EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS

PREPARING THE WORKERS OF TODAY FOR THE JOBS OF TOMORROW

JULY 2009

EXECUTIVE SUMMARY

In this report, the President's Council of Economic Advisers (CEA) presents a projection of potential developments in the U.S. labor market over the next five to ten years and discusses the preparations necessary to develop the 21st century workforce. We discuss the skills that will likely be most relevant in growing occupations, the value and limitations of our current post-high school education and training systems, and the characteristics of a more effective education and training structure.

At an aggregate level, the data indicate that the economy of 2016 will resemble the economy of 2008, with several important shifts that have implications for employment.

- **Health care is forecasted to remain a large source of job growth in the labor market.** The long-term trend toward more employment in health care is expected to continue, with many health care occupations, including medical records and health information technicians, registered nurses, clinical laboratory technicians, and physical therapists, expected to grow.

- **The decades-long decline in the share of workers that are employed in manufacturing is expected to moderate**. Some industries within manufacturing – such as aerospace and pharmaceuticals – are projected to create many jobs.

- **The construction industry is projected to eventually recover and add jobs in the coming decade.** This rebuilding would generate a demand for skilled workers such as electricians and plumbers.

Well-trained and highly-skilled workers will be best positioned to secure high-wage jobs, thereby fueling American prosperity. Occupations requiring higher educational attainment are projected to grow much faster than those with lower education requirements, with the fastest growth among occupations that require an associate's degree or a post-secondary vocational award. Key attributes of a well-trained workforce as well as elements of an effective education and training system are detailed below.

- **Employers value workers who can think critically and solve problems.** Many highly-paid occupations require workers with good analytic and interactive skills.

- **Occupations that employ large shares of workers with post-secondary education and training are growing faster than others.** While expected growth in construction and some manufacturing industries would create job opportunities at all skill levels, workers will be better positioned for good jobs if they acquire additional training and education. Occupations that have grown recently require more formal post-secondary schooling than occupations that have declined.

- **The U.S. post-high school education and training system provides valuable skills to those who complete programs in high-growth fields.** However, it could be more effective at encouraging completion and responding to the needs of the labor market.

- **Elements of a more effective system include:** a solid early childhood, elementary, and secondary system that ensures students have strong basic skills; institutions and programs that have goals that are aligned and curricula that are cumulative; close collaboration between training providers and employers to ensure that curricula are aligned with workforce needs; flexible scheduling, appropriate curricula, and financial aid designed to meet the needs of students; incentives for institutions and programs to continually improve and innovate; and accountability for results.

Worker flexibility is key given the dynamic nature of the U.S. labor market and ongoing technological change. In 2003, for example, a quarter of American workers were in jobs that were not even listed among the Census Bureau's Occupation codes in 1967, and technological change has only accelerated since then. Environmental-related occupations – which are expected to experience tremendous growth over the next decade – did not exist in comparable data prior to 2000. As we build a new foundation for economic growth in the 21st century, the nation's workers will be better prepared for ever-changing opportunities if they have strong analytical and interpersonal skills. High-quality education and training is the best way to prepare the workers of today for the jobs of tomorrow.

I. INTRODUCTION

The 20th century saw rapid technological change that enhanced productivity, created new industries, and increased demand for skilled labor.[1] The core of our economy shifted first from agriculture to manufacturing and then from manufacturing to services.[2] In recent decades, increasing specialization and trade have blurred the lines between the domestic and global economies. In many industries, globalization has increased competition for jobs as workers around the world participate in the constant flow of goods, services and information. But it has also created opportunities for highly skilled workers, who now enjoy a broader markets for their output. Throughout the course of these fundamental changes, America's workers have adapted and provided the skills and ingenuity that fueled a growing economy.

Testing the resilience of the U.S. workforce, however, our economy slid into a recession beginning in December 2007 that has proven to be the worst downturn in the United States since the Great Depression. Already, 6.5 million jobs have been lost, and more losses are expected before the economy reaches bottom and employment growth returns. The recession has accelerated the decline of already-contracting industries, such as auto manufacturing, and has led to an extraordinary decline in the financial services industry that few anticipated even 18 months ago. We must therefore improve training and job search assistance policies to facilitate not just re-entry into the labor market for the unemployed, but also entry into jobs that take advantage of growth opportunities.

This report examines the sectors that are expected to grow and develop over the next several years. The American Recovery and Reinvestment Act (ARRA) will create new opportunities in already-expanding industries such as health care and education, and also will create new opportunities in fledgling industries, such as renewable energy production and distribution.

Employers demand workers who can think critically and solve problems. As a result, future prosperity will require greater worker investment in post-secondary education and training. The current U.S. education and training system offers a variety of ways in which workers can obtain the skills valued by employers. Many of the existing programs, particularly those in fields related to high-growth industries and occupations, have been shown to lead to improved employment and earnings outcomes.

However, there remain important limitations to our education and training system, many stemming from low completion rates, limited accountability, poor coordination among different programs and excessive bureaucratic restrictions on the use of training funds. The report concludes with a discussion of the important elements of a well-functioning education and training system that should drive reform efforts.

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[1] Goldin and Katz (2008).
[2] Blinder (2006).

II. THE ECONOMICS OF RECOVERY AND THE RETURN TO STABLE GROWTH

Although many families may struggle over the coming months, history demonstrates that the U.S. economy is resilient and will recover from the current economic downturn. However, the growth path may not look the same as that envisioned before the recession.

