Bridging the Skills Gap

How the Skills Shortage Threatens Growth and Competitiveness . . . and What to do About It

Fall 2006
About ASTD
ASTD (American Society for Training & Development) is the world’s largest association dedicated to workplace learning and performance professionals. ASTD’s members come from more than 100 countries and connect locally in 140 U.S. chapters and 24 Global Networks. Members work in thousands of organizations of all sizes, in government, as independent consultants, and suppliers.

ASTD started in 1944 when the organization held its first annual conference. ASTD has widened the profession’s focus to link learning and performance to individual and organizational results, and is a sought-after voice on critical public policy issues.

About ASTD Press
ASTD Press is an internationally renowned source of insightful and practical information on workplace learning and performance topics, including training basics, evaluation and return-on-investment (ROI), instructional systems development (ISD), e-learning, leadership, and career development.
Dear Colleague,

We are pleased to release “Bridging the Skills Gap,” an ASTD white paper produced in collaboration with members of the ASTD Public Policy Council. This is the third ASTD white paper to examine the impact of a critical gap within the workforce, and how to address it so that organizations can grow and be competitive in today’s knowledge economy.

Rhetoric about the widening skills gap in the workforce is increasing. Business leaders complain that their number one concern is finding the right people to fill a growing list of vacant positions. Researchers warn that shifts in workforce demographics affect the availability of labor to fill high skilled jobs. Stories about managers lacking the necessary leadership capabilities and a shrinking pool of qualified talent blanket the business sections of newspapers. And, concerned about the United States’ ability to compete with China and India, U.S. policy makers are introducing legislation to spur innovation and boost competitiveness.

But, much of this dialogue has focused only on one side of the skills gap issue – what the problem is, where it is, and who’s affected. Missing from the discussion is what learning professionals, business leaders, and policy makers should do to address the challenge. ASTD’s goal with this paper is to move the discussion from simply talking about the problem to helping organizations take action on their skills gaps through the plan and process provided here.

Equipping workers with the skills they need to help organizations grow and succeed puts the learning function at the center of this issue. Together with the leaders of their organizations, learning and performance professionals can use the action plan in this paper to assess potential gaps, set goals, implement learning solutions, and measure the results and impact for their organization. The case studies included are best-practice examples of organizations that have acted on a skills gap.

The public policy community has an important role as a partner in this work. This paper provides recommendations to government for streamlining training programs and services to help individuals access learning opportunities, and help organizations hire and develop skilled talent.

We invite your comments on this paper and insights on the skills gap. Please send them to the ASTD Policy and Public Leadership department by email: skillsgap@astd.org.

Through this paper and ASTD’s leadership in workplace learning and performance, we hope you will engage in this dialogue and be part of our community of learning. Together, we can help organizations achieve success by building a knowledgeable, highly skilled workforce.

Best regards,

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On behalf of ASTD and the Policy and Public Leadership department, we would like to extend our gratitude to the members of the 2006 Public Policy Council for their guidance, insights, and thoughtful contributions to this paper. “Bridging the Skills Gap” will play an important role in shaping the dialogue about this important topic, and learning professionals, business executives, and policy makers will benefit from your expertise. Thank you for your dedication to this project.

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"Skills Shortage Hits Manufacturers."
"Lack of Talent Threatens Growth, Competitiveness.” “Wanted: Skilled Workers.”

Organizations in the United States and around the world are finding themselves ill-equipped to compete in the 21st-century economy. The reason: too many workers lack the right skills to help their employers grow and succeed.

At the same time that the global, knowledge-based economy places an ever-growing premium on the talent, creativity, and efficiency of the workforce, business leaders talk of a widening gap between the skills their organizations need to grow and the current capabilities of their employees.

It is not just individual organizations and industries that are suffering the consequences of the “skills gap.” Communities, states, regions, and entire nations pay a heavy price when businesses cannot find or equip employees with the right skills for critical jobs. Even in China and India, widely perceived as unstoppable engines of economic growth, a lack of worker skills often is cited as a major obstacle to business success.

Many discussions of how to “right-skill” the workforce with training and education focus broadly on issues concerning the “pipeline” of education and training. The question at the center of these conversations: How to strengthen K-12 and postsecondary education to ensure a steadier supply of workers with the requisite skills?

Improving education is essential; the public and private sectors need to collaborate to make sure people enter the workforce with the necessary skills and competencies to drive productivity, growth, and success.

However, ASTD looks at a different set of questions in this paper: What can business leaders do within their organizations to assess the severity of the skills gaps they face now and will face in the future? And how can they close those gaps in ways that contribute to the growth of their employees and the success of their organizations?

In ASTD’s 2003 white paper, The Human Capital Challenge, the ASTD Public Policy Council observed the following: “Now more than ever, the success of public and private organizations in the United States and throughout the world depends on the knowledge and capabilities of their employees.”

The connection between human capital and organizational success is even clearer today, as skills shortages threaten the short- and long-term success of increasing numbers of businesses and industries throughout the world.

In reality, organizations will always face some type of skills gap – if they didn’t, they wouldn’t be growing and innovating to stay ahead of shifting market conditions, evolving industries, and changing customer needs. The key to achieving business growth and success is having a workforce with the capacity to continually learn, update their skills, and hone their knowledge in today’s rapidly changing environment.

ASTD’s purpose in developing this paper isn’t to suggest a solution to eliminate the skills gap, but to provide business leaders and learning professionals with a reusable action plan and process to develop knowledgeable, highly skilled employees, and to provide policy makers with recommendations on how government can streamline training programs and services to meet the needs of individuals and organizations.

In today’s economy where knowledge is the currency of success, organizations simply cannot expect to succeed and prosper by overlooking looming labor shortages, workers with obsolete skills, and the impact of employee learning on growth and success. Right-skilling the workforce requires a significant commitment to employee learning and development. Working together, individuals, business leaders, and government must meet this challenge head-on to realize future growth and success.
**What is the skills gap?** A skills gap is a significant gap between an organization’s skill needs and the current capabilities of its workforce. It is the point at which an organization can no longer grow and/or remain competitive in its industry because its employees do not have the right skills to help drive business results and support the organization’s strategies and goals.

**What is causing the skills gap?** The ASTD Public Policy Council has identified four major factors behind today’s skills gap:

**Jobs are changing.**
Changes in the nature of business are leading to changes in the skills required of employees. Global competition, technology, and other forces place a premium on speed, innovation, and the ability to adapt rapidly to change.

“Even if employees are equipped for today’s jobs, they need to be ready to learn, re-learn, and in some cases, unlearn to respond to corporate downsizing, workplace modifications, and other realities,” according to the authors of Building a Nation of Learners, a 2003 report by the Business-Higher Education Forum.

Today’s employees also need a higher level of technical and professional skills than their counterparts in decades past. In 1950, 80 percent of all jobs in the U.S. were classified as unskilled. In a complete reversal, an even larger proportion of jobs – 85 percent – are classified as “skilled” today, meaning they require some education beyond high school.

The increased demand for higher-level skills in the U.S. and other developed countries is related to broader shifts in the economy, including declines in low-skill manufacturing, the growth of the service sector, and the advent of new technologies.

**Educational attainment is lagging the need for skills.**
At the same time that the U.S. and other nations need more workers with higher-level skills, advances in education have been trailing off in recent years.

“While successive generations have required more schooling, educational attainment has plateaued among American youth during the last several years,” according to economist Tony Carnevale of the National Center on Education and the Economy.

Between 1980 and 2000, the share of U.S. workers ages 25 and over with at least some education and training beyond high school increased by 19 percent. Between 2000 and 2020, this percentage is projected to rise by only 4 percent. This leveling off of educational attainment is happening while data show a widening gap in earnings between those with college and postgraduate degrees and those with just a high school diploma.

Because of the mismatch between educational attainment and job growth in the years to come, Carnevale projects that the U.S. economy will be short 14 million workers with at least some college experience by 2020.

