact of training programs on California's economy is the increased production in businesses with training programs, plus the increased activity of their various suppliers. The aggregate increased production of their suppliers is the "indirect effect." This indirect economic impact, called a "ripple, or multiplier, effect," excludes any offsetting negative effect on other California suppliers.

California's current economic environment is particularly conducive to widespread multiplier effects. California has the largest economy of any state in the nation and is a major trade center for the Pacific Rim. Recent advances in communications and information processing technologies, along with falling transportation costs, have produced keen competition in the markets for nationally and internationally traded commodities and services. Consequently, California businesses that produce, warehouse, transport, or sell nationally and internation-

ally traded goods and services face rigorous domestic and international competition.

Whether a particular training program will have multiplier effects is usually determined by whether the firm's industry is in the basic rather than the service sector. In some cases, however, training programs in the service sector can have multiplier effects. This happens when a firm's market consists of local customers, but the firm competes with out-of-state producers to supply the local market. This is the case of "import substitution," where an increase in the firm's output replaces imported goods rather than locally produced goods. If new local production replaces imported consumer or production goods and services, then the new production generates additional local jobs. In short, service activity of the import-substitution type can have multiplier effects. An example would be a new bakery serving local supermarkets that previously imported their baked goods from outside the region. In sum, if all ETP training in the service sector were in businesses competing with non-California suppliers, then the productivity enhancement in those industries would also have a multiplier effect on local jobs.

The other reason for indirect benefits from ETP incumbent-worker training is that it upgrades jobs as well as workers' skills. By upgrading jobs, businesses gain a competitive edge in the market and will then order more goods and services from suppliers. We assume here that companies will increase all of their inputs more or less in proportion to the increased productivity of their retrained workers.[5] This means that their orders from local suppliers will rise in proportion to their workers' increased productivity (measured by earnings). An additional multiplier effect comes as the trainees become more productive and earn and spend more in the local economy, which generates additional economic activity.

This analysis suggests that ETP could most effectively foster California's economic growth by concentrating incumbent worker programs on companies in basic industries or those involved in import substitution. Training in these industries would increase output both directly (the productivity effect) and indirectly (the multiplier effect). In fact, since January 1, 1994, legislation requires that all ETP incumbent worker contracts occur in basic industries except for contracts involving Special Employment Training (less than 10 percent of the

budget). However, many of the contracts completed during our study period began before January 1, 1994, and so were not subject to the basic industries requirement.

The California Department of Commerce's Office of Economic Research developed the multipliers used in this study (Office of Economic Research 1995). We used industry-specific, statewide job multipliers including the effects of both additional industry and consumer spending in response to increases in basic activity. To obtain an overall, average multiplier, we weighted the industry multipliers by the percentage of trainees in each industry. The weighted average multiplier for both industry and consumer spending was 1.8. This multiplier value indicates that for each $100 of new basic sector activity, an additional $80 of service sector activity is created.

Multipliers are commonly applied to changes in basic activity to find the effect on total activity. To determine which training programs were in basic industries or industries involved with import substitution, we used a list of industries categorized as basic industries in California and ETP contract information. Our analysis of ETP projects indicates that 65.9 percent of trainees were in companies with potential multiplier effects.[6]

Table 7.5 shows the calculation of ETP training programs' multiplier effect on the California economy. Of the $31. 8 million increase in trainee productivity estimated in Table 7.5, 65.9 percent or about $21 million was taken to be in basic industries. This productivity increase was multiplied by the 0.8 indirect effects portion of the weighted multiplier of 1.8, to estimate that the indirect benefits to the California economy from trainees' increased productivity was $16.8 million. This

Table 7.5 Indirect Effects

Percent of retrainees in basic industries		Increased productivity		Increased productivity in basic industries		Weighted multiplier for basic industries		Indirect impact of retraining
65.9%	of	$31,803,000	=	$20,958,000	×	0.8 (of 1.8)	=	$16,766,000

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

means that the enhanced productivity of trainees employed in basic industries generated an additional $16.8 million of activity for suppliers and businesses patronized by trainees.

Outcome 3: California Jobs Saved—$362 Million

UI fund savings—$61 million

One purpose of ETP training is to prevent displacement of workers whose employers are not successfully competing with out-of-state companies. If employers are not competitive, they will lose market share, cut production, and lay off workers. The threat of worker displacement is one of the bases for an ETP funding application. Companies applying on this basis must show that incumbent worker training will enhance their competitive position and reduce the threat of displacement. These ETP incumbent worker contracts directly enhance the competitiveness of California businesses by increasing both workers' skills and the skill requirements of those workers' jobs. Without the ETP contracts, the training and job upgrading presumably would not have occurred, and these companies would have lost sales and cut jobs. If in basic industries, these jobs could have been lost to the California economy, at least temporarily. A temporary loss of these jobs could occur while the companies restructure, or until other California businesses recognize the market opportunity and restore the lost jobs. If the threatened jobs were not in a basic industry, then some other California business would have gained the lost sales, and there would have been no net loss to the California economy. Therefore, benefits to the California economy from preventing job loss come only through training programs in companies with out-of-state competitors.

The economic benefits of reducing the threat of layoffs are twofold. The first is that UI funds are saved that otherwise would have been drawn by laid-off workers as UI benefits. We estimated UI fund savings from this source by using the number of trainees threatened with displacement, the estimated number of weeks they would have been unemployed, and their UI weekly payment rate. The second economic benefit of preventing layoffs is that the earnings that trainees would have lost while unemployed are not lost. We estimated the "saved" earnings of trainees by using the number of trainees threat-

ened, the estimated number of weeks they would have been displaced, and their pretraining earnings.

The percentage of trainees threatened with displacement during the study period is reported in Table 7.6. Our estimate of the number of potentially unemployed trainees came from examining ETP retraining contracts. Under current regulations, most ETP retraining contracts must satisfy one of the following three requirements: 1) workers must be threatened with displacement if not retrained, 2) the company must be transitioning to a high-performance workplace, or 3) the company must be diversifying its product line. This regulation took effect for contracts initiated after January 1, 1994. Before then, all ETP retraining contracts required that workers be threatened with displacement. Some training contracts in the study period were initiated before January 1, 1994, and we assumed that all trainees covered by those contracts were in jeopardy of layoff. For contracts initiated after January 1, 1994, we only included those trainees in contracts that were justified by a threat of worker displacement.

Our estimate of the average number of weeks that experienced, newly unemployed workers would be unemployed in the following year came from the comparison groups. We identified workers in the 1993, 1994, and 1995 comparison groups who made an unemployment claim in their selection quarter, but not in the previous quarter, and then tabulated their average weeks of UI claims during that year (the selection quarter plus the next three quarters). Because the number of UI weeks claimed varied by industry and by year, we averaged the annual UI weeks claimed, weighting by trainees' industry composition and training completion date (before 1994, during 1994, after 1994).