In the near term, various factors should help to stem the downturn and eventually increase overall production and lead to employment growth. Most obviously, the ARRA provides $787 billion of fiscal stimulus spread primarily over the next two years. This fiscal stimulus takes a number of forms: tax cuts for working families and businesses; protection of the most vulnerable through programs such as extended unemployment compensation; direct government spending on infrastructure, energy efficiency projects, and other public investments; and fiscal relief for state governments to help maintain key services. Taken together, the various forms of fiscal stimulus are expected to provide powerful upward pressure on aggregate demand and to aid recovery.

The ARRA is projected to create or retain 3.5 million jobs as of the fourth quarter of 2010.[3] These jobs are projected to be in all major industries in the economy. The ARRA also spurs business investment, which is a key source of long-run growth, through loan guarantee programs and important support for new areas with excellent potential. Investments in renewable energy, the smart grid, and health information technology are projected to create many new job opportunities in a diverse set of industries spanning the service and manufacturing sectors.

Two other factors are likely to aid growth in the near term.[4] One is inventory investment. Throughout the current recession, businesses have reduced inventory investment substantially. Businesses have chosen to curtail production and run down existing stocks. This behavior has led to a situation where even just a return to normal behavior implies a substantial rise in inventory investment, and thus a powerful short-run impetus to growth. Renewed inventory investment should spur production and job creation throughout the economy.

The second factor that could provide near-term recovery is pent-up demand by consumers. The large declines in household wealth make it unlikely that consumers will return to their low-saving ways. But, it is possible that consumers will go through a period of somewhat-elevated consumption as they purchase some of the cars, appliances, and other goods they have put off buying since the recession began. This could provide a period of growth in the consumer-goods-producing sector of the economy and retail trade.

[3] This estimate is relative to employment that would have occurred without the ARRA. See Romer and Bernstein (2009).

[4] Romer (2009) discusses the likely growth pattern of the U.S. economy during the recovery and after the return to full employment.

Over the longer run, the U.S. economy is likely to see an important rebalancing of our spending and production. Higher household saving rates imply that eventually other types of spending will need to fill the breach in aggregate demand. The most likely candidates are net exports and business fixed investment.

For the past several years, low personal savings and substantial budget deficits have led to large inflows of foreign capital and large trade deficits. As we move to more sustainable levels of consumption and increased fiscal responsibility, capital inflows will naturally decline and the trade deficit will narrow. This rise in our net exports will likely stimulate the production of both manufactured goods and high-skilled services, such as accounting, law, and insurance, which the United States has typically exported.

Non-housing business fixed investment is also expected to be an important source of growth over the next decade. Higher private saving, lower budget deficits, and lower demand for new homes will all tend to put downward pressure on real interest rates, and so tend to increase business investment. The many investment opportunities in areas such as renewable energy, the smart grid, and energy-saving technologies will also promote higher investment.

In order to meet the increased demand for consumption of domestic goods and business investment goods, the decades-long trend of declining manufacturing employment will likely moderate. In addition, there will be new opportunities to expand exports in services.

III. JOBS OF THE FUTURE

The U.S. Department of Labor's Bureau of Labor Statistics (BLS) provides the most comprehensive job projections available. The BLS provides estimates for growth by industry and occupation, as well as detail on the education and training requirements for all occupations. However, the BLS projections were last published in 2007 and only incorporate information available through that year, before the current economic downturn and the enactment of the ARRA.[5]

To provide the most current information, we use a set of industry employment projections from the Interindustry Economic Research Foundation (IERF, or Inforum) to complement BLS projections of industry and occupation growth.[6] Inforum uses BLS employment data through

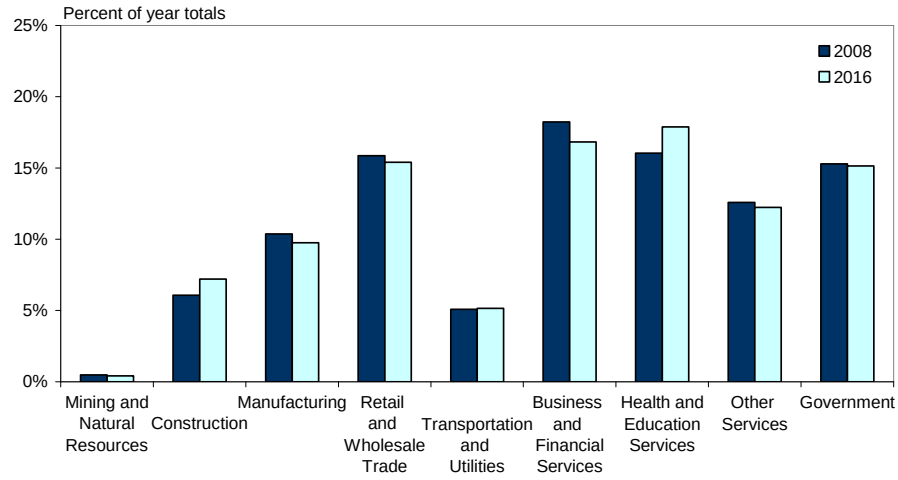
[5] The BLS is expected to update their projections using data through 2008 in December 2009. These projections will estimate job growth through 2018.

[6] Inforum, an economic forecasting and research group at the University of Maryland that has been in operation since 1967, employs interindustry-macroeconomic general equilibrium models to examine past employment trends and to forecast future employment across sectors of the economy. Their primary model, LIFT (Long-term Interindustry Forecasting Tool), uses a bottom-up approach to make such predictions, meaning that it uses component data within each of its defined industries to estimate future employment rather than starting with top-level macroeconomic indicators. In this regard, the model is well-suited to address the questions posed in this report, which focus on industry-level growth. The LIFT model aggregates the North American Industry Classification System (NAICS) industries into 97 industries that span the economy, and uses up-to-date data from the monthly BLS establishment survey, which allows the model to capture trends during the current recession, including the potential impacts of the ARRA.