**Workforce growth is slowing.**
Low growth in all segments of the workforce is fast becoming a fact of life in the U.S. and other developed countries.

According to the Hudson Institute, the world’s “advanced regions” – including the U.S., Western Europe, and the developed nations of the Pacific Rim – will see a smaller number of new workers entering the labor force in the current decade than were added in the 1990s. Western Europe will experience an absolute decline in workers between 2000 and 2010.

In the U.S., the looming retirement of the baby boom generation of workers has captured attention. According to a recent study by the Conference Board, 64 million workers – or approximately 40 percent of America’s labor force – will be eligible for retirement by 2010. One-half of companies interviewed felt the departure of those workers presented potential “knowledge vulnerabilities.” Among the industries most concerned about the impending brain drain were technology and pharmaceuticals.

Of course, if retiring workers were slated to be replaced by an equal or greater flow of new skilled employees, there wouldn’t be a problem. But the U.S. and other developed nations face a shrinking supply of younger workers. According to the Conference Board study, the number of U.S. workers between ages 35 and 44, those normally expected to move into senior management ranks, will decline by 10 percent by 2010. In Europe and Japan, the shortage of younger workers is even more pronounced.
“The combination of baby boomers, immigrants, and working women has helped swell our workforce by 1.6 percent a year for the past 50 years,” according to the authors of *The Jobs Revolution: Changing How America Works.* “But during the coming 50 years America’s workforce will grow by approximately 0.6 percent annually, about one-third the pace set over the last half-century.”

**Businesses are not leveraging their learning investments effectively.**

According to the ASTD 2005 *State of the Industry* Report, business leaders increasingly recognize that employee learning and skills development is crucial to sustaining a competitive advantage. However, a sampling of practices at those organizations that are uniquely committed to workplace learning reveals where the majority of businesses fall short.

Every year, ASTD’s BEST Awards recognize organizations that connect enterprise-wide learning to organizational performance. Common characteristics of learning functions in organizations that won ASTD BEST Awards were:

- A high level of investment in learning, and sophistication in determining and evaluating investments
- Measurement and demonstration of efficiency and effectiveness of the learning function
- Alignment of learning with business strategy and requirements and individual employee competency needs
- Provision of a broad range of internal and external formal and informal learning opportunities
- Involvement and support for learning from senior executives
- Significant allocation of resources for non-learning performance improvement activities

Compared to organizations in ASTD’s Benchmarking Survey (data from a broad cross-section of public and private U.S. organizations of varying sizes and industries), these BEST Award winners devote more resources to workplace learning (measured on a per-employee and percent-of-payroll basis); and enroll employees in more formal learning. And, in devoting a higher level of effort to measuring the learning function and its impact on business results, these companies offer ideas and inspiration for other organizations seeking to address skills gaps and leverage the power of learning.

**Where are the biggest gaps?** Business leaders have reported deficiencies in both “hard” and “soft” skills among current and prospective workers. Shortages are reported in four key areas:

- Basic skills – The “three Rs” (reading, writing, and arithmetic), customer service, communications, basic business acumen
- Technical and professional skills – computer/technology skills, plus skills for specialized industries (e.g., automotive or construction)
- Management and leadership – skills covering areas such as supervision, team-building, goal-setting, planning, motivation, decision making, and ethical judgment
- Emotional intelligence – skills such as self-awareness, self-discipline, persistence, and empathy

**Four Signs That an Organization May be Facing a Skills Gap**

1. There is a mismatch between the skills the organization needs (current and future) and the capabilities of the workforce.
2. The organization did not train employees during hard times and is struggling to catch up.
3. The number of high skilled, specialized jobs needed to take the organization forward is increasing.
4. There is a high percentage of baby boomers in the workforce that are or will be leaving soon.
In an online poll conducted by ASTD between December 2005 and January 2006, 96 percent of 369 respondents said there was a skills gap in their organizations, or expected one within the next year.

When asked to identify the skills gaps their organizations were experiencing today, these ranked as the three most important: managerial/supervisory skills, communication/interpersonal skills, and leadership/executive-level skills.

The ASTD poll underscored the fact that bridging the skills gap is about more than improving workers’ competence in science, technology, engineering, and math. Education and training in these subjects are critical – technical and engineering skills, for example, play a crucial role in rapid change. However, there are also significant gaps in non-technical areas such as leadership, management, and communication that are equally important to the ability to innovate, collaborate, and compete.

A study by Executive Development Associates found that 70 percent of surveyed companies are experiencing moderate to major leadership shortages – and expecting them to get worse. Many of the 100 organizations that participated in EDA’s research reported that they had money to grow; however, a lack of leadership skills prevented them from expanding into new markets or making new acquisitions.

Fortune magazine documented the lack of leadership talent in a February 2006 article with this observation: “…today—after 500 years or so—the scarcest, most valuable resource in business is no longer financial capital. It’s talent.”

Among other competencies reported to be in short supply among all employees are those categorized as emotional intelligence. They include: self-awareness, self-discipline, persistence, and empathy. Popularized by psychologist and author Daniel Goleman, emotional intelligence has been linked in research studies to improved performance for individuals and organizations.

“The evidence suggests that emotionally intelligent leadership is key to creating a working climate that nurtures employees and encourages them to give their best. That enthusiasm, in turn, pays off in improved business performance,” Goleman has observed.

What are the specific types of skills gaps your organization is experiencing? (Respondents chose the top three.)
How widespread is the skills gap today? The demands of a global, technology-driven, data-intensive, knowledge-based economy are creating skills gaps across entire industries and throughout the public sector. The one-two punch of recent graduates entering the workforce unprepared for current demands and the looming retirement of large numbers of baby boomers also undermines the ability of businesses to grow and compete.

In a 2005 survey, the National Association of Manufacturers (NAM) revealed an equally urgent portrait of the extent of the skills gap. The survey’s headline finding: More than 80 percent of responding manufacturers were experiencing an overall shortage of qualified workers that cuts across industry sectors.

The NAM survey showed that 90 percent of manufacturers reported a moderate to severe shortage of skilled production workers, including machinists, operators, craft workers, distributors, and technicians. Sixty-five percent of respondents reported a shortage of scientists and engineers, and the problem is more acute in industries such as aerospace and defense.

In addition, 46 percent of manufacturers in the survey reported inadequate problem-solving skills among current employees; more than a third cited insufficient reading, writing, and communications skills in their employees.

Focusing on technical skills, the National Science Foundation reported that the number of jobs requiring science and engineering skills is growing at almost five percent per year. Growth in the science and engineering labor force has only been possible because large numbers of foreign-born graduates have immigrated to the U.S., according to the NSF report. But global competition for these workers is on the rise, suggesting that the U.S. and other countries can’t continue to count on foreign-born scientists and engineers to fill home-grown skills gaps.

Compounding the problem is the fact that many of today’s technology and other skills become obsolete in as little as three to five years. The challenge for employers: how to ensure that worker skills keep up with business needs.

What is the impact of the skills gap? A shortage of skilled workers can put the brakes on innovation and growth. The reason: In today’s economy, the knowledge and skills of the workforce are the key to growing and sustaining a competitive advantage.

According to the Council on Competitiveness report, Winning the Skills Race, “U.S. prosperity in today’s knowledge-driven economy demands the world’s most skilled and productive workforce.” The report went on to single out worker skills as “the greatest competitive challenge” facing the U.S.

In the January 2005 Training + Development magazine article, “The Coming Labor and Skills Shortage,” economist Tony Carnevale adds this: “The ability of the U.S. to produce high levels of skilled workers is critical to the overall performance of its economy in global competition.” Carnevale cited an article by Sandra Black and Lisa Lynch in which they note that a one-year increase in the education level of workers increases productivity by 8.5 percent in manufacturing and 12.7 percent in non-manufacturing industries.