Table 7.6 Breakdown by Displacement Threat

	1994–95 Contracts (%)	1995–96 Contracts (%)	Both years (%)
Percent threatened by displacement	95.3	55.9	81.0
Percent not threatened by displacement	4.7	44.1	19.0
Total	100.0	100.0	100.0

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

Table 7.7 shows average annual UI weeks claimed by workers in industries similar to the trainees' in 1993, 1994, and 1995. As an aside, the reason for the slight rise in UI weeks claimed between 1994 and 1995 is simply the SIC weighting of the experience of the comparison group. The unweighted UI weeks claimed by the newly unemployed in the comparison group actually dropped slightly between 1994 and 1995.[7]

Finally, we estimated the average UI payment that would have been received by the trainees if they had lost their jobs. These calculations are shown in Table 7.8, where the total number of trainees, 42,036, is multiplied by the 81.0 percent of training completers whose jobs were in jeopardy, to estimate 34,049 threatened trainees. To estimate trainee UI payments if they had been laid off, we used the average weekly UI payments during the year before training, on the assumption that the average reflected the level of UI payments they would have received. The average UI payment of $112 per week times the number of threatened trainees times the average 18 weeks unemployed totals $68,642,784. We estimate that this $68,642,784 would have been drawn on UI funds during the subsequent year if 81.0 percent of the trainees had become unemployed because they did not receive ETP training. The UI payments actually made to these trainees averaged $174 during the subsequent year and totaled $5,924,526; the difference is $62,718,258. However, we have already attributed some of this difference to what the trainees would have been paid if they had not been retrained and had followed comparison group unemployment trends. That amount is $1,978,383 (see Table 7.3), and the 81 percent associated with trainees threatened with displacement is $1,602,490. Subtracting this from the $62,718,258 difference yields $61,115,768 in UI fund savings from preventing unemployment of trainees.

Table 7.7 Average UI Weeks Claimed

	1993 average	1994 average	1995 average	Weighted average
Annual UI weeks claimed	21.6	17.4	17.5	18.0

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

Table 7.8 UI Fund Savings Attributable to Saving Jobs

Trainees placed			42,036
Times	Displacement percentage	×	81
Equals	Trainees threatened	=	34,049
Times	Average UI payment per week	×	$112
Times	Average annual weeks of unemployment	×	18.0
Equals	UI payments retrainees would have received	=	$68,642,784
Minus	UI payments trainees did receive	−	$5,924,526
Minus	81% of the reduction in UI payments due to increased job stability	−	$1,602,490
Equals	Estimated UI fund savings	=	$61,115,768

SOURCE: Moore, R.W., D.R. Blake, G.M. Phillips, D. McConaughy, and A. Cheung-von Hamm. 2000b. *Training that Makes a Difference: ETP's Impact on Trainees, Companies and the State's Economy.* Sacramento, California: Employment Training Panel. ERIC Document Reproduction Service No. ED 4327562.

Earnings impact: $167 million

The second benefit of saving jobs is preventing trainees from losing earnings. The benefit of avoiding these earnings losses comes in two ways: directly to the trainees and indirectly to the California economy. A total of 34,049 trainees were threatened with job loss during the study period. The estimated value of displacement prevention to trainees would be their average weekly wages times the additional weeks that they would have been unemployed during the next year. Table 7.7 shows that 18.0 weeks of unemployment were expected, given displacement. Trainees actually averaged 1.5 weeks of unemployment, so 16.5 additional weeks of unemployment would have been associated with displacement. Trainees' average weekly wages in the year before training was $460. Therefore, trainees' expected loss of earnings was 16.5 weeks times $460 per week times the number of 34,049 threatened trainees: $258,431,910. However, not all trainees worked in basic industries and so not all lost earnings would have been lost to the California economy. If companies in nonbasic industries had suffered temporary job losses when they were unable to meet their competition because employees were not trained, then their sales, jobs, and earnings would have decreased but their California competitors would have expanded sales, jobs, and earnings. Although particular

workers would have lost earnings, overall jobs and earnings would not have been lost to the California economy.

The earnings lost to the California economy would be those lost by trainees in basic industries because those lost jobs and earnings would have been picked up by out-of-state competitors. In basic industries, 22,043 trainees were threatened with job loss. The estimated value of this earnings loss to the California economy is the average weekly pretraining earnings times the additional annual weeks of unemployment associated with displacement times the number of affected workers. Specifically, the expected earnings loss for the California economy during the first year after training was 16.5 additional weeks of unemployment at $460 average weekly earnings for 22,043 trainees in basic industries: $167,306,370.

Note that the estimate of a possible $167,305,000 loss in earnings assumes that those trainees in jeopardy would, in fact, temporarily lose their jobs. Because these jobs are in basic industries, our analysis also assumes that these jobs would not be picked up by other California companies, at least not for the typical duration of unemployment. Our analysis further assumes that after the expected 18-week duration, new jobs would develop and that these workers would find those or other suitable jobs.

Indirect effects—$134 million

The loss of $167,305,000 in earnings in California's basic sector implies some indirect or multiplier effects of the lost earnings because basic sector jobs generate supply activities for job materials and services, as well as consumer expenditures by jobholders. If basic sector jobs and earnings disappear (even temporarily) there will be a loss of sales by supplying firms and consumer-oriented producers, and therefore the local economy will suffer decreased employment and earnings. Applying the 0.8 indirect portion of the multiplier derived above to the estimated earnings loss yields about $133,845,000 in indirect effects on the California economy. The sum of estimated direct and indirect effects of preventing temporary basic industry job losses through ETP retraining is $301,150,000 for the study period.

Summary

We estimated ETP's total impact on the California economy at $413 million during the first year after training. The largest portion of this total came from saving California companies and workers from the economic disruption of temporary business and job losses. The $362 million estimate of these savings may seem large to some, but it is the product of careful analysis and conservative assumptions. Workers and company officials will testify that losses of business by a company and the resulting economic dislocations of downsizing and layoffs are economically painful, even if only temporary. In the case that our conservative estimate of the temporary pain of economic dislocation were off by a factor of two, that would still leave an impact of $180 million saved by avoiding lost sales and the related layoffs.

We also estimated that the $62.8 million in direct ETP contract costs during the study period produced a $51.5 million gain in the first year after training due to increased employment stability and the direct and indirect effects of productivity increases. It is worth noting that our estimates regarding the extent of economic growth due to productivity increases are conservative. These estimates do not include any company growth beyond what is directly associated with demonstrable training effects on the trainees, plus the indirect requirements related to those training effects. Our estimates did not include any increase in profitability or subsequent sales and employment growth that the trainees' companies might have enjoyed because of training. Even though our analysis of the company effects of training shows evidence that training increases both company profitability and employment growth, our estimates of economic impact do not include these effects.

Notes

1. This amount includes only the training funds in the ETP contracts paid to trainers of incumbent workers. All training costs borne by the individual trainees and companies, along with ETP's administrative costs, were excluded on the cost side. All benefits to companies were excluded along with any benefits accruing to either trainees or to state funds after the first post-training year.
2. The comparison group experiences used throughout this analysis are those of the industry-adjusted comparison group. That is, the experience of the comparison

group in UI claims, earnings, or other variables was derived by weighting the comparison group according to the industrial composition of the trainees. This was done by determining the experience of the 25 industry-based subgroups of the comparison group and then weighting data from each industry subgroup by the proportion of trainees in that subgroup. This procedure yields a comparison group with the same industrial composition as the trainee group.