2008 to project growth at the industry level. However, because the Inforum projections do not cover occupations, we supplement them with the less-current BLS occupation projections. At the industry level, the two sets of projections generally agree, though the difference in baselines (2006 for BLS and 2008 for Inforum) produces differences in predicted growth in some sectors.[7] Of course, neither BLS nor Inforum can anticipate every change that will occur. For example, the expansion of the internet to its current level was not fully anticipated in the early 1990s. Thus, all interpretation of future labor market changes should be considered with caution.

Figure 1 compares the distribution of workers across major industry groups in 2008 and 2016 using the Inforum projections. While there is some projected movement in a few industries, these forecasts suggest that the industrial composition of the U.S. economy in 2016 should strongly resemble that in 2008.

Figure 1: Projected Distribution of Workers Across Major Industries, 2008 and 2016



Source: CEA aggregations of Inforum LIFT Model Industry Projections.
Note: Totals do not include jobs in agriculture, forestry, and fisheries.

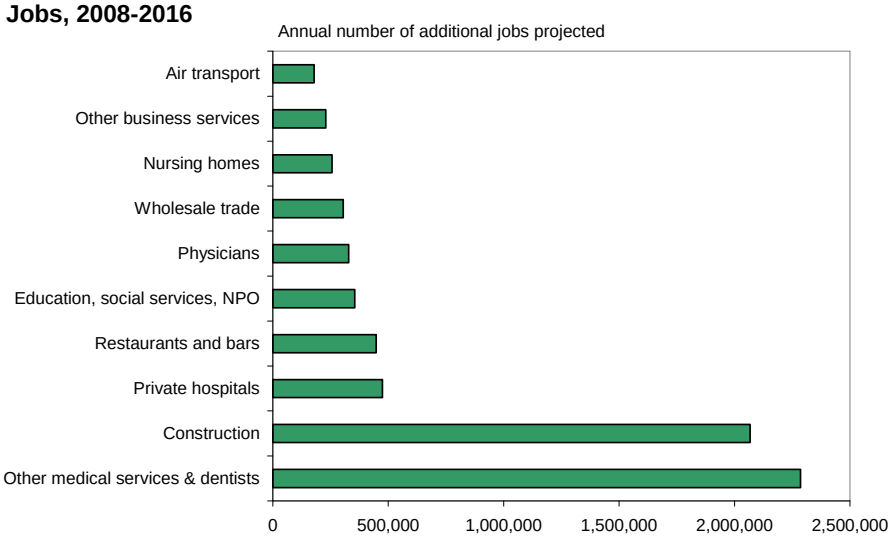
Some important changes are projected, however. For example, the health care and education industries are expected to contribute most substantially to job growth in the future. Retail trade is projected to contract somewhat in terms of employment share, partly because the growth in consumer spending is expected to slow going forward.

We next look within broad sectors to get a sense of particular, more narrowly-defined industries where job growth is expected. Using the Inforum projections, the private industries

[7] We focus on Inforum projections through 2016 to be consistent with BLS projections. The projections from Inforum through 2020 are broadly similar to those through 2016 in terms of industries expected to grow. Two aspects of the projections in Figure 1 reflect the influence of the recent recession and therefore differ from those published by the BLS. First, as a share of total employment, business and financial services are predicted to decline substantially from their pre-recession levels. Second, the construction industry's share of total employment is projected to grow, as employment in 2008 was much depressed relative to earlier years but is expected to recover. BLS projections from 2006 anticipated neither the decline in construction employment or the more recent collapse in the financial sector. As a consequence, while the BLS and Inforum projections generally agree about long-run trends, they diverge with respect to these two sectors.

that exhibit the largest net growth from 2008 to 2016 are depicted in Figure 2.[8] We exclude the government sector, which is not projected to grow notably in its share of overall employment. The subsectors depicted in Figure 2 are forecasted to account for 86% of job growth among all industries with positive job growth though 2016 and are key sources of job opportunities for new and incumbent workers.

Figure 2: Projected Employment Changes in Industries Adding the Most Jobs, 2008-2016



Source: Inforum LIFT Model Industry Projections. NPO are nonprofit organizations.

Health care dominates the list in Figure 2, with the subsectors of nursing homes, physician offices, and hospitals growing strongly. "Other medical services and dentists," which is a broad category including the ever-expanding home health care, outpatient care, and medical and diagnostic laboratories subsectors, is expected to add the most jobs.

But there are also non-health-care industries in the list, creating a broad set of opportunities for workers. Figure 2 shows strong growth in construction. This is a broad industry that includes the construction of manufacturing and retail buildings, roads and bridges, utility systems, and homes. The ARRA will contribute to construction employment growth in the next few years through direct investments and incentives for private investment in infrastructure, the construction of power and communication structures, and the weatherization of homes. Another area of growth is air transport. An important occupation in this industry is aircraft mechanic and service technician (see box on next page).[9]

[8] The specific industries that the BLS projects to add the most jobs are similar to those projected by Inforum. For example, the 10 industries with the greatest employment growth according to the BLS include food services and drinking places, office of health practitioners, construction, management, scientific, and technological consulting services, individual and family services, private hospitals, employment services, retail trade, residential care facilities and computer systems design and related services.

[9] Descriptions of occupations in the text boxes rely on information from the BLS *Occupational Outlook Handbook* (http://www.bls.gov/OCO/). For reference, the median earnings for all occupations in 2008 were $32,390.