The connection between worker skills and business performance isn’t news to CEOs around the world. IBM Business Consulting Services’ Global CEO Study 2004 found that “CEOs overwhelmingly believe that revenue growth is their number one financial priority over the next several years.” The study went on to say, “CEOs recognize that growth and differentiation require major change, yet deficiencies in skills and competencies … seriously threaten the growth agenda.”

In a recent Training + Development magazine article, “Eliminate the Skills Gap,” Vince Serritella, Vice President of Employee Development for W.W. Grainger, goes straight to the bottom line. “Companies must either invest in the company human capital value chain and continuously build competency or lose competitive advantage … When employees perceive that their company would rather churn their workforce instead of investing in their performance and competencies, their attachment to the employer is tenuous and their commitment to performance erodes,” he said.
Organizations draw on many sources for the development of their talent. They rely on school systems, national and local workforce development programs, professional associations, and private education companies, among other sources, to provide a steady supply of potential employees for the labor pool. Many organizations work closely with these institutions to align their efforts with the skill needs of organizations in the community and the economy as a whole.

Business leaders obtain the talent they need by recruiting experienced workers to fill specific skills gaps. But more and more, faced with the reality of rapidly changing skills needs, the efficiency of technology-enabled learning, and an increasing shortage of skilled labor across many industries, these leaders understand that they also must train and develop their employees or risk business success. To do this, they rely on their workplace learning and performance professionals (WLP) to manage employee learning and development, measure its impact on performance, and demonstrate business results based on the performance change.

Why is Learning Vital? To be effective, organizations must understand what skill sets they need now and in the future at every level of the organization – all the way to the executive suite. In many organizations challenged by a very competitive business environment, it’s not enough to “hire for attitude” and “train for skills.” Employees must come to work with skills that allow them to be effective immediately. Starting with the selection process, savvy organizations identify critical skills and competencies that new hires must have, and they recruit for those. WLP professionals work with their partners in human resources to identify the potential learning needs of an employee before his or her first day of employment. Understanding the organization’s goals and strategies, managers work with employees to map their learning needs to business requirements through the use of individual development plans and performance plans.

Although WLP professionals have traditionally held the responsibility for designing courses and delivering training to employees in primarily classroom settings, today, they are responsible for much more than conducting training; they are leading integrated systems of talent management that provide learning and skills development, leveraging a variety of learning technologies at every step of employees’ careers. Talent management is the set of activities that attract, retain, develop, and motivate employees to give their best performance in support of organizational goals. Talent managers are those who assure that employees have the skills, capabilities, and engagement to drive the current and future performance of the organization.

This focus on talent management means that the elements of training and human resources—once viewed more as separate, distinct activities with limited coordination—now work in sync to assess skill needs for jobs, recruit and select individuals based on the skills and competencies required for the job, map performance goals and learning/development plans to the business strategies of the organization, and manage opportunities for coaching, mentoring, leadership development, and other activities that may be part of the organization’s succession plans.

The ASTD Competency Study, Mapping the Future: New Workplace Learning and Performance Competencies, defines an integrated system of those elements (see figure on page 10) from which WLP professionals can build plans for selection, training, performance, career mapping, and succession.

By identifying the critical competencies and areas of expertise (AOEs) that are necessary for success in a given job, WLP professionals can work with a hiring manager to select new employees who demonstrate the desired competencies and professional expertise that is required to be successful in the position. This same list of competencies will become part of the performance management system to monitor and evaluate the individual’s performance on the job. These competencies also serve as the basis for choosing appropriate training.
Why are learning professionals key to helping organizations address skills gaps? In short, people must continually learn, acquire new knowledge, and develop their skills to be effective contributors to their organizations. The only way for an organization to grow and compete in a rapidly changing global business environment is to have a skilled workforce that is innovative, understands the economic environment and marketplace, and is driven to be best in class in their industry. An organization’s WLP team understands that necessity and they know that employee development starts before a person is employed and continues throughout a person’s tenure and career. This team knows that having the right people, with the right skills, at the right time is critical for success.

Section four of this paper includes an action plan for business leaders and WLP practitioners to implement when faced with skills gaps. It will help to answer some key questions:

- Is there a skills gap in my organization?
- Where is the gap, how big is it, and what are the implications if the gap goes unfilled?
- What should my team do to address the gap?
- How can we implement a process that will help us get ahead of this in the future?
Skills for Long-Term Success in Improving Individual and Organizational Performance

Responding to today’s skills shortages with short-term fixes is not enough. For business leaders, WLP professionals, and policy makers, the more critical challenge is to address skills gaps in ways that contribute to long-term organizational success.

Developing a highly skilled workforce takes a commitment from business leaders in the private sector, the public training and workforce development system, and leaders in higher education. Organizations must work independently and with public sector partners to ensure that workers have the following:

- **Critical Skills and Competencies.** The necessary knowledge, skills, and abilities to contribute to the performance and competitiveness of organizations, as well as the growth of local, regional, and national economies.

- **Business Acumen.** A solid understanding of financial and business principles, plus the communications competencies and self-discipline needed to deliver results in a team-based, work environment.

- **Leadership Skills.** Leadership, managerial, and supervisory capabilities that bring out the best in workers and inspire innovation and performance improvement across the business.

- **Technical Capacity.** A firm foundation of technology skills and other “hard skills” that are specific to jobs in current and emerging industries.

- **Adaptability.** The capacity to learn new skills quickly and to adapt easily to new responsibilities, changes in business needs and priorities, and the ever-shifting demands of the global economy on individuals and organizations.

- **Innovative Thinking.** The ability to think creatively and to generate new ideas and innovative solutions to business challenges.

- **Personal Responsibility for Learning.** A willingness to take responsibility for continuously improving one’s capabilities and skills through mentoring, training, and other learning activities during one’s working lifetime.

It’s clear that gaps exist from basic skills to technical skills to management and leadership skills, and they affect all levels of employees in every industry. While workforce development experts discuss the severity of the issue and its wide-ranging consequences, few people have provided suggestions on what to do. Attracting and retaining knowledgeable, highly skilled talent consistently ranks as one of top three items that concerns CEOs the most when they talk about leading their organizations to the next level. Many CEOs and senior executives aren’t sure how to determine if their organizations are facing a skills gap, or what actions to take if they are.

Business leaders look to their WLP professionals to assess the skills and competencies employees need, both now and in the future, in order to link learning to key business drivers and deliver results for organizations. Business leaders and learning professionals should use this action plan to identify, address, and take charge of skills gaps in their organizations.

### Action Plan

1. Understand the organization’s key strategies and performance metrics
2. Identify competencies that map to these strategies
3. Assess the skills gap
4. Set goals and prioritize the path to filling the gap
5. Implement learning solutions
6. Measure results and communicate the impact
### An Action Plan to Take Charge of the Skills Gap

#### Step 1: Understand the organization’s key strategies and performance metrics

Be sure you know the answers to these questions, and can articulate the connection between key business metrics and learning.

- What are your organization’s key strategies, goals, and objectives?

- Who are your customers or who is your audience? How satisfied and engaged are they with your organization?

- What is your position in the industry or market, and who are your key competitors? Does your organization have a competitive advantage - If so, what is it?

- Does your organization have a business plan with a recent SWOT (strengths, weaknesses, opportunities, and threats) analysis?

- How does your CEO or senior executive measure the organization’s performance and success?

- How are your senior leaders measured in their performance goals?

- How does your organization change course when it is not meeting performance goals?

- Where is your organization and industry headed in the next year, three years, and five years?

#### Step 2: Identify competencies that map to these strategies and performance metrics

Identify core business functions and organizational strategies that depend on skilled talent for their execution.

- Based on your organization’s strategies and core business functions, what skills and competencies are needed in the organization?

Define the organization’s “future state” – these are the skills you must have (in the next one to three years, for example) to meet business goals.