3. Some researchers argue that changes in wages underestimate the increase in productivity because of some common pay practices (e.g., Bishop 1995). If this is correct, then these estimates understate the real impact of ETP training.
4. Note that this use of comparison group earnings would include the productivity effects of the average level of training going on in the California economy, because that training would affect the average earnings in the labor force.
5. This assumption is based on the large body of empirical evidence, which supports homogeneous production functions as applicable to most production activities. These production functions, of which the popular Cobb-Douglas production function is one example, have the property that all inputs are increased proportionately when input prices are relatively stable. That is, an increase in labor productivity would result in an increase of other inputs as well.
6. For the list of basic industries, see *California Economic Growth*, Center for Continuing Study of the California Economy, Palo Alto, California, pp. A1–A5, 1999.
7. Unweighted UI weeks were 21.3 weeks in 1993, 17.1 weeks in 1994, and 17.0 weeks in 1995.

8
Recommendations

Our recommendations are presented in two major sections:

- Policy recommendations for states with incumbent-worker training programs
- Methodology recommendations for evaluators of these programs

RECOMMENDATIONS FOR POLICYMAKERS

Policy recommendations for state-sponsored, customized, worker training programs must begin with a fundamental question—should states invest in such programs at all? Based on our evaluation of California's Employment Training Panel program, we believe that there is a strong rationale for investing in these programs. Our reasoning begins with the premise that there is an underinvestment in training non-college-educated workers. The research reported in Chapter 3 shows why rational firms would underinvest in these workers. The primary motivation is that companies pay all of the costs of training but, because employees may leave, they do not believe they will capture all of the benefits. Furthermore, many companies have limited experience with training and they are unsure if training will yield an acceptable return on investment. This leads managers to choose not to train, though their company may actually benefit substantially from training.

Federal investment in training tends to overlook employed workers and focus on disadvantaged workers who are unemployed, such as out-of-school youth, unemployed workers, and people living in poverty. Public community colleges and technical institutes provide government-subsidized opportunities for workers to upgrade their skills, but workers must do so on their own time and at least partially at their own expense. Many workers do not take this opportunity—some do, but they receive training that is not specific to their job or company and may benefit little from such training, making it a relatively risky investment compared to employer-provided training.

Given the multiple barriers to investment in private training, we believe that it is appropriate for states, with their understanding of local economic conditions, to step in and provide targeted incentives to those companies and workers who can benefit most from additional training. Such incentives reduce the training investment risk for both employers and workers and lead to increased training. Furthermore, we are convinced that successful experiences with state-funded training encourage companies to increase their own training investment and thus, over time, reduces training underinvestment by much more than the public investment.

Based on the results of our research, we recommend seven policies that state-sponsored incumbent-worker training programs can adopt to improve their success.

1. *Share governance between labor, management, and public representatives.*
   As noted in Chapter 2, these state-sponsored programs have been attacked in the past as corporate welfare. Participation of labor in program governance can ensure that the interests of both workers and employers are considered, and it can insulate programs from charges of corporate welfare as well. Also, involving both groups recognizes that training will benefit both workers and management—it upgrades workers' skills and, more often than not, increases their earnings while improving company productivity. The participation of both employers and labor, in our experience, brings a practical appreciation of business needs to the policymaking process. Operating a training program within a working business is far different from operating a program in an institutional setting, such as a training center or a community college. Policies need to be developed that recognize the constraints created by attempting to train while maintaining production. Similarly, representation of the public through elected or appointed officials ensures that the public's larger interests are considered in policy developments. Though shared governance by these often-contentious groups can slow policymaking, we believe that the participation of all three groups ultimately yields better policy and broader support for the program.

Finally, when controversy does erupt, as it inevitably will, the fact that governance of the program is not in the hands of a single stakeholder group helps to insure the survival of the program. We believe this principal is amply illustrated throughout ETP's history, where controversies over funding decisions have periodically threatened the program's existence.

2. *Make sure that state investment generates additional training and does not simply replace existing training.*
   A significant hazard for any state-sponsored training is that, rather than adding to the total investment in training, it will lead businesses to use the state subsidy to replace existing training investment. As our economic impact shows, unless state investment leads to additional training and productivity, it has no positive economic impact. States can take several steps to avoid this pitfall:

   - Careful targeting by program managers can lessen the chance of state investment replacing private investment. We recommend targeting frontline workers, who are seldom trained by employers, rather than professional and technical workers, on whom employers typically invest the bulk of their resources and where states make a huge investment through the public higher education system.
   - States can give priority to training that introduces new production techniques and technology rather than to routine training. This helps ensure that public investment does not replace routine private investment and promotes the diffusion of innovative techniques such as TQM.
   - States can target companies that are unlikely to invest in training but could benefit greatly. Ideal targets include companies far below their industry's best practices, small businesses, and businesses seriously threatened by out-of-state competition.

   Enforcing these standards is a difficult task because staff and governing bodies must acquire some industry expertise, exercise judgement rather than simply apply rules, and occasionally challenge the claims of large employers. We believe this is

worth doing and that it can be done. If governing bodies do not make a point of ensuring that state funds do not replace existing training investment, the message to the swarm of consultants hovering around these programs is that they can get "free" government money for their clients. In a short time, the program will find itself mainly funding large corporations' routine training that would have occurred without state subsidy.

3. *Pay for performance.*
A unique feature of ETP is its one-hundred-percent, pay-for-performance provision; employers or training agencies are only paid for trainees who complete training and are retained in a related job for 90 days. Though we can imagine other pay-for-performance systems that would work just as well, we firmly believe that some kind of pay-for-performance standard is essential to provide discipline. In a pay-for-performance system, both employers and trainers select trainees carefully and do not inflate the length of training (which would increase the chances of dropouts). Pay-for-performance seems particularly appropriate for state programs focusing on incumbent workers, where the risk and uncertainty is much less than in programs serving displaced workers in disadvantaged populations.

The pay-for-performance policy is likely to be attacked as promoting "creaming" by those who value equity over efficiency. Equity advocates will argue that strong performance requirements encourage employers and trainers to "skim off the cream" (the most able workers) for training and leave out disadvantaged workers. In our view, this type of selection is a good thing in incumbent-worker training programs because it increases the chances that training will actually improve productivity, which is the program's goal. One factor that mitigates "skimming" is that if training is to introduce a production innovation such as TQM or SPC, companies will typically train all workers on a given production line rather than select the most able workers. In our view, by increasing workers' productivity and earnings, the program improves the viability of companies and thereby strengthens the state's overall economy. Everyone in the state, including the disadvantaged, ultimately benefits

from stronger basic industries. Finally, there are many other federal and state programs that do target the most disadvantaged sectors of the population, but few that target frontline workers.

A second, and in our view more valid, criticism of the pay-for-performance system is that it discourages companies from participating because they do not want to run the risk of not being reimbursed for the cost of training. As we noted in the introduction, this dynamic initially constrained the growth of ETP. But we have observed that over time, as methods for managing performance-based projects diffuse among companies, the willingness of employers to take on the risk of incumbent-worker training increases dramatically. As we noted, in its early years ETP could not contract for all its funds, but over time, demand for ETP funding increased until it far exceeded available funds and funding priorities became an issue.