While manufacturing overall is projected to continue to decline as a share of total employment, several manufacturing subsectors – such as aerospace and drugs, along with other similarly-advanced manufacturing industries – are anticipated to grow (but not enough to make the list in Figure 2). The jobs in these industries are varied. For example, the major occupations in aerospace include assemblers (aircraft structure, surfaces, rigging, and systems), service technicians, and mechanical drafters. Drug manufacturing jobs include packaging and filling machine operators, chemists, and medical scientists. Other areas of advanced manufacturing expected to grow will employ industrial machinery mechanics and mechanical drafters.

Job Spotlight: Aircraft Mechanics

2008 median earnings: $51,390

Within the air transport industry, *aircraft mechanics and service technicians* are responsible for keeping aircraft and equipment in working order. Engines, landing gear, avionic instruments, and accessories require constant inspection and maintenance. The work of such mechanics is fast-paced as flight schedules need to be maintained.

Aircraft mechanics usually must attend schools that are approved by the Federal Aviation Administration. Certified mechanics usually attend school for 18-24 months and are expected to demonstrate knowledge of the operation of aircrafts. The job outlook for the next decade is good, with thousands of new jobs being created.

IV. A Closer Look at Two Key Areas of Growth

We next turn to the BLS occupation projection data in order to provide more specifics about particular areas of high demand. These areas are sources of both near-term and future job growth. We begin with health care, which has continued to add jobs even during the recession. Investments in ARRA, especially in health information technology, will create additional opportunities for workers. We then discuss occupations associated with clean energy and the environment. The Occupation Information Network (O*Net) lists energy as a high-demand industry cluster.[10] Many occupations that are involved in the production and distribution of energy are also occupations BLS projects to grow quickly. Recent investments in the ARRA that focus on the production of renewable energy will likely only increase demand in this area.

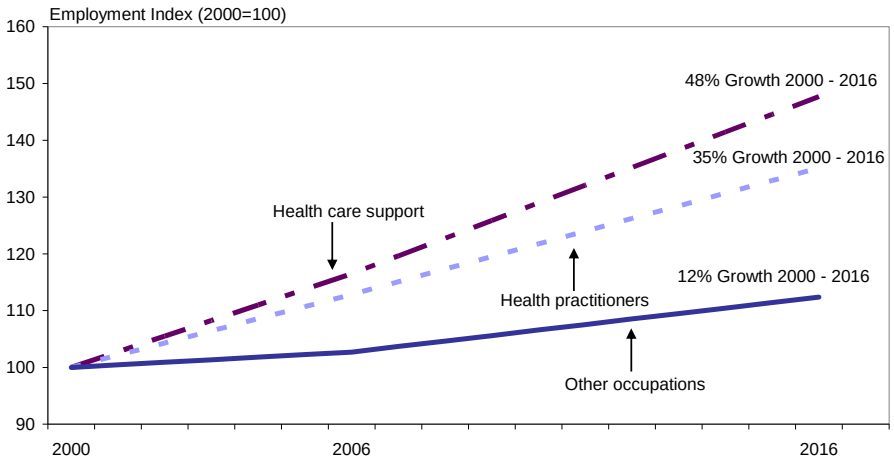
Health Care

Figure 3 uses BLS *Employment Projections* data to illustrate the rapid growth in health care employment from 2000 to 2006; the figure also shows that this trend is expected to continue and likely accelerate through 2016.[11] Health care practitioners and technicians, which include physicians, registered nurses, and other health professionals and technicians, are expected to be in increasing demand. Jobs for medical records and health information technicians (see box on next page) are also projected to increase. Investments in health information technology will only accelerate the growth in this occupation.

[10] See http://online.onetcenter.org for O*Net's complete list of high-growth industry clusters.

[11] We recognize that the recession and recovery will likely alter BLS projections, but we anticipate that the general trends in this section will continue, particularly for non-cyclical sectors like health care.

Figure 3: Actual and Projected Growth of Health-Related Occupations vs All Other Occupations, 2000-2016



Sources: "Occupational Employment Projections to 2010." Bureau of Labor Statistics. *Monthly Labor Review*. November 2001. "Occupational Employment Projections to 2016." Bureau of Labor Statistics. *Monthly Labor Review*. November 2007.

Jobs in health care support occupations, also shown in the chart, are projected to experience even faster growth. The increased demand in this area stems largely from an aging population that will require care at home, at nursing care facilities, and in inpatient and outpatient settings. Support occupations that will likely grow in importance are physical therapists, physical therapist assistants, medical social workers and home health care aides.

We emphasize that this expected growth in health care occupations does not account for comprehensive health care reform. Health care reform is expected to slow the growth rate of health spending as efficiency is improved. However, even with a slower growth rate of spending, the expected expansion of health coverage could lead to increased demand for workers – including physicians, non-physician clinicians, health care support workers and nurses – to cover the newly insured population.

Job Spotlight: Medical Records and Health Information Technicians

2008 median earnings: $30,610

Medical records and health information technicians assemble patients' health information, maintain records of observations, medical interventions, and treatment outcomes, and evaluate these records for completeness and accuracy.

With a growing number of tests, treatments, and procedures that will be increasingly scrutinized by health insurance companies, regulators, and consumers, significant job growth is expected in the coming years. Generally, medical records and health information technicians have an associate's degree.

A Clean Energy Future

Another set of occupations with strong growth potential are in fields related to clean energy production and environmental protection. There are growing opportunities in these fields, particularly for workers with technical skills.

For example, Figure 4 shows the past and future growth of environment-related occupations compared with all other occupations between 2000 and 2016. The environment-related jobs we consider are environmental engineering technicians (see box), environmental engineers, environmental scientists and specialists (including health), and environmental science and protection technicians (including health). Clearly, the U.S. labor market is already becoming increasingly "green" through the growth in these occupations. Jobs devoted to environmental improvement grew far faster than other occupations from 2000-2006 and the BLS projects fast relative growth through 2016.