Map the skills and competencies needed to the organization’s current and future goals and strategies.

- Determine the priority of the skills and competencies – what are the most important ones that the organization must have to grow and be successful?

Create a matrix that is meaningful to the organization (the competencies may be mapped to job function within the organization, department, employee group, or area of specialty).

#### Step 3: Assess the skills gap

Understand the demographics of your workforce. Are many employees nearing retirement? Assess your organization’s risk of losing knowledge if long-time employees leave.

Conduct a workforce review to determine the status of current and future skills gaps by organization/division, job category, and demographic segment. Do this through a comprehensive skills inventory for all employees, from entry-level workers to senior executives.

Determine the most important skills gaps your organization faces now, in one year, three years, five years, and potentially 10 years.

Based on the assessment, determine the largest skills gaps and which employees most need skills development. Prioritize the most critical skills gaps.

Consider these questions:

- Are the gaps more pronounced in specific employee groups?

- Are the gaps in specific lines of business?

- Are the gaps geographically-based?
### An Action Plan to Take Charge of the Skills Gap

**Step 4:**
**Set goals and prioritize the path to filling the gap**

- Identify targets for closing the gap between current skill sets and those needed to support the future goals of the organization.
- Decide whether to hire skilled talent, build it internally, and/or obtain it through outsourcing.
- Set baseline measures by documenting employees’ skills assessments as they stand now.
- Set goals for “speed-to-competence” – how quickly do you need to develop these skills, and how will you measure the effectiveness of the skills development?
- Set goals for internal communication and change management plans that will accompany the comprehensive action plan to address the organization’s skills gap.
- Develop a separate communication and change management strategy for managers. Include managers in every step of the implementation and measurement strategy.
- Create or improve processes and methods for identifying internal talent, recruiting new talent, and retaining employees with the key skill sets that the organization needs.

**Step 5:**
**Implement learning solutions**

- Led by the organization’s learning function, create an organization-wide learning plan to address skills gaps. Deploy learning resources through a learning management system.
- Create individual learning plans and learning paths for employees.
- Select appropriate delivery modes for learning opportunities – instructor-led classroom, online instruction, informal learning, or a combination.
- In addition to traditional training methods (e.g., classroom or online instruction), include learning opportunities such as coaching, mentoring, job rotation, external programs and courses, tuition reimbursement, and so forth as part of the learning plan.
- Set up systems that will document and measure employees’ competencies and skills before, during, and after the learning takes place.
- Ensure that the learning employees will receive is relevant, timely, and accessible, and is linked directly to narrowing the identified skills gap.
- Engage the organization’s senior leadership in supporting learning programs and advocating for workforce readiness.
- Create opportunities for the CEO and senior executives to lead courses and model “leaders as teachers.”
- Create opportunities for seasoned and highly skilled workers to stay involved and engaged in the organization by being part of the skill development of others as mentors, coaches, and team leaders.

**Step 6:**
**Measure results and communicate the impact**

- Measure employees’ progress on the learning plans against individual and organizational goals.
- Use measurement tools such as scorecards and dashboards to measure progress before and after learning takes place.
- Measure organizational gains in efficiency, effectiveness of the learning, and speed-to-competence.
- Test for senior leadership’s awareness of the progress in building needed skills.
- Link the results of the learning back to organizational strategies and goals.
- Determine whether the organization is meeting or has met its goals to narrow skills gaps.
- Measure and communicate the return-on-investment (ROI) for the learning program—what are the financial and non-financial benefits to the organization in the short- and long-term? Adjust solutions based on success.
- Report results to all stakeholders in the organization.

Consider these questions:

- Did your learning solutions and implementation plans have a measurable effect on narrowing skills gaps in your organization?
- Is your workforce better equipped with skills now?
- What business results can be identified based on the learning solutions implemented?
The Role of Individuals, Organizations, and Government

Today’s knowledge- and service-based economy demands a completely different response to skill requirements than that of the industrial economy of past decades. The stakeholders—individual employees, organizations, and government systems—are struggling to keep up with new developments and with the training and retraining demands that those developments require. This has proved too daunting for some employers, who have suffered economic losses and been forced to close plants or restructure the business to remain competitive, with devastating consequences for workers and communities.

At the other end of the spectrum are organizations that realized early on the importance of training to remain competitive, and have committed substantial resources to creating robust learning opportunities for employees. They understand that employee learning—tied to the business goals of their organizations—allows them to upskill or reskill their workforce, so that their organization can respond quickly to industry changes or emerging trends with a steady pool of highly skilled workers.

But is it enough for employers to understand the link between skilled employees and competitiveness? What about those organizations that have not realized the value of training, or have not successfully connected learning to business goals? And can organizations alone ensure that their employees have the skills they need to keep the company competitive in today’s economy? Increasingly, no. As never before, having workers with the right set of skills is the key to business success, and that is the joint responsibility of individuals, their employers, and government.

Individuals are increasingly accountable for gaining the skills needed to ensure the success of the organizations in which they work. It is imperative that they share responsibility for their own learning and development—throughout their lifetime—with their employers. It is the role of government to provide the support and the environment so that learning is fostered by organizations and pursued by employees.

To better understand the roles and responsibilities of each stakeholder—individuals, organizations, and government—in ensuring a skilled workforce, and to suggest ways each stakeholder can ensure that the workforce remains competitive, ASTD provides this matrix of roles and recommendations.
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<th><strong>INDIVIDUALS should...</strong></th>
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<tr>
<td>Take responsibility for their own skill development and career development.</td>
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<td>Take responsibility for the quality of their work.</td>
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<td>Be flexible, adaptable, and able to learn new skills quickly.</td>
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<td>Be proactive in acquiring skills, in furthering their education, and committing to lifelong learning.</td>
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<td>Take the initiative to increase their knowledge and skills when their job or organization require it.</td>
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<th><strong>ORGANIZATIONS should...</strong></th>
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<td>Invest in employee development and commit resources to learning initiatives that support business goals and strategies.</td>
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<td>Create an environment of continuous learning and provide appropriate learning and development opportunities.</td>
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<td>Benchmark organization-wide learning against best practices.</td>
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<td>Recognize and reward learning and development that support current and future skill needs.</td>
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<td>Provide working conditions and an atmosphere that help retain mature workers, so that highly skilled and knowledgeable workers stay in the workforce.</td>
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<td>Reframe retirement as an opportunity for experienced employees to help close the skills gap through mentoring, coaching, or other activities.</td>
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<th><strong>GOVERNMENT should...</strong></th>
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<td>Provide support for programs that promote a highly skilled workforce.</td>
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<td>Provide a framework to link all stakeholders involved in economic development—government, school systems, employers, and workers.</td>
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<tr>
<td>Assist populations that are difficult to employ, and provide support to unemployed, underemployed, or dislocated workers.</td>
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<td>Protect workers and unemployed populations from unfair labor practices, and regulate business practices.</td>
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<tr>
<td>Provide a “laboratory” for cutting-edge practices that resolve training and workforce challenges, and assess whether the practices can be successfully replicated in other localities.</td>
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<tr>
<td>Provide incentives for organizations to invest in employee learning and development.</td>
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The previous pages of this paper describe the skills gap, what’s at stake, and best practices among companies that rely on their workplace learning and performance professionals to “right-skill” workers in innovative ways. More importantly, the paper provides business leaders and learning professionals with a vision of success and a reusable action plan and process for developing knowledgeable, highly skilled employees.

The next section focuses specifically on the role of government as a partner to address the skills gap challenge. These recommendations provide suggestions to policy makers on how to streamline and simplify government training programs, promote partnerships, enact legislation, and coordinate tax incentives, with the ultimate goal of helping individuals develop the skills they need, and helping organizations utilize public sector programs that develop skilled talent.