4. *Subsidize training, but don't foot the whole bill.*
Research cited in Chapter 3 clearly shows that employer-provided training leads to increased earnings and productivity for employees. Returns from public investment in training, through programs such as JTPA, are much less certain. One can conceptualize training decisions on a continuum from purely private decisions, driven by return expectations, to completely public decisions, where many factors other than investment return come into play. The strength of the ETP program is that, while representing a public training investment, the employer's decision to train with ETP funds is similar to a completely private training decision; employers will only enter into an ETP project if they believe they will receive a substantial return on their investment. (As noted earlier, the ETP subsidy increases the likelihood of an acceptable return but does not guarantee it.) The problems that arise when people spend someone else's money are well known and should be avoided. In most ETP programs, trainees are "on the clock"—paid by their employer for the time they are in training. This makes the employer's investment in the training at least equal to ETP's investment. Substantial cost sharing by employers brings market discipline to the training decision, much as co-payments are intended to

reduce wasteful medical treatments. As noted in Chapter 7, when trainees were trained "off the clock" (at no cost to the employers), the impact of training appeared to diminish substantially. In this situation, employers were less careful in selecting employees for training and made less effort to customize training to their company, thus weakening the impact of training. Finally, subsidizing a portion of training costs rather than reimbursing the entire cost allows the state to leverage its money to reach many more companies and workers.

States need to ensure that employers share training costs. Pay-for-performance is one method and requiring that trainees be "on the clock" is another. Employers can also contribute by providing classroom space, equipment, or trainers. The challenge for states is to design their reimbursement system so that the state's investment is large enough to motivate employers to undertake training that they normally would not, but not large enough to remove market discipline from the decision. The history of ETP's fee structure shows that this is a delicate balance, and that the required incentive will probably vary from company to company and industry to industry. Though more research is needed in this area to help states fine-tune their reimbursement systems, the principle of reimbursing less than the full cost of training is a firm policy benchmark.

5. *Target basic industries and threatened companies.*
Almost all states justify their programs by arguing that they contribute to economic development. Our economic impact model shows that, if this is a program goal, targeting basic industries is an effective way to maximize economic impact. In states with programs supported by a broad-based employment tax or by the general fund, this may be controversial, as workers in nonbasic industries pay the tax but are ineligible for training. The rationale for this targeting decision is that all workers will benefit from the overall economic growth generated by basic industries. Workers in service industries will benefit from increased earnings and employment opportunities when basic industries generate greater demand for their services.

We also recommend that states target companies that are threatened by out-of-state competition or are far below their in-

dustry's best practices—in both cases, workers' jobs are at risk. Our economic impact model in Chapter 7 clearly shows that preserving jobs has the greatest economic impact. Therefore, training that keeps jobs in the state by increasing the competitiveness of companies faced with out-of-state competition clearly has the greatest economic impact. Similarly, workers are at risk in companies that are far below their industry's best practices, and such companies have the greatest potential to gain from training because there is a clear path to improved productivity and competitiveness. This puts program managers in a bind. Companies that are threatened or are poorly managed are likely to be much more difficult to work with than prosperous, well-run companies that are not threatened and are using best practices. Nevertheless, though it may be more costly to serve the less successful companies, that is where the greatest potential benefits lie. Some argue that it would be more efficient to let low-performing companies close and let others take up the slack. This may not be the case if the company is in a basic industry that faces out-of-state-competition. In this situation, if the company closes, the work may go out of state or out of the country.

Targeting only basic industries is often controversial. In Text Box 8.1, we lay out in detail the economic reasoning underlying this recommendation.

6. *Avoid exclusive training providers.*
As public programs, state incumbent-worker training programs are often pressured to designate a public education or training agency as the exclusive training provider. This is not the best policy. The strength of state training programs for incumbent workers is that training is customized to the needs of the company and the workers. In our view, the best way to promote customization is to allow employers to select their own training providers. Many industries that use unique technology and methods are served by specialized trainers. Companies should be allowed to tap these resources. No single public or private training agency can reasonably be expected to customize its training to the unique needs of all industries and companies in a

Text Box 8.1 Rationale for Targeting Basic Industries

Training in the nonbasic sector generally does not enhance state economic growth and may, in fact, simply shift unemployment to other local competing firms. This conclusion is based on the regional growth theory, which postulates that demand for local goods derives from out-of-state demand for basic industries' products. This out-of-state demand determines the amount of output that basic industries will produce and, by extension, the amount nonbasic industries will produce to supply the basic industries. Nonbasic industries supply the demands of basic industries and of all people and institutions comprising the local economy, but the size of the local economy as a whole responds to demand from outside the region. Furthermore, this theory suggests that the relationship between the outputs of basic and nonbasic sectors is approximately constant and is expressed by the regional multiplier.

The approximate constancy of the regional multiplier is the source of the problem with training incumbent workers in the nonbasic sector. If workers in one local nonbasic company are trained and made more productive, that company will presumably take business from other nonbasic companies. But if the size of the nonbasic sector is fixed relative to the basic sector, training in nonbasic companies may simply lead to layoffs in competing nonbasic companies, increasing unemployment there. An exception to this possible unfortunate result is if the local economy is at approximately full employment and the basic sector is growing. Then, growing demand for nonbasic sector output would absorb the higher productivity of the newly-trained workers. Nevertheless, training incumbent workers in the nonbasic sector is probably not a fruitful use of training program funds, as it only leads to increased output in a very tight labor market when unemployment rates are extremely low.

Note that this result does not apply to training unemployed workers for jobs that already exist in the nonbasic sector. Presumably, those new jobs exist because the basic sector has grown and spawned new nonbasic sector jobs. Training lesser-skilled, unemployed people to qualify for existing nonbasic jobs does reduce unemployment and at the same time enhances the productive capabilities of the labor force.

state. Designating a single training agency often results in generic training with a very limited potential to improve competitiveness.

As we pointed out in Chapter 3, allowing companies to choose their own trainers creates a vigorous market for training services and an interest group of trainers and consultants who will try to influence program policies to their advantage. Managing this market may be the major policy task of the state program, but we believe it can be managed successfully if policymakers are aware that they govern the program through the incentives they create for these consultants and trainers. Generally, we recommend that governing bodies' best approach to managing consultants and trainers is to create an open market where objective data about contractors and their performance is readily available to companies considering a project. In Chapter 3, we provide a list of specific recommendations for managing the role of consultants and trainers. We also note that even when there is a single provider, that provider will still become a powerful interest group that attempts to shape policy.

7. *Focus on management reinforcement of training.*
The fieldwork in Chapter 5 clearly shows that the productivity impact of training is ultimately determined by the quality of training and that of management reinforcement after training. As we noted in the case studies, the quality of management reinforcement varies dramatically across projects. Many policymakers and program managers focus primarily on the mechanics of training fund allocation, pay little attention to the quality of training, and seldom consider what management does after training.

We recommend that state agencies promote management reinforcement of training by providing employers and training consultants with case examples of successful management reinforcement of training. These cases might include examples of how management can

- tie compensation to the implementation of innovations and reforms growing out of training;
- provide career growth after training;

- give workers a larger role in decision making; and
- infuse new technology into production.