Job Spotlight: Environmental Engineering Technicians

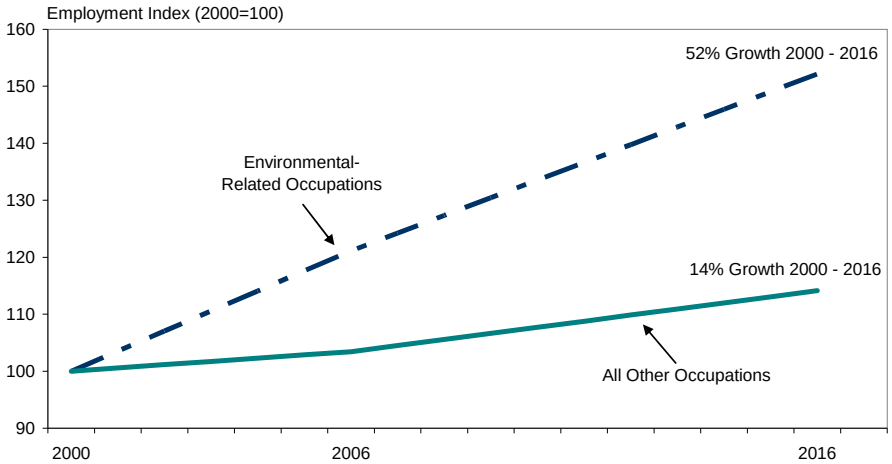
2008 median earnings: $41,100

Environmental engineering technicians test and operate equipment that is used in the control and remediation of environmental pollution. They work closely with engineers and scientists and are employed in a wide variety of industries, including architectural and engineering service firms, as well as technical consulting services.

The job of engineering technician typically requires completion of a two-year program at an accredited institution of higher education. Community colleges and technical institutes offer these programs. Among all engineering technicians, growth in environmental-related jobs is projected to be the fastest.

These environmental jobs account for only a small fraction of a growing list of occupations and industries that are becoming increasingly devoted to clean energy production, energy efficiency, and environmental protection. Investments in the ARRA will also help support jobs that will improve the energy efficiency of homes and buildings, adding to the already strong growth expected in construction. Investments in renewable energy will add employment to industries as diverse as wind turbine manufacturing and agriculture.[12] Distributing power through an updated, more efficient, system will require even more electrical power line installers and repairers (see box on next page), which was already a growing occupation according to the BLS projections.

Figure 4: Actual and Projected Growth of Environmental-Related Occupations vs All Other Occupations, 2000-2016



Sources: "Occupational Employment Projections to 2010." Bureau of Labor Statistics. *Monthly Labor Review.* November 2001. "Occupational Employment Projections to 2016." Bureau of Labor Statistics. *Monthly Labor Review*. November 2007.

[12] As with the ARRA investments overall, government spending through the ARRA that supports "green" initiatives should be viewed as a boost to an industry that was already growing. This growth was stalled by the recession but the ARRA is expected to move the industry back toward its pre-recession growth path.

Although it is currently hard to classify "green" jobs as they cross standard industry and occupation definitions, the BLS has begun to consider a new classification system to learn more about these jobs.[13] This will allow researchers to track changes in this rapidly evolving sector.

CEA analysis suggests that particular areas of "green" potential (e.g., wind and turbine manufacturing, mass transit, or producing energy-efficient automobiles) pay more on average than otherwise comparable jobs. They also are more likely to be held by primary earners in the household and to be unionized.[14]

Job Spotlight: Electrical Power Line Installers and Repairers

2008 median earnings: $55,100

Electrical power line installers and repairers work on the networks of wires and cables that carry electrical power from generating plants to customers. The occupation requires at least a high school diploma. To become proficient, line installers and repairers often complete several years of long-term on-the-job training, formal apprenticeships, and some classroom work. Other qualifications include basic knowledge of algebra and trigonometry, as well as good reading and writing skills. Physical fitness is also highly valued, as workers must be able to climb, lift heavy objects, and do other activities that require strength, stamina, and coordination, often while balanced on poles and towers.

V. SKILLS FOR GOOD JOBS

Of particular concern is the future of good jobs, those that pay high wages and provide a ticket to the middle class. In today's economy, these jobs disproportionately employ workers with education and training beyond the high school level. For example, most of the occupations highlighted in the previous section, such as aircraft mechanic and environmental engineering technician, offer wages that, on average, are well above the median in our economy, and require at least some post-secondary training.

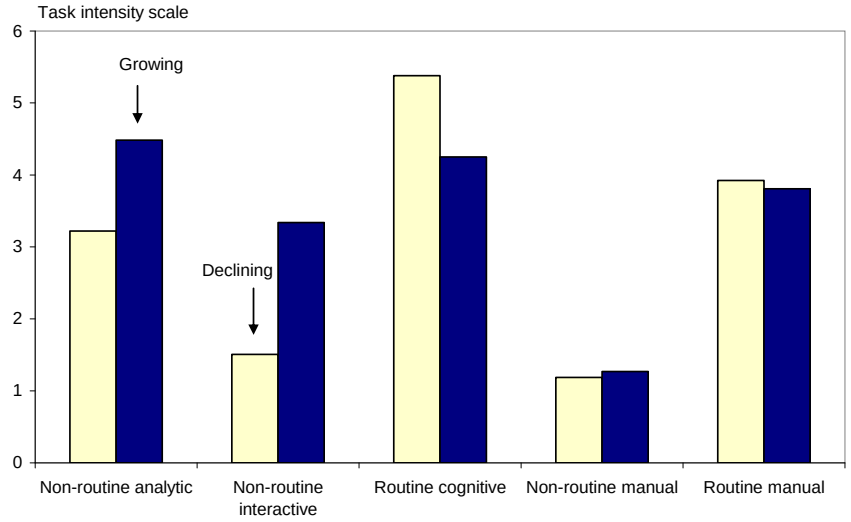
These educational requirements reflect a need for highly skilled workers who can perform complex, ever-changing tasks. Economists have classified the intensity of five types of tasks across occupations using the Dictionary of Occupational Titles (DOT).[15] The taxonomy gauges the degree to which each occupation uses non-routine analytic skills (such as mathematics, used by architects), non-routine interactive skills (directing and planning, used by school teachers), routine cognitive skills (adhering to strict limits or standards, used by machinists), non-routine manual skills (physical coordination, used by fire fighters), and routine manual skills (manipulating objects with fingers rapidly, used by tool and die makers).