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Traditionally, government has assisted people who face challenges finding work. More recently, it also plays an important role in coordinating programs that help organizations find knowledgeable, skilled workers and assists emerging industries by funding partnerships to develop the skills of the current and future workforce. Through the publicly-funded training system, organizations receive incentives such as tax credits and grant opportunities to train and upskill their workers. And, through fair policies and resources, the public sector assists individuals who need to embrace a new mindset in which learning is seen as a continual process during the course of one’s lifetime, instead of a finite goal marked by the receipt of a degree or a job in a new field. But government can play a more effective role by providing a more coherent system for narrowing skills gaps.

“Individuals and organizations are, in effect, the stakeholders and customers of public sector training programs, but in many cases, they aren’t aware of the programs or elect not to participate,” said Vince Serritella. “To the extent that government can clarify, streamline, and coordinate the available public sector training programs, organizations and individuals will benefit by better understanding how the public sector can help them realize their training and learning goals.”

To more effectively assist individuals and organizations to narrow skills gaps, the public sector can provide them more guidance in navigating complex training programs and policies. To achieve that, ASTD recommends the following public policies:

- **Link more closely regional economic development, education, and workforce development, and directly tie their programs and services to organizations in need of employees by:**
  - Promoting regional alliances through initiatives such as the U.S. Department of Labor / Employment and Training Administration’s Workforce Innovation in Regional Economic Development (WIRED) initiative, which promotes talent development by leveraging public workforce system resources with industry and education resources.
  - Partnering with communities, organizations, and local governments to collect and disseminate best practices and information on model workforce programs. Highlight those practices and become advocates for them.
  - Promoting and supporting public-private partnerships, such as those with community colleges, ensuring that students leave school with the skills employers need, and the experience to transition into the workforce.
  - Ensuring that public training programs, such as those offered through the Trade Adjustment Act, link directly to available jobs.
  - Passing the reauthorization of the Workforce Investment Act, which improves the law by legislating better local representation by the education, economic, and workforce development communities, and by providing greater flexibility in allocating federal training dollars.

- **Simplify and standardize processes for accessing public sector training dollars so that stakeholders can navigate the public sector system more easily, and better coordinate their use of its training programs.**

- **Address the needs of a maturing population that is highly skilled, that wishes to continue working in some capacity, and whose skills are crucial to organizations’ growth and success.**
  - Consider providing incentives to organizations that successfully recruit, retain, and retrain mature workers, and assist in removing barriers—real or perceived—to hiring or retaining mature workers in part-time and other flexible arrangements. Barriers include employees’ ineligibility for health care, life insurance, and other benefits offered to full-time employees, and inability to access social security and retirement benefits.
• Provide a coherent framework of lifelong learning in which learning is viewed as a continuum of education along an individual’s lifetime. This should include coordinating tax incentives such as:

• Providing support to individuals for lifelong learning programs through training tax credits, such as the current HOPE and Lifelong Learning tax credits, and education savings accounts.

• Providing additional support to individuals through initiatives that are portable, such as Lifelong Learning Accounts (LiLAs), and that are flexible in terms of who accesses the benefit (employer or employee) and what functions are covered, such as the broad definition of technology and communication functions found in the TRAIN (Technology Retraining and Investment Now) Act.

• Continuing to fund Section 127 of the Internal Revenue Code so employers can provide education assistance benefits to employees tax-free (currently $5,250 per year).

• Pass a version of competitiveness legislation that addresses skills gaps beyond the STEM (science, technology, engineering, and math) subjects, since other gaps in skills such as communication and leadership also threaten organizations’ ability to grow and succeed.

• Include innovative solutions such as the Digital Opportunity Investment Trust Act, which reserves a portion of the revenues received from the sale of the electromagnetic spectrum for training, research, and development projects that use advanced information technologies.

• Allow organizations to recruit skilled workers through visa programs, but set aside the proceeds or a portion of the proceeds from visa fees for training incumbent, dislocated, and unemployed workers.

With government as a partner, individuals can obtain the skills they need for engaging, challenging, and well-paid work, while fulfilling their responsibilities to further their education. By partnering with government and accessing its training resources, organizations benefit by attracting skilled, knowledgeable, and adaptable workers. And, the economy benefits from a strong tax base and a steady flow of new products and services created by a high-performing workforce.

**Conclusion**

Organizations that are constantly changing and improving require their workers to be agile, flexible, and able to learn new skills quickly. Skills gaps, or the gap between the skills workers have and those the organization requires to grow the business, will exist as the organization continues to expand in new directions.

The key, then, for business leaders is to understand demographic data, conduct assessments, connect training to business goals, and take action to effectively manage the skills gap. Strategically linking the organization’s human capital functions and understanding key demographic data will help organizations be better prepared to react quickly and perform effectively in today’s competitive business environment.

This paper provides business leaders and learning professionals with an action plan and process to understand how to assess and manage skills gaps. By clarifying the roles of individuals, organizations, and government in addressing skills gaps and providing recommendations to public policy makers, ASTD hopes this paper is used as a resource and tool for successfully managing skills gaps in organizations.
THE ORGANIZATION:
Caterpillar Inc. is the leading manufacturer of construction and mining equipment, diesel and natural gas engines, and industrial gas turbines. Based in Peoria, Illinois, the 80-year-old company and its global network of dealers operate on every continent. Caterpillar is a Fortune 100 company with 92,000 employees. Sales and revenue in 2005 were $36.34 billion. Caterpillar University is responsible for developing global enterprise-wide learning.

ASSESSING THE SKILLS GAP:
Caterpillar’s goals for 2020 center around aggressive growth and increased profitability by going into new geographies particularly in Asia, adding new product lines, and being more entrepreneurial than in the past. Compounding the challenge is the pending retirement of employees and the need to hire new employees in the regions of the world where Caterpillar is experiencing the highest growth. Caterpillar estimates that it will need to hire the equivalent of its current workforce by the year 2020 as it grows to 120,000 employees. Working with their executive leaders in 2001, Caterpillar University defined the leadership characteristics (i.e. competencies) needed to achieve Caterpillar’s 2010 goals for the company’s 8,000 leaders – supervisors, managers, department heads, and executives. Caterpillar currently revisited these competencies to ensure they were still relevant in meeting the goals recently established for 2020.

THE STRATEGY:
To create and embed the leadership “language” created in 2001, the company worked with the Hay Group to launch The Caterpillar Leadership Framework through a program called Making Great Leaders (MGL). MGL emphasized three Caterpillar leadership competency clusters designed to instill a Vision of success, build the skills to Execute the vision, and assure the creation of a Legacy through developing future leaders. The MGL program is a highly interactive two-day event in which leaders receive feedback on their leadership via three assessment tools, which focus on competencies, styles, and climate. Leaders are given time in MGL to create development plans and receive individual coaching from Hay Group consultants who conduct the program. MGL is cascaded from the top down to front-line leaders with Caterpillar’s CEO and top team participating as well.

The CEO provides continued sponsorship by asking all managers and above to participate in MGL by the end of 2006. Online resources and individual coaching supplement MGL along with a Leadership Development Guide that helps leaders strengthen their competencies, styles, and climate.

THE RESULTS:
By the end of 2006, the majority of Caterpillar’s 2,500 managers will have participated in MGL along with hundreds of front-line supervisors. MGL has consistently rated in the 90th percentile at evaluation Level 1 (satisfaction), and a Level 3 (transfer of learning to the job) study revealed an 89 percent application rating.

Measuring success and holding leaders accountable are important parts of the new People strategy, which is evident in Caterpillar’s recently announced strategy for 2020, and which includes People as a critical success factor. By 2010, the goal is to have 80 percent of employees evaluated as having an engaged leader and 80 percent of employees engaged in their work along with 80 percent of employees evaluating their leader as possessing the new leadership competencies. Engagement and leadership are measured each year via an enterprise-wide employee opinion survey, which measures the progress towards the 80 percent targets. Estimates show both those goals at or above 70 percent as of early 2006, which is more than a 20 point improvement vs. five years ago.