METHODOLOGY RECOMMENDATIONS FOR EVALUATORS

Textbooks on program evaluation often recommend that programs devote one percent of their budget to program evaluation. These texts also recommend that evaluators be brought into programs during the design stage so that carefully designed evaluation can be built into the program (e.g., Rossi and Freeman 1993, or Patton 1996). In reality, program evaluations tend to be episodic, poorly funded, and designed when the program is almost over or in response to particular problems that have emerged during implementation. Consequently, evaluators need to be light on their feet and quick to respond to whatever circumstances confront them. State incumbent-worker training programs are no exception. Few programs have been systematically evaluated, and we know of none that had evaluations designed into them from day one. Thus, our recommendations acknowledge that our fellow evaluators likely will be designing evaluations on a limited budget and after programs have been operating for some time.

Throughout several changes in leadership, ETP has been willing to open itself to objective evaluation of its performance. It has also tolerated fairly wide experimentation with evaluation methods, ranging from large-scale follow-up studies of employment and earning, through traditional surveys of projects, to in-depth case studies. In this section, we make a series of recommendations for evaluating state incumbent-worker training programs based on our experience, knowledge of available data, and understanding of evaluation methods. We begin with some overall recommendations for evaluation approaches and then give specific recommendations related to particular methods.

Triangulate, Triangulate, Triangulate

Triangulation simply means collecting data on a single program from several perspectives. For example, in the most recent study of ETP's impact (Moore et al. 2000b), we conducted 23 case studies of

projects, followed up on the earnings of over 57,000 trainees, and studied the impact of training on company growth. Combining these three perspectives provided insights into the ultimate impact of the program in terms of changes in employee earnings and company growth, and into how the program achieved its impact. It also generated a new understanding of how ETP was actually implemented in the field. Using this larger perspective, we were able to help both managers and policymakers see the program in new ways. This led to a number of policy changes and a richer understanding of the program, which continues to inform policy discussions.

To be effective, evaluations need to triangulate in two ways: by the methods employed, and by the perspectives from which they measure impact. Evaluation approaches that use a single method are subject to some standard criticisms. Traditional follow-up studies that only look at trainee earnings or earnings changes are criticized for being black-box assessments—program investment goes into the box and earnings come out, but there is little insight into how the program achieves its effects. On the other hand, qualitative approaches that look at a few programs in depth can provide rich detail about those particular programs but are often criticized for being unrepresentative or subjective. We find that a combination of quantitative and qualitative methods yields the most valuable results and answers the common methodological criticisms that cause people to resist accepting the results of a single method approach.

Measure Program Impact on All Key Players

Incumbent-worker training programs are designed to have multiple impacts. Most programs aim to increase the earnings and improve the employment stability of trainees; to attract, retain, and enhance the competitiveness of companies; and to improve the state's economy. Measuring only one type of impact does not reveal whether or not the program is achieving its overall mission. During several studies, we have cast about for available data and methods that can be used to collect both qualitative and quantitative data on the three aspects of ETP's mission. We present here our recommendations for other evaluators, organized by various perspectives from which programs may be evaluated.

Employee perspective

It is critical to measure the impact of training on employees' earnings and employment. Effective evaluations must go beyond the measurement of earnings, to collect detailed data on whether employees learn the skills they are taught, are able to use the skills they learned, and whether their productivity improved as a result.

Quantitative measures of employment and earnings

Chapter 4 shows that, in California, we can track most trainees through the unemployment insurance system. We recommend this approach because no mail or phone follow-up can find as high a proportion of trainees. As we noted in our analysis, there are some populations, such as the self-employed, who are missed by this approach. Also, states that share a substantial part of their labor market with another state will need records from that state. Nevertheless, the comprehensiveness of UI systems and the reliability of reported earnings are their strengths. That said, these systems are designed for collecting taxes and paying unemployment insurance claims, so it is a challenge to use them for research purposes. A seemingly simple process of collecting trainees' social security numbers and getting their earnings records before and after training quickly becomes a complex problem of data cleaning and measurement. Over the past decade, a number of researchers have developed methods for working with the UI earnings data and creating valuable measures (e.g., Stevens and Shi 1996). For readers interested in technical matters, Text Box 8.2 summarizes some of the primary problems we encountered using data from unemployment insurance systems and how we dealt with them.

Another problem with unemployment insurance databases is that workers appear, disappear, and reappear. The handling of these workers may profoundly affect study results. Again, this is a complex problem, and we discuss it in Text Box 8.3 for readers who are prepared to delve into the issues involved.

Finally, as discussed in Chapter 4, the key question is what would have happened to the trainees had they not been trained? To answer this question, evaluators need to collect data on similar workers who did not receive training. We have experimented with various approaches: We have compared individuals who completed the program

Text Box 8.2 Common Problems with Unemployment Insurance Data

California's large size and unique demographics make working with the base-wage file a unique challenge. The large number of undocumented workers in the state raises some particular issues that must be resolved in order to use the file as a research tool.

False social security numbers (part 1)

There are numerous checks that the Social Security Administration prescribes to determine whether a social security number has any chance of being valid. We have found that in state unemployment data, there can be thousands of social security numbers that are invalid.

False social security numbers (part 2)

Even if a social security number is not invalid per se, it might be the result of fraudulent duplication. The easiest test of fraudulent duplication is an extraordinary number of employers submitting UI payments on behalf of the same SSN. In any given year, we would find anywhere from a few dozen to a few hundred social security numbers with over 500 employers in a given quarter. The record was a SSN that purportedly had several thousand employers each quarter.

Some legitimate social security numbers may look false. Not every SSN with twenty-five employers in a quarter is necessarily fraudulent. Some occupations treat workers as employees even if they only work a few hours a month. For example, Hollywood studio musicians are sometimes paid as employees, even though they may perform for 50 different projects in the course of a quarter. We use as a first test whether the SIC codes of the employers are in a coherent group. If the SIC codes are all in an entertainment related industry, for example, we would flag the record but allow it to be included in some calculations. If the SIC codes are all over the map, ranging from chemistry to banking to warehouse services in a single quarter, we would conclude that the SSN was fraudulent and treat it accordingly.

False social security numbers (part 3)

Some social security numbers are not sold on the black market but are shared within a household or small community. These are extremely difficult to detect as anything but standard multiple jobbing by workers. However, if the SSN appears to have ongoing wages from multiple employers at the same time that UI payments are being made, we would conclude that the SSN was probably fraudulent.

The challenge of extraordinary reported income

Some incomes reported in the UI databases are so extraordinarily high that they can impact the averages for an SIC category. For example, one individual in our control group reportedly had earnings in excess of $100,000,000 per quarter, which would have resulted in a nearly $10,000 higher quarterly average income in the relevant SIC group.

False UI claims

Unfortunately, the UI system sometimes makes payments based on fraudulent claims. While many of these are not apparent, repeated UI claims without intervening employment—which can also be viewed as UI claims in excess of the maximum permitted number of benefit weeks—are viewed as data error and treated accordingly.