The modern economy requires workers with higher skills than in the past. Figure 5 shows the skills taxonomy applied directly to occupations that have recently grown and declined in terms of shares of total employment.[16] Occupations that have grown require a greater intensity

[13] See http://www.dol.gov/dol/budget/2010/PDF/CBJ-2010-V3-01.pdf for a description.
[14] Middle Class Task Force (2009).
[15] Autor, Levy, and Murnane (2003).
[16] Specifically, we used data on task intensity that are publicly available from Autor, Levy, and Murnane (2003) via the first author's web site (http://econ-www.mit.edu/faculty/dautor/data/autlevmurn03). These data include each occupation's skill intensity (one average for each of the five tasks). We assign each worker in the March *Current Population Survey* (CPS) from 1992 – 2002 a skill level for each of the five tasks based on the longest occupation he or she held in the previous year. From 1992-2002, a consistently-measured set of occupations and industry definitions were used in the CPS, thus allowing for consistent comparisons across occupations that are growing and

of non-routine analytic and interactive tasks, such as frequent use of mathematics and high executive functioning, than do occupations that have been in decline, which are more reliant on manual and routine tasks. This is also reflected in industrial shifts: physicists and registered nurses are prevalent in the fast-growing higher education, science, and health care industries, while textile workers are in declining industries. Food technologists and elementary school teachers are part of quickly-growing industries, while tool grinders and sharpeners are in those in decline. Thus, while many good, middle-class jobs in the past required only proficiency in well-defined tasks – e.g., operating a rotary drill – the U.S. labor market has been moving toward jobs that require skills that enable workers to flexibly complete tasks that are uncertain and interactive.

Figure 5: Task Intensity of Declining vs Growing Occupations, 1992 - 2002



Source: CEA calculations using data on task intensity from Autor, Levy, and Murnane (2003) and CPS data.

Although "interactive" skills, such as effective communication and the ability to work well with others, have not traditionally been studied, nor perhaps valued, by educators, there is growing awareness of their importance for adult success. Researchers have highlighted the growing importance of "non-cognitive" skills in the labor market and argue that a range of behaviors that reflect "greater student self-awareness, self-monitoring, and self-control" are key indicators that students are able to effectively learn and succeed in a modern post-secondary environment.[17]

These results match employer reports as well. In 2006, The Conference Board released the results of a survey of over 400 employers concerning the readiness of new entrants into the labor force.[18] Employers noted that professionalism/work ethic, teamwork/collaboration, oral

declining. A growing occupation is one with a positive annual average growth rate in share of total employment (with total employment measured by all individuals reporting an occupation held in the previous year). Declining industries are the remainder.

[17] See, for example, Heckman, Stixrud, and Urzua (2006) and Roderick, Nagaoka, and Coca (2009).

[18] The Conference Board (2006).

communication, and critical thinking/problem solving are among the most important skills labor market entrants need.

Importantly, post-secondary education and training can provide the cognitive and interactive skills required for good, high-paid, jobs. Analysis of data from the *Current Population Survey* (CPS) indicates that occupations with a high intensity of analytic and interactive skills tend to have large shares of workers with post-secondary education.[19] Moreover, occupations with a high concentration of college-educated workers have been growing much faster than others.

This analysis is consistent with another set of results from the employer survey conducted by The Conference Board. Respondents noted that graduates from two- and four-year college programs were on average better prepared to meet the challenges of the labor market than high school graduates. Specifically, those with only a high school degree were reported to be deficient in professionalism/work ethic and critical thinking/problem solving.[20]

The Conference Board also found that their survey respondents believed most recent high school graduates lacked the basic skills of reading, writing, and math that were deemed necessary by employers. Among these basic skills, employers deemed this group to be most deficient in writing. Employers judged nearly three-quarters of high school graduates as unable to write at a basic level, for which competency includes knowledge of both spelling and grammar. These rudimentary skills, combined with the applied skills of problem solving and interacting with others, are critical for workers in the current labor market according to Donna Klein, President and CEO of Corporate Voices for Working Families (a sponsor of The Conference Board Report).[21] One member of the President's Economic Recovery Advisory Board (PERAB) echoes this view in reporting that one-half of the job applicants to his large company cannot do basic 8th grade math. Other members of the PERAB report that many workers do not possess the basic reading and math skills necessary for even entry-level work.[22]

The occupational demands of the future are expected to require skills obtained through post-secondary education and training. Figure 6 shows that occupations requiring higher educational attainment are projected (using the BLS forecasts) to grow much faster than those

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[19] We obtain this result by pooling occupation means of education (share with some college or more and share with a bachelor's degree or more), age, union status, metropolitan status, and proportion female for the longest jobs held in the previous year by respondents in the 1992 – 2002 March CPS samples. We merge these to the Autor, Levy, and Murnane (2003) skill intensity levels for each occupation. We then regress each skill intensity individually on the education measure(s) and the other control variables. We include first the share with some college alone as the sole education indicator. We then include share with bachelor's degree or greater as an additional control. The result of a strong positive relationship between analytic skills and share with some college education, as well between interactive skills and share with some college education holds even when the share in the occupation with a bachelor's degree is held constant.