Chris Arvin, Dean of Leadership for Caterpillar University, says, “This is a prime example of our leaders becoming serious about leaving a legacy by actively developing themselves and teaching others. Leadership development has become a critical element of Caterpillar’s strategy and its importance is recognized if Caterpillar is to reach its goals for 2020.”
THE ORGANIZATION:
General Motors Corporation, North American Product Development (GM) in Detroit, Michigan, is the world’s largest vehicle manufacturer with $193 billion in revenue, 335,000 employees, operations in 32 countries, sales in 200 countries, and 14.2 percent of the world market.

ASSESSING THE SKILLS GAP:
For over a decade, global competition has driven unrelenting price pressure for all car and truck manufacturers. To survive in this environment, American vehicle manufacturers have been forced to radically reduce the cost of design and manufacturing while simultaneously improving quality. GM has employed several strategies to reduce cost, and one of them has been to increase the use of CAE (Computer Aided Engineering) methods.

CAE is a collection of computer-based methods that uses sophisticated software to simulate, analyze, and optimize the design of parts. The traditional engineering process requires building and testing prototypes, revising designs based on test results, and repeating the cycle until the design meets specifications. CAE replaces the physical testing with virtual testing that can produce more accurate results in a fraction of the time and cost. All major automotive companies worldwide have adopted CAE methods to shorten the duration and reduce the cost of vehicle design.

A small GM CAE group was established during the 1980s. This group’s capabilities grew as the effectiveness of CAE technology increased, but its focus was limited to critical areas such as body structure and crashworthiness. Except for this CAE group, very few GM engineers had CAE skills.

In 1991 the CAE group proposed a radical change in the vehicle development process, a change that would make CAE methods ubiquitous. During the mid 1990s, GM put in place a common computer aided design system from Unigraphics Solutions, which was a necessary foundation to expand the use of CAE. A second foundation was standardizing the software used in each engineering task. By 2000 GM was ready to rapidly expand the use of CAE, necessitating an extensive training program to teach CAE skills to the majority of GM engineers.

THE STRATEGY:
Strategic changes in the vehicle development process required expanding the variety and quantity of CAE training. Consequently, the engineering training organization was asked to work closely with the CAE organization to plan and implement the needed training. “Focus groups,” which had deep skills in specialized CAE techniques, were assigned to work with the training group to plan this expansion of training.

The first step toward meeting this challenge was to bring a small number of people from the CAE community into the training organization. These people would need broad CAE expertise as well as skills in the design, production, delivery and management of training. People with the required skills were identified and recruited to establish a small, highly capable CAE training group.

The second step was to define requirements and decide where to procure the training. Subject matter experts from the focus groups defined the audience, scope and duration of training for each software tool. Once requirements were established, the CAE training group investigated suppliers and made decisions about whether to buy or develop training. In general, they decided to develop training only for courses with large audiences or for proprietary applications.

THE RESULTS:
The initial training portfolio of nine CAE courses in 1993 has grown steadily. Beginning in 2001, over 2000 “designing engineers” have been trained in the mainstream CAE software, which is used for first-order analysis of mechanical part designs. For more detailed analysis, over 150 courses in 35 advanced CAE tools are currently offered. During the past three years 11,000 student-days of CAE training were completed.

Ultimately, the effectiveness of a training program is measured by performance improvement. During the growth of CAE based design, productivity in Product Development more than doubled, and the calendar time required to design a vehicle was cut in half. CAE has been an essential enabler for these improvements.

The use of CAE tools continues to grow with no end in sight. Although much has been accomplished in the fifteen years since the idea was proposed, the full potential of CAE has not been realized. GM is still committed to increase the use of CAE methods in an ongoing effort to reduce the time and cost of designing new vehicles while improving the qualities that customers value.
THE ORGANIZATION:
Lawrence Livermore National Laboratory in Livermore, California is part of the National Nuclear Security Administration within the U.S. Department of Energy. LLNL has been managed since its inception in 1952 by the University of California. The laboratory’s mission is to meet America’s national security needs through advances in science and technology. LLNL has more than 8,000 employees and the education demographics of the scientists and engineers at LLNL differ significantly from the national norms. According to a National Science Foundation study in 1999, approximately 41 percent of the scientific/engineering workforce holds advanced degrees. At LLNL, that percentage is 75 percent.

ASSESSING THE SKILLS GAP:
Hiring, retaining, and developing a workforce that includes a high proportion of top level engineers, scientists, and computer scientists is a mission-critical activity for LLNL. From the beginning, the Laboratory has had to compete with cash-rich private employers for workers with advanced skills, but even more significant is the need for constant skill growth and development. In scientific and engineering communities, where the bar can be raised overnight, ongoing opportunities to learn cease to be a nice-to-have perk and become a necessary-to-survive strategy. “We talk a lot about technical agility here, and what that means is you have to move fast just to stay where you are,” said Anne Khoury, Division Leader, Employee and Organization Development for LLNL.

THE STRATEGY:
Starting in the 1970s, LLNL forged relationships with the University of California at Davis and Stanford University to use a microwave link to offer master’s and doctoral courses on-site to engineers and computer scientists employed at the Laboratory. The goal was to provide employees with an opportunity to advance their education while doing study and research relevant to their work at the Lab. Before long, however, the availability of the courses also became an important recruitment tool. The type of people who qualified for employment at LLNL were drawn by the opportunity to earn advanced degrees. Also, the Laboratory benefited in two additional ways: first, by being able to grow the skills that were needed rather than going through expensive recruiting initiatives; and second, by avoiding the long acclimation process associated with bringing workers into a highly specialized environment.

THE RESULTS:
Since the instructional television program with the University of California Davis (U.C. Davis) was launched in 1971, 125 engineers and scientists have earned degrees. Stanford has awarded master’s degrees to nearly 20 LLNL employees through the Stanford Instructional Television Network.

According to Jeff Williams, Senior Staff Engineer, obtaining advanced degrees at LLNL serves two purposes. For employees, it provides a competitive advantage, given that 25 percent of the scientists and engineers have master’s degrees and an even larger 50 percent have doctorates. These statistics differ significantly from U.S. norms, characterized by 56 percent of the employed scientists and engineers having undergraduate degrees, 27 percent having graduate degrees, and only 14 percent having doctorate degrees.

For the Lab, advanced degrees increase the technical contribution of employees. The advanced degrees are not valued by themselves, according to Williams, but they lead to more sophisticated technical contributions, a requirement in a premier research and development organization such as LLNL. Additionally, approximately 85 percent of the degree recipient alumni pool have been promoted or had some other major career advancement.

Degree completion, according to Education Programs Leader Kathy Zobel, has proven to be a critical tool for employee retention. In the most recent look at the program’s impact, employees were tracked for seven years. The attrition rate for all degreeed employees after seven years averaged 3.7 percent per year, ranging from a high of 4.2 percent at the undergraduate level to 2.8 percent at the PhD level. By comparison, attrition among employees who began and completed degrees at U.C. Davis and Stanford during the seven years averaged just 0.2 percent; with the high of 0.3 percent at the graduate level and 0.1 percent at the PhD level.

As evidence of the value of the courses for LLNL’s recruiting, Zobel cited the example of an employee who received offers from every firm where he was interviewed, including IBM, Intel, Lockheed Martin, and others. After choosing to work at LLNL because of his interest in pursuing an advanced degree, he received his master’s there and is now studying for his doctorate.

“He might have made a lot more working somewhere else, but the educational opportunity here has become a real enticement—not just for that one employee, but for others as well,” Zobel said.
THE ORGANIZATION:
The Social Security Administration (SSA) Office of Systems (OS) employs more than 3,200 Information Technology (IT) professionals skilled in a wide variety of specialties. These professionals work across seven Associate Commissioner-level offices that cover the areas of supplemental security income, retirement, survivors, and disability insurance systems, earnings and enumeration systems, architecture and enterprise support, electronic services, and telecommunications and systems operations.