The challenge of split employers

Some individuals are apparently employed by two or more employers in equal shares. This is usually because they work for a conglomerate with multiple employer identification numbers and UI accounts. For example, an individual might work full time on a project for Acme Industries but receive half of his paycheck from Acme Holdings and half from Acme Research Co. If Acme Holdings and Acme Research Co. are in separate SIC categories, there is ambiguity in assigning the employee's efforts to an industry. We normally use the industry of the employer paying the largest amount in a given quarter. If, however, Acme Holdings and Acme Research took turns paying the employee's monthly check, this would indicate a flip-flopping SIC code (as well as a cyclical pattern in the identity of the primary employer) that would suggest significant employment instability—even if the employee in question had the most stable job in the state. In our research, we attempted to identify these cases using special computer logic and then assigned one SIC (and employer number) or another on a case-by-case basis. One logical test we employed was to see whether the raises in pay from one employer were mirrored by raises in pay from the other employer.

to those who dropped out. We have also constructed "comparison groups" from the unemployment insurance system that we use to infer the unique impact of training on earnings. The federal government has supported large-scale experimental studies using random assignment to training, in an attempt to measure training impact. Still, we believe that comparison groups drawn from the unemployment insurance sys-

Text Box 8.3 The Challenge of Missing Workers

The labor force

The labor force is operationally defined as all individuals receiving UI payments plus all individuals receiving labor earnings. We compute this for each time period in our evaluations by merging the UI wage records and UI benefits databases. Another important component of the labor force are new entrants or re-entrants seeking employment—these don't show up in our data until they receive employment and later, perhaps, unemployment payments.

Vanishing workers

Individuals listed in the datasets will vanish from time to time. This might be because they died, retired, or moved out of the state. They might have moved into non-reporting jobs (e.g., self-employed real estate broker, federal agency). They might have dropped out of the labor force for personal reasons (e.g., soccer mom) or because of discouragement regarding job prospects. Sometimes individuals who had previously vanished come back.

How to handle the zeros? (Part 1: the problem)

When individuals leave the measurable labor force, it may be inappropriate to count their earnings as zero. (For example, consider a factory worker in Gary, Indiana, who now works in Chicago, Illinois. The Indiana UI datasets might suggest this worker had left the labor force.) Still, a certain number of these formerly employed individuals truly did fall out of the labor force and have no income. If they are people who are not working, then their absence of earnings is important when computing averages representing the labor force. However, if they are otherwise employed, counting them as "zero earners" could generate a massive downward bias in earnings averages. This is particularly important when comparing "before" and "after" measures. How one handles the workers in the "before" period who aren't in the "after" (and workers who weren't in the "before" but are in the "after") must be addressed when designing an evaluation.

How to handle the zeros? (Part 2: one solution)

Until better data or a better algorithm comes along, we use the following approach in our research. We impose a participation test in prior quarters and subsequent quarters but without necessarily mandating continuous participation. For example, we might check whether the worker was found in the labor force two years prior to training and two

years after training; if so, all intermediate data—including zeros—would be used in computing averages. Sometimes we find it appropriate to impose strict labor force participation—workers must be found every quarter during some period before training as well as every quarter for some period after training.

tem provide the best and most cost-effective method for estimating the impact of training when it is impossible to create a large-scale experimental study.

Qualitative measures of employee experience

To discover why some programs succeed and others do not, one has to examine the qualitative experience of trainees. We have found that the best way to do this is to treat selected training contracts as case studies. First, we familiarize ourselves with the context of the case (the company's industry, recent history, and reason for training). We then collect data retrospectively on trainees' experience and their perception of the impact of training. In Chapter 5, we reviewed in some detail the methods we employed. Overall, we found that we could efficiently collect data through group interviews, observations of the production process, and use of a standard evaluation questionnaire.

Selecting projects for case studies is difficult. Seldom are there sufficient resources to select a group of projects large enough to comprise a representative sample for traditional statistical analysis. Instead, we recommend that evaluators try to capture a group of projects representing the diversity of project types funded so that they can observe program implementation in a variety of settings. For example, we deliberately chose a group of sites that included large and small employers, manufacturing and service industries, and different types of training providers. Another alternative is to select for study projects that were particularly successful or unsuccessful. Examining these "outlier" projects can be a powerful method for identifying the factors that contribute to success or failure. We suspect a "live" case study would be superior to our retrospective case study approach. In a live case study, evaluators would live with a project through its development, into its implementation, and during some follow-up period. This would allow the evaluator to study the project in real time and avoid

the inherent biases of trainees recalling their experiences. Evaluators could observe training as it was delivered and follow trainees back to their job to observe its impact. In our experience, support for such a thorough and time-consuming evaluation is hard to come by, but we believe it would be a valuable approach if the opportunity were to arise.

Company perspectives

The least-developed area of study appears to be the evaluation of the impact of state-funded incumbent-worker training programs on companies. Conventional evaluation designs tend to begin and end with a follow-up on employee earnings. There are a few studies, cited in Chapter 3, that document the impact of training on companies' financial performance. We believe measuring the impact of these programs on companies is crucial to effective evaluations, since it is through the companies that state-funded training affects the economy. We see our effort to evaluate the impact of ETP on companies as the first step in what we hope will be a series of studies with increasingly sophisticated methods.

Quantitative approaches

We began this project believing that we could get uniform, reliable financial data on most companies' performance before and after training, along with industry benchmarks from commercially available data services. This turned out not to be the case, however. Many ETP project sites were small companies not covered by the proprietary data systems, were divisions of a larger company for which separate data was unavailable, or were simply absent from the database. Once again, we had to turn to the Unemployment Insurance system for reliable data. Chapter 6 shows that we were able to reliably measure company growth in terms of employment and total wages paid, and could create groups of similar companies to serve as industry benchmarks. This approach had many limitations, but did prove a valuable method for comparing the experience of companies with ETP training contracts to similar companies without ETP training over the same time. Since this type of data is available in every state, we believe our method is a replicable model for retrieving valuable data in other states.

As an alternative, states could consider asking companies to submit, as part of the training application, financial and productivity data related to the goals of the training, and then require them to provide similar data for the year after training. For larger companies, the data might need to be subdivided. Our fieldwork provides examples of the types of data that could be reported. For example, if a goal of training was to improve product quality, the company could report existing data on scrap rates or warranty returns. These data are particularly valuable if there are industry benchmarks to compare against.

Qualitative measures

As part of the case studies, we tried to collect detailed before-and-after financial data on each site. We wanted to see if we could tie ETP-funded training to changes in financial performance in each case. We encountered many barriers: Some companies were unwilling to share financial data even after being promised complete confidentiality. In large corporations, we were dealing with lower-level managers, such as plant managers, who did not have access to this data or did not have the authority to release it. More interestingly, we found that companies did not really track training-induced performance changes, and many had not even considered doing so. This being the case, our site visits focused on getting a quick overview of the company's production process. Once we had a basic idea of what was going on, we focused our questions on possible performance measures that we might use. We often thought of performance measurement methods that the managers of the firm had not considered. The performance measures we used were very specific to each company and process. Managers were more likely to be able and willing to answer very specific questions about matters such as scrap rates, labor inputs, or quality criteria. Every firm was different, and the managers in the firms had different views depending on what part of the process they managed. Most company-specific data were anecdotal. If we obtained documents, they generally focused on a very specific aspect of the company.