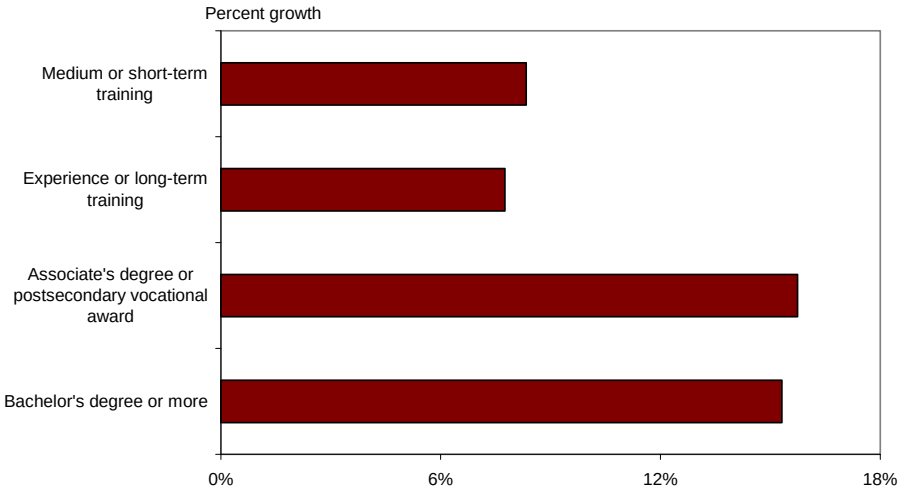
[20] The Conference Board (2006).

[21] See http://www.21stcenturyskills.org/index.php?option=com_content&task=view&id=250&Itemid=64.

[22] The President's Economic Recovery Advisory Board (PERAB) is comprised of business, labor and academic leaders and provides the President with non-governmental insight to enhance the nation's economic strength and competitiveness. Given the importance of a skilled workforce to American businesses, the PERAB has begun an examination of the training needs of the American workforce.

with lower education requirements. The categories with some education required beyond high school are growing faster than those not requiring post-secondary schooling. The growth is not solely among occupations requiring bachelor's degrees; occupations that require only an associate's degree or a post-secondary vocational award are actually projected to grow slightly *faster* than occupations requiring a bachelor's degree or more.

Figure 6: Projected Employment Growth from 2006-2016 by Occupation's Education or Training Requirement



Source: BLS Occupational Employment Projections, press release (Table 9).

VI. Evidence on the Effectiveness of the Major Components of the Current U.S. Post-High School System

The previous section indicates that skills obtained after high school are central to workforce preparedness. The U.S. system of post-high school education and training has a diversity of options to obtain these skills, including four-year colleges, community colleges, private two-year colleges, public and private vocational-technical institutions, community-based organizations, and formal apprenticeship programs. These options provide flexibility, allowing those who seek to prepare for academic degrees the foundation to do so while also allowing those adults who need it to improve their basic skills and complete a post-secondary certificate or degree. It also has options for those workers seeking to upgrade their skills or retool mid-career.

While the current system offers many education and training options, important questions to ask are whether participants benefit and whether there are ways in which the system can be improved. This section of the paper reviews the evidence on the effectiveness of the current post-secondary system with the first question in mind. In the next section, we discuss important avenues for future improvement.

Evidence on Effectiveness

In many respects, we know by the "market test" that individuals acquire valuable skills through the current U.S. system of education and training: employers are willing to pay more for

workers with more education. Over the past two decades economists have carefully documented that individuals earn about 10% more for each additional year of schooling they complete.[23] While it is widely known that there is a positive gain to attending a four-year college, it is less well known that other forms of post-secondary schooling provide similar returns.[24] For this reason, this section focuses on the effectiveness of education and training delivered outside of the four-year college setting. [25]

Community Colleges

Approximately 35% of college students, 35% of individuals receiving job training through the Workforce Investment Act (WIA), and a notable proportion of adults attending adult basic education (ABE), General Education Development (GED), and English as a Second Language (ESL) classes are enrolled in a community college.[26] Researchers have estimated that attending a community college significantly increases earnings, regardless of whether an individual completes a degree.[27]

However not all of the degrees and certificates awarded by community colleges – ranging from engineering technician or nursing assistant to bricklayer or automotive mechanic – have the same value.[28] Rather, research suggests that the most valuable credentials are those in quantitatively-oriented fields or high-growth/high-need occupations such as health care.[29] Similarly, evidence from Washington State suggests that displaced workers who attend a community college substantially increase their long-term earnings compared to those who do not. Again, the benefits are greatest for academic courses in math and science as well as courses related to the health professions and other technical fields.[30] These findings point to a powerful role for

The Community College: The Quintessentially American Institution

Community colleges serve many students who otherwise would not have a place in higher education. Traditionally "open door" institutions (typically any one with a high school degree or who demonstrates "an ability to benefit" can attend), community colleges serve traditional-college-aged individuals who aspire to a bachelor's degree but may not be prepared for a four-year college or find the lower cost attractive; those who aspire to receive a two-year associate's degree, or a certificate; and those who want to take only a class or two. They provide "option value" for students who are not sure they are college material but would like a low-cost opportunity to "try it out." And, they serve as an important educational option for the growing numbers of older and "non-traditional" students.

In fulfilling these myriad of roles, community colleges are both part of the "formal" higher education system as well as part of the workforce development system (i.e., "job training"). Further, over 79% offer contract training in which they work directly with the public sector, employers and other clients (such as prisons) to develop and provide training for specific occupations or purposes (GAO, 2004). In many respects community colleges are the epicenter of the U.S. post-high school education and training system.