As Social Security has automated processes and improved efficiencies during the last four years, the OS hired approximately 1,100 new IT professionals and managers to serve the changing systems needs of the growing agency. Complicating the staffing challenge was a large wave of looming retirements of managers and IT workers with specialized programming knowledge. OS leaders knew that it was critical to attract and retain skilled talent to stay ahead of technological advances and the agency’s IT needs.

ASSESSING THE SKILLS GAP:
Since 2001, the OS workforce increased from 2,800 to almost 3,200 employees today, most of whom are IT specialists. By 2015, 51 percent of the OS workforce will be eligible to retire, and another 12 percent could exercise early retirement. With half of the OS workforce under age 50 and the other half over age 50, retiring IT workers with significant programmatic knowledge and technical expertise could leave. OS leaders knew that it was essential to upskill the current workforce and recruit new workers with the necessary technical expertise that is critical to maintaining the agency’s systems now and in the future.

While the staffing and retirement data speak volumes about the need to address the looming skills shortage in the OS, the entire agency is also following through on a mandate from the Office of Management and Budget (OMB) within the Executive Office of the President to assess workforce skills and competencies that are critical to accomplishing the agency’s mission and objectives. All federal agencies, including Social Security, must assess gaps in critical skills and develop a plan and schedule for closing those gaps. Agencies report progress to the Office of Personnel Management (OPM), which monitors human capital planning across the government.

THE STRATEGY:
During the initial assessment phase, OS leaders conducted research and benchmarking with other government agencies and held discussions with subject matter experts to understand best practices in undertaking a skills inventory. With more than 250 managers, OS leaders conducted a skills inventory to evaluate current skills and competencies for the OS workforce and determine what skills were needed in the next three years. Serving as a baseline benchmark, the skills inventory measured more than 200 skills and 90 competencies for each IT professional in the OS. The inventory quantified what OS leaders knew from anecdotal evidence: technical skills, management expertise, and programmatic knowledge were in short supply.

By comparing baseline data from the inventory with the skills and competencies identified as critical in the next three years, OS leaders identified the 10 largest gaps. While they initially focused on the largest gaps, OS leaders were careful to look at all gaps from top to bottom as the need for certain skills and competencies may change over time. OS leaders set into motion an organization-wide plan involving training, recruitment/staffing, and retention. Working closely with managers, the training staff conducted assessments and created learning strategies to address the largest gaps. And, as managers hired new employees or replaced those who had left, they evaluated what types of skills and competencies were lacking and actively recruited new hires with those skills.

In addition to the skills inventory, the OS created a long-term process to strategically manage human capital. This process, including the steps of targeting, assessing, planning, executing, and monitoring, provides an opportunity for the OS to proactively address skills shortages and demographic changes in the workforce before significant gaps in skills and competencies occur.

THE RESULTS:
The OS compares data from year to year to understand if the organization is making progress on closing skills gaps. Between 2003 and 2005, OS data revealed a 46 percent decrease in the gap of critical skills and competencies. The OS is making significant progress in narrowing the gap between the skills that are leaving (through attrition and retirements) and recruiting individuals into positions with the necessary skills and competencies. The overall retention rate for the OS has increased from 77 percent in 2003 to 91 percent in 2006.

In addition to its progress in narrowing skills gaps, recruiting skilled talent, and retaining knowledgeable IT workers, the OS set up a Human Capital Steering Committee in which managers from the seven OS offices and key departments work together to ensure that ongoing processes are in place to address current and future skills gaps. This oversight and governance by the committee ensures that the OS will have the right individuals with the right skills to carry out jobs when they need to be done.
THE ORGANIZATION:
The University Health System (UHS) in San Antonio, Texas includes University Hospital, a 604-bed acute care hospital, and the primary teaching facility for The University of Texas Health Science Center, as well as neighborhood and outpatient clinics. The system has 4,500 employees.

ASSESSING THE SKILLS GAP:
In a reflection of an industry-wide problem confronting the health care field, San Antonio hospitals have been experiencing acute workforce shortages among nurses and the allied health professions. UHS alone was experiencing a vacancy rate among registered nurses (RNs) of 22 percent in 2001, threatening patient care and requiring the UHS emergency center to close its doors to some trauma patients. Across the city, hospitals were reporting 800 RN vacancies. Among the problems causing the gap: significant numbers of today’s nurses are approaching retirement; qualified applicants to nursing and allied health instructional programs are in short supply; and, experienced adult workers who might be interested in a career switch to nursing face job and family pressures that make it impossible to attend college full-time. Compounding these problems is a shortage of faculty members to train nurses. With many faculty retiring, new nurses have not been taking their place because they can earn more in staff nursing positions.

THE STRATEGY:
Realizing there is no single magic bullet to address the shortage of nurses, UHS joined in a wide-ranging partnership with other health care facilities, educational institutions, and government workforce development entities to convene a healthcare summit in 2001. Among the outcomes of the summit: UHS forged partnerships with three local schools of nursing to certify UHS nursing staff as adjunct faculty members and to create “extension campuses” at the hospital.

UHS also adopted what the system’s administrative director, Jacque Burandt, called a “grow your own” strategy to providing nursing instruction to workers in non-nursing jobs. Through the Certified Nursing Assistant (CNA) program, UHS enabled environmental service and food service workers, as well as other incumbent employees, to obtain clinical experience and mentoring as nursing aides as a first step toward obtaining nursing scholarships and careers.

“In the past, there has been a huge hole in the pipeline of new nurses because people could not get the clinical experience they needed without leaving their jobs and going to the community college to start their training,” said Burandt. With funding from state and local workforce development initiatives, the CNA program offered workers the flexibility and the support they needed to bridge the gap.

THE RESULTS:
Through its partnerships with local nursing schools to add faculty and create extension campuses at the hospital, UHS was able to create and fill more than 70 new nursing student slots, an increase of 25 percent. In addition, more than 25 UHS staff had completed the CNA program as of early 2006. At UHS, the success of these and other efforts could be seen in a huge reduction in the vacancy rate for RNs to just two or three percent.

“We’re making it more convenient for people to get the instruction they need,” said Burandt. She added that a key factor in UHS’s success has been a stepped approach to instruction, with each new step leading to a certification and enhanced job prospects.
THE ORGANIZATION:
BD, a leading global medical technology company that makes and sells medical devices, instrumented systems and reagents, is dedicated to improving people’s health throughout the world. BD is focused on improving drug therapy, enhancing the quality and speed of diagnosing infectious diseases, and advancing research and discovery of new drugs and vaccines. The company’s capabilities are instrumental in combating many of the world’s most pressing diseases. Founded in 1897 and headquartered in Franklin Lakes, New Jersey, BD employs more than 25,000 people in approximately 50 countries throughout the world. The company serves healthcare institutions, life science researchers, clinical laboratories, industry, and the general public.

ASSESSING THE SKILLS GAP:
More than five years ago, BD established a three-part strategy for growth: driving revenue growth through innovation, expanding margins by improving operating effectiveness, and strengthening organizational and associate capabilities. Within this strategy are initiatives to develop new, innovative products; enhance process improvements; and achieve productivity efficiencies. Because manufacturing is a central part of the organization and an integral part of growing the organization, it was important to examine the leadership and management capabilities of plant leaders at BD’s 52 manufacturing sites worldwide.

Johnathan Macy, VP of Global Manufacturing, notes that as manufacturing operations leaders looked ahead five years, they focused on how the plants and plant leaders must perform to support business goals. He describes the process for skills and competency assessment as going from an “as is” (the current state) to a “to be” state (the future) along a value stream…everything in the continuum from order receipt to order fulfillment. Macy explains that BD had a solid understanding of the capabilities of plant leaders; a more formal assessment quantified competency levels and helped the organization better assess those leaders’ competencies in the “as is” state and determine what it would take to help them move toward the “to be” state, or the future direction of the company. “The role of [manufacturing] operations is to help site leaders develop their capabilities so they can execute to business strategies,” Macy notes.