For readers who would like to look at this issue in depth, we provide Text Box 8.4, which includes suggestions for measuring the impact of training on a single company's performance.

Text Box 8.4 Measuring Training's Impact on Company Performance

- Get an overview of what is going on, either through background research or through a quick tour or oral overview. This will help to develop strategy and tactics for information gathering.
- From the very beginning of the site visit, be aggressive in information gathering while showing great appreciation to the person helping you and taking an interest in the firm.
- Take lots of notes.
- Do not act like you are entitled to information, as this will alienate those upon whom you depend for information. When taking ETP funding, firms agreed to provide information to individuals such as ourselves, but they did not seem to take this seriously. Some refused to deal with us.
- Be persistent in pursuing information. If you can help the interviewees think about ways to measure performance changes, you are more likely to get information out of them—many people are willing to help but need the proper prodding. This process requires that you be sincerely interested in the process and understand it. Your active interest in their work will motivate interviewees to cooperate more actively.
- Help the interviewees with their memories and find various ways to ask the same question. Many of them will not have really thought about the impact of training on the company or on a process. Training is one of many aspects of their jobs, and it fades in their memories, especially if a year or two has passed.
- If the interviewee does not have the information you're seeking, ask them who can help you.
- When you return to your office, immediately write up your observations before memory fades. After a while, the companies are just a blur.
- Be creative in your analysis, entering it with an open mind. The information you obtained is all you have to work with going forward. What are the data telling you?

Measuring the Impact of Training on a State's Economy

Training programs typically have specific goals that are laid out in the enabling legislation and the mission statement, and these goals are the basis upon which evaluation must rest. The program's intended economic impact may be a general contribution to economic growth, or there may be a specific objective such as reducing the welfare rolls or the unemployment rate and UI claims. It is also important to be sensitive to collateral effects of the program and to measure those impacts as well.

The ETP program goals are typical of many state training programs: to reduce unemployment and UI claims and to promote economic development. Our measures of the economic impact of ETP, discussed in detail in Chapter 7, focus on these two intended outcomes of the program. The following recommendations include both general advice on measuring economic impact and issues specific to measuring the attainment of ETP goals.

Use a comparison group to isolate the training effect on critical variables

Measuring the economic impact of a program begins by developing accurate measures of the program's impact on individuals. The analysis needs to focus on "critical variables," which are indicators directly tied to program goals. For example, we identified the amount of UI payments as a critical variable, because one goal of the program was to reduce UI cost. Once identified, the impact of training on critical variables has to be isolated from other effects present in a dynamic economy. Many people underestimate the extent of change occurring in a dynamic economy. People continually enter and leave the labor force—not only teenagers or college graduates entering and 65-year-olds retiring, but also many middle-aged people moving into and out of the labor force. Overall employment and unemployment rates have both seasonal and sectoral variations. Technical progress and change in incomes and tastes lead to changing demands that affect some industries and occupations positively and others negatively. Consequently, earnings and unemployment experience can vary significantly between industries and occupations. Also, geographical clusters of industries

will vary in employment and earnings growth. Researchers can expect these dynamic forces to be continually present in the economy, and so any before-to-after tracking of trainees' experiences must take into account changes that would have happened without training.

The construction of some type of comparison group is essential to isolating the effects of training. The comparison group's experience should approximate what would have happened to the trainees had they not been trained. A simple before-to-after rise in earnings or fall in unemployment would not estimate the effect of training, as these changes could be due to generally rising wages and declining unemployment. Since all states have access to the base wage file in the UI system, we believe that the best way to benchmark the experience of trainees is to compare them with a similar group of workers who did not receive training, using before-to-after changes in critical variables.

The comparison group should be selected or adjusted to be as similar as possible to the trainee group. A group randomly selected from the labor force would not be an appropriate comparison group for a training program that focused on particular industries or occupations. A randomly selected comparison group can be broken into subgroups, however, and by weighting subgroup experience to reflect the composition of the trainees, an appropriate comparison group can be constructed. Given the many barriers to constructing large-scale experiments in this field, we believe this to be the best method available to evaluators for measuring training's impact on trainees' labor market experience. In Chapter 4, we detailed how we constructed measures or labor market outcomes; other researchers have also worked extensively with the UI base wage file to create measures appropriate to various vocational education and training programs (e.g., Stevens and Shi 1996). This is an area in which more work can be done to increase the value of measures, but we do not see any other data source that offers a similar opportunity to create comprehensive and reliable measures of training's impact.

Use the correct population when aggregating estimates of program effects

If the average change in variables, such as earnings or unemployment, is based on the experience of some subset of the trainee popula-

tion, care must be taken in applying that average to an overall population to estimate the program's aggregate effect. For example, if an aggregate estimate of trainees' earnings change is based only on full-time workers, then applying that same earnings change to all program participants—whether working full time, part time, or not even found in the labor force—would vastly overstate the program's true effect on earnings. Similarly, if the average unemployment reduction of those found in the labor force were applied to a population of trainees, including those both found and not found in the labor force, then the reduction in unemployment produced by the training program would be overstated.

Similar caveats apply to estimating aggregate effects over time. It would be inappropriate to obtain an annual aggregate effect by applying a change-in-earnings estimate based on the first two quarters after training, because the effects of training are known to change over time. Some training program evaluations have produced unmistakable overestimates of training program effects by multiplying the highest post-training quarterly earnings by four to estimate the annual aggregate earnings of trainees.

Base estimates of a training program's impact on an understanding of the dynamics of the state's economy

An understanding of the main factors determining a state's economic growth is required to more effectively identify training program outcomes that cause or enable growth. The productivity of a state's economy is generally limited by the size and skills of its labor force, available resources, and ability to compete in national or international markets. Furthermore, according to accepted regional growth theory, growth in the basic sector of the economy can spawn expansion in the nonbasic sector but not vice versa. Training programs can promote economic growth in two ways: 1) by enhancing the skills and effective size of the labor force, and 2) by increasing the competitiveness of the state's basic industries.

ETP promotes economic growth through incumbent-worker training that targets basic industries—those that compete in national or international trade. Training is designed to upgrade both workers' skills and the jobs they occupy, making the workers more productive and the

companies more competitive in national and international markets. We estimate that companies' sales increases in those markets are at least equal to their workers' productivity increases. Growth in sales by these basic industries requires additional purchases from their local suppliers to support the greater output. Thus, state economic growth resulting from incumbent-worker training is the sum of increased sales by basic companies, plus any concomitant increase in sales by local suppliers. These additional local sales are estimated using local industry multipliers, which are usually available. Further discussion of this procedure appears in Chapter 7.

Training programs' labor force effects derive from the impact of training on workers' skills and unemployment. A paramount purpose of training programs is to raise trainees' skills and productivity, which effectively enlarges the state's productive capacity. Also, to the extent that these programs lower unemployment, they increase output by putting more people into the active workforce. Furthermore, if a training program can avert layoff and the subsequent period of unemployment for laid-off workers, state output will be larger by the amount that would have been lost while workers find other jobs.

Final Thoughts

In their best selling book, *Reinventing Government*, Osborne and Gaebler observed that "If you don't measure results you can't tell success from failure" (Osborne and Gaebler 1993, p. 147). We agree. An aging workforce, continued technological change, and employers' continuing reluctance to invest in training frontline workers convince us that state-funded incumbent-worker training programs have a significant role to play in the future. The uniqueness of each state program makes a nationwide evaluation impossible, while at the same time offering a wide range of policy innovations for study. We hope this comprehensive look at ETP will trigger evaluations of other states' models, which in turn will lead to a robust discussion of what policies and practices actually generate success or failure in these important programs.

Appendix A

Characteristics of Customized Training Programs, 1998–1999

Table A.1 Characteristics of Customized Training Programs, 1998–1999

State	98–99 Budget	98–99 Rank per capita	Incumbent workers (%)	Incumbent workers ($)	New hires (%)	New hires ($)	Revenue source	Average per person ($)	Average per project ($)	Direct training or contracting	Training provider choice—yes/no	State agency
AL	18,000,000	5	0	0	100	18,000,000	General fund	650	N.A.	Contracting	Y	Education
AK	3,200,000	3	0	0	100	3,200,000	Special tax	N.A.	N.A.	Contracting	Y	Other
AZ	5,000,000	34	0	0	100	5,000,000	General fund	N.A.	N.A.	Contracting	N	Commerce
AR	1,500,000	42	10	150,000	90	1,350,000	General fund	750	40,000	Contracting	Y	Commerce
CA	117,200,000	6	90	105,480,900	10	11,720,100	Special tax	1,300	400,000	Contracting	Y	Independent
CO	5,700,000	29	37	2,109,000	63	3,591,000	General fund	400	50,000	Contracting	Y	Education
CT	4,024,882	33	75	3,018,662	25	1,006,221	General fund; bond	450	N.A.	Contracting	Y	Labor
DE	902,432	36	96	866,335	4	36,097	Special tax	635	25,000	Contracting	Y	Commerce
FL	4,000,000	43	0	0	100	4,000,000	General fund	800	N.A.	Contracting	Y	Commerce
GA	10,200,000	30[a]	0	0	100	10,200,000	General fund	320	N.A.	Training	N	Education
HI	2,500,000	17	95	2,375,000	5	125,000	Special tax	N.A.	N.A.	Contracting	N	Labor
ID	3,000,000	10	0	0	100	3,000,000	Special tax	N.A.	N.A.	Contracting	Y	Labor
IL	20,573,000	24	90	18,515,700	10	2,057,300	General fund	235	246,000	Contracting	Y	Com.; ind.
IN	13,000,000	18	80	10,400,000	20	2,600,000	General fund	500	N.A.	Contracting	Y	Commerce
IA	43,402,000	1	5	2,170,100	95	41,231,900	bonds	2,517	N.A.	Contracting	Y	Commerce
KS	33,000,000	2	5	1,650,000	95	31,350,000	Bonds; general fund	N.A.	850,000	Contracting	Y	Commerce
KY	3,099,000	39	50	1,549,500	50	1,549,500	General fund	N.A.	N.A.	Contracting	Y	Independent
LA	7,500,000	22	40	3,000,000	60	4,500,000	General fund	2,500	250,000	Contracting	Y	Com.; ed.
ME	3,200,000	11	90	2,880,000	10	320,000	General fund	500	50,000	Contracting	Y	Labor
MD	9,100,000	21	30	2,730,000	70	6,370,000	General fund	N.A.	10,000	Contracting	Y	Commerce
MA	9,000,000	28	75	6,750,000	25	2,250,000	Special tax	N.A.	N.A.	Contracting	Y	Labor
MI	30,000,000	9	87	26,100,000	13	3,900,000	General fund	600	N.A.	Contracting	N	Other
MN	7,650,000	26	70	5,355,000	30	2,295,000	General fund	900	300,000	Contracting	N	Other
MS	5,500,000	16	80	4,400,000	20	1,100,000	General fund	50	15,000	Contracting	N	Education
MO	28,000,000	4	50	14,000,000	50	14,000,000	General fund	700	50,000	Contracting	Y	Commerce

NB	2,775,000	25	36	1,000,000	64	1,775,000	General fund	1,000	50,000	Contracting	Y	Commerce
NV	500,000	44	0	0	100	500,000	General fund	1,000	100,000	Contracting	N	Commerce
NJ	20,000,000	15	75	15,000,000	25	5,000,000	Special tax	1,000	180,000	Contracting	Y	Labor
NM	6,000,000	7	0	0	100	6,000,000	General fund	3,300	490,000	Contracting	Y	Commerce
NC	19,800,000	13[a]	43	8,514,000	57	11,286,000	General fund	N.A.	N.A.	Training	N	Education
ND	900,000	27	80	720,000	20	180,000	Bonds	N.A.	N.A.	Contracting	Y	Education
OH	13,000,000	35	50	6,500,000	50	6,500,000	General fund	500	67,000	Contracting	Y	Commerce
OK	7,865,967	12	40	3,146,387	60	4,719,580	General fund	600	85,000	Training	N	Education
PA	29,000,000	13[a]	50	14,500,000	50	14,500,000	General fund	1,500	N.A.	Contracting	Y	Commerce
RI	1,200,000	32	75	900,000	25	300,000	Special tax	N.A.	20,000	Contracting	Y	Other
SC	7,670,000	19	0	0	100	7,670,000	General fund	1,100	60,000	Training	N	Education
SD	7,500,000	37	15	112,500	85	637,500	Special tax	N.A.	N.A.	Contracting	N.A.	Commerce
TN	4,500,000	40	50	2,250,000	50	2,250,000	General fund	850	90,000	Contracting	Y	Commerce
TX	66,500,000	8	65	43,225,000	35	23,275,000	Spec. tax; gen. fund	900	300,000	Contracting	Y	Comm.; Other
UT	2,800,000	30[a]	65	1,820,000	35	980,000	General fund	500	14,000	Contracting	N	Education
VT	570,000	38	60	342,000	40	228,000	General fund	1,000	17,500	Contracting	Y	Commerce
VA	13,000,000	23	5	650,000	95	12,350,000	General fund	770	N.A.	Contracting	Y	Commerce
WA	558,000	45	70	390,600	30	167,400	General fund	250	25,000	Contracting	N	Education
WV	3,000,000	20	60	1,800,000	40	1,200,000	General fund	200	30,000	Contracting	Y	Other
WI	4,550,000	41	75	3,412,500	25	1,137,500	General fund	N.A.	N.A.	Contracting	Y	Commerce
Total	593,191,281		54	317,783,184	46	275,408,098						
States Without Programs 1998–1999												
MT	0	46[a]										
NH	0	46[a]										
NY	0	46[a]										
OR	0	46[a]										
WY	0	46[a]										

[a]Indicates a tie in rankings.

SOURCE: Duscha, S., and W. L. Graves. 1999. *State Financed and Customized Training Programs.* Washington, D.C.: U.S. Department of Labor.

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The W.E. Upjohn Institute for Employment Research is a nonprofit research organization devoted to finding and promoting solutions to employment-related problems at the national, state, and local levels. It is an activity of the W.E. Upjohn Unemployment Trustee Corporation, which was established in 1932 to administer a fund set aside by the late Dr. W.E. Upjohn, founder of The Upjohn Company, to seek ways to counteract the loss of employment income during economic downturns.

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