THE STRATEGY:
Through facilitated discussion with BD Manufacturing managers and manufacturing site leaders, the group identified 36 competencies—a blend of operational and general leadership—that manufacturing plant leaders and their site managers must have to be successful. Such competencies include: “goes from idea to action quickly and strategically,” “leads change well,” “understands and integrates stakeholder, customer, and plant needs into aligned initiatives with actionable plans,” and so forth. Using a four-box model with team readiness along one axis and individual credibility and results record along the other axis, plant leaders can rate their own competencies, and together with BD manufacturing operations leadership, identify gaps and areas for improvement.

This diagram (above) shows plant leader competencies as circles plotted in the four-box model. The goal for plant leaders is to develop their competencies and move them to the “high-high” quadrant, or the to-be state.
THE RESULTS:
BD measures results of the manufacturing plant leader competency model in several ways. Specifically, plant managers are measured on their progress on the four-box model (how the circles in the competency grid are moving to the high-high quadrant). The diagram below shows the results of the effort after one year, and the incremental positive change in plant manager competencies as they move toward the high-high quadrant. The change in plant manager competencies is directly linked to BD’s focus on addressing critical competencies in priority order, and measuring the results of those efforts at specific points in time.

Using something BD calls “Engine Calibration Tool,” manufacturing operations leaders are able to measure the amount of organizational change taking place as plant leaders build their capabilities. The Engine Calibration Tool measures the organizational change associated with the overall manufacturing strategy, and is an outcome of the site leadership capability associated with implementing the strategy.

Additional measures include the connection between individual and company performance, and organizational change. Through this program, BD measures performance at the following levels: individual capability, plant leader competency, overall plant performance, and organizational change. The outcome from these areas is part of the organization’s core performance metrics. For example, overall plant performance is measured by a site’s contribution to a business’s profit and loss, which is tracked through cumulative profit and loss impact.
THE ORGANIZATION:
The Computing Technology Industry Association (CompTIA) represents the business interests of the information technology (IT) industry. For 24 years CompTIA has provided research, networking, and partnering opportunities to its 20,000 member organizations in more than 100 countries worldwide. CompTIA initiatives extend to areas such as convergence technologies, electronic commerce, information security, IT services, public policy, skills development, and software. CompTIA helps organizations maximize the benefits they receive from their investments in technology, and assists IT workers to obtain the skills they need for productive careers in technology.

ASSESSING THE SKILLS GAP:
The U.S. Bureau of Labor Statistics estimates that demand for IT professionals will grow by nearly 50 percent by 2012, with more than 1.5 million new computer and IT-related job openings. But the U.S. will have only half that many qualified graduates due to the declining number of students enrolling in math and science courses. In May 2006, the Government Accountability Office released a study which found that the proportion of post-secondary students obtaining degrees in science, technology, engineering, and mathematics (STEM) has fallen significantly. In 1994 and 1995, 32 percent of post-secondary students obtained degrees in STEM fields. The percentage fell to 27 percent in 2003 and 2004.

The IT industry is constantly developing and introducing new products and technologies to the market. These technologies require existing workers to continuously upgrade their skills and require new workers to seek out training to keep up with new technologies. Technology is a driving force for our global economy and IT skills are critical to the competitiveness of every industry. Thus, the IT skills gap is an issue that crosses borders, industries, and markets. Specific issues that contribute to the skills gap include the following:

- Government regulation such as FISMA (Federal Information Security Management Act), HIPAA (Health Insurance Portability and Accountability Act), and Sarbanes-Oxley, which encourage proof of secure, reliable, private IT systems and support staff
- Reduced numbers of students and younger workers pursuing IT careers
- The need for information security specialists
- Growth of new technology adoption including wireless networks; data, voice and video convergence; home media networks; and radio frequency identification
- Academia’s need for improved IT skills training and testing

STRATEGIES:
CompTIA’s vendor-neutral, foundational IT certifications were demanded by the industry to provide a benchmark, and created to provide individuals with broad-based knowledge and skills for a number of technologies including hardware, networking, security, and RFID (Radio Frequency Identification). IT certification, based on carefully researched skill and knowledge objectives and standards, remains a key solution to IT training and testing programs worldwide. Certification programs rely on ongoing job task analysis and regular analysis of new technology.

CompTIA added the CompTIA Tech Career Compass, which connects skill standards, certifications, training, and job role titles to enable all IT skill stakeholders—IT professionals, hiring managers, and curriculum and training developers—to better understand what is required to attain common IT skill standards and provide an IT career roadmap in this new and evolving industry. Community colleges now utilize this comprehensive Information and Communication Technology (ICT) free career guidance web tool to develop curriculum, and HR managers use it to write job descriptions, identify ICT job roles, and assess workers.

Other strategies to close the IT skills gap include:

- Electronic validation of skills directly from the certification provider’s database enables employers to better mandate IT certification and training programs for staff and partners. It also helps to point new entrants in the IT field toward training and testing that help them find jobs. For academia, documented proof of testing and certification help to enable the transfer of college credit.
- Career awareness campaigns and targeted efforts at the secondary and post-secondary academic markets to facilitate training and certification.
- New workforce initiatives under the banner of the CompTIA Educational Foundation are helping individuals from under-represented populations to overcome barriers to employment and achieve successful, long-term IT careers.
• Customized training and testing models to deliver precisely what new job roles require, enabling IT certification providers to select existing objectives from a wide range of certifications and standards. As IT certification providers recognize each other’s programs, optimal skill and knowledge paths can exist.

RESULTS:
The number of individuals holding CompTIA certifications is approaching 900,000. In the last year alone, approximately 40,000 IT professionals achieved CompTIA A+ certification. CompTIA A+ is recognized throughout the IT industry as the standard in foundation-level, vendor-neutral certification for computer service technicians. About 25,000 people earned CompTIA Network+ certification, which validates technical ability and skill in the networking environment in use today and planned for tomorrow. Ten thousand individuals received CompTIA Security+ certification, a widely accepted credential that validates mastery of critical practices for communications security, infrastructure security, cryptography, and operational and organizational security.

CompTIA surveyed IT managers with responsibilities for various IT programs, including help-desk, field service, and network management and administration to determine the impact of professional certifications on their organization’s employment practices, employee retention, business development, operational efficiency, and other factors.

The managers offered strong evidence that professional certifications of IT skills helped manage networks and help desk operations more efficiently and reduced turnover among staff with network management responsibility. Reduced turnover leads both directly and indirectly to reduced costs and greater productivity.

Organizations with a high percentage of certified staff reported fewer occurrences of network downtime than those with a low percentage of certified staff. Certified staffers are also able to manage larger, more complex networks more efficiently. The survey also explored the impact of certification on help desk productivity. Responses from IT managers who oversee help desk and field support indicate that certification can improve productivity and reduce turnover.
An organization’s efforts and investments to train employees so they are fully engaged and properly developed to execute the organization’s strategies and opportunities for growth.


As defined in the ASTD online poll on talent management, (2006, April).


Additional Resources

ACT–www.act.org

American Society for Training & Development (ASTD) –www.astd.org

The Aspen Institute–www.aspeninstitute.org

The Computing Technology Industry Association (CompTIA)–www.comptia.org

The Council for Adult and Experiential Learning (CAEL) –www.cael.org

Council on Competitiveness–www.compete.org

Digital Promise (DP)–www.digitalpromise.org


National Association of Manufacturers–www.nam.org

National Center on Education and the Economy (NCEE) –www.ncee.org

National Science Foundation–www.nsf.gov


U.S. Chamber of Commerce–www.uschamber.org