[23] Ashenfelter and Rouse (1999), Heckman and Krueger (2003).
[24] Kane and Rouse (1999).
[25] We do not discuss training provided by community-based organizations and vocational-technical institutes largely because there is little good evidence about its effectiveness.
[26] U.S. Department of Education (2008), U.S. Department of Education (2005) (calculated from Table 192), and U.S. Government Accountability Office (2005) (page 25).
[27] Kane and Rouse (1999), Marcotte et al. (2005).
[28] U.S. Department of Labor.
[29] Jacobson and Mokher (2009).
[30] Jacobson, LaLonde, and Sullivan (2005).

community college education in helping displaced workers through the current economic downturn, particularly if they take classes in fields related to high-growth industries and occupations.

Federal Training Programs

According the U.S. Office of Management and Budget the Federal government currently spends over $16 billion on job training and employment services, largely under the Workforce Investment Act. WIA funds training provided in a variety of settings. According to a Government Accounting Office (GAO) study, about one-third of individuals receiving training under WIA do so at community colleges, another third attend proprietary schools, while the rest use four-year colleges, community-based organizations, and public vocational and technical schools, and other providers.[31]

Research suggests that WIA participants benefit from the program, on average, although quality is uneven. A recent study found that WIA training programs for adults boosted employment and earnings, on average, although there was substantial variation across states. A similar pattern of results, with slightly smaller earnings gains, was observed for the dislocated worker program.[32] There is also growing evidence from state programs that training for adults can have large positive impacts on earnings, particularly in studies that track participants for a longer period of time.[33]

As discussed in the previous section, employers currently bemoan the lack of basic skills in the U.S. workforce, and individuals without such skills have a hard time adapting to the ever-changing U.S. workplace. The three components of the U.S. post-high school education and training system that focus on basic skills – adult basic education, GED, and English as a Second Language programs – are therefore critical as they provide a means by which students age 16 and older and immigrants can improve basic skills in reading, writing, and arithmetic and English-language proficiency.[34]

Studies have found that the GED may carry a labor market premium, albeit one that may be smaller than that associated with a regular high school diploma.[35] Recent studies of ABE and ESL programs report that ABE/ESL instruction is associated with small, positive short-term net

[31] U.S. Government Accountability Office (2005).

[32] Heinrich, Mueser, and Troske (2008). In addition, the Federal government also currently spends over $2.5 billion on training programs for disadvantaged youth. Training in the most intensive of these programs − Job Corps and the National Guard's Youth ChalleNGe program − is provided by contract to private companies as well as other agencies, including the military. The most rigorous research strongly suggests that to the extent programs work for this population, they must be intensive (and are therefore expensive). See Schochet, Burghardt, and McConnell (2008) and Bloom, Gardenhire-Crooks, and Mandsager (2009).

[33] Hotz, Imbens, and Klerman (2006), Dyke et al. (2006).

[34] Over 3,100 such adult education programs, serving about 2.7 million adult learners in 2008, are funded under the Adult Education and Family Literacy Act (AEFLA). The actual instruction for these programs is provided by various providers, including Local Education Agencies (LEAs), community colleges, community-based organizations, and correctional institutions (Tamassia et al., 2007)).

[35] Tyler and Lofstrom (2009), General Education Development Testing Service of the American Council on Education (2008).

impacts on hourly wages, hours worked, and quarterly earnings for participants, although longer-term impacts are more mixed.[36]

That Federal training programs improve participants' labor market outcomes indicates they provide skills valued by employers. They have a valuable role in helping displaced workers regain employment in the short-term and in helping adults obtain and refresh their skills in the face of an ever-changing workplace. That said, the Federal system of job training could be much more effective.

Room for Improvement: Completion or Lack Thereof

The research indicates that individuals gain valuable skills in post-secondary education and training programs, particularly at community colleges, but there are problems in the system. One of the most important is relatively high drop-out and non-completion rates. Among students who first enrolled in a public four-year college, 78% had attained an academic degree or were still pursuing a degree six years later; the percentage drops to only 53% for those who first enrolled in a public two-year college.[37] Low program completion rates also plague adult basic education programs.[38]

A key factor impeding program completion is a lack of preparedness. In 2001 nearly one-third of first-year college students in the United States needed to take remedial classes in reading, writing, or mathematics, at an estimated cost of over $1 billion annually. Those who require remedial classes are much less likely to complete their degree than those who do not.[39]

Another common complaint across several types of adult education and training programs is that ineffective curricula lead to student disengagement. Although data are limited, anecdotal work suggests that "drill-and-skill" teaching methods, rather than those that build motivation and encourage inquiry by applying skills learned in the classroom to later academic and vocational activities, remain the dominant form of pedagogy.[40]

Of course there are other factors contributing to poor completion. A dizzying array of course options leave many students confused about which classes would lead to a credential or provide for a smooth transfer to a four-year institution. The overall lack of clarity and guidance

[36] See Washington State Workforce Training and Education Coordinating Board (2008), Hollenbeck and Huang (2006), and Cho and Tyler (2008).

[37] Among students who enrolled in community college, only 50% of those that enrolled with the goal of completing a certificate, 47% of those with a goal of earning an associate's degree, and 45% of those that had enrolled with the goal of earning a bachelor's degree (or transferring to a four-year college) actually fulfilled their goal or were still actively pursuing their degree. These estimates are from the *Beginning Postsecondary Students Longitudinal Study (1996-2001)* and were generously provided by David Bergeron.

[38] A recent survey of adult education programs finds that over 25% of adult learners enrolled in ABE, ASE, or ESL leave before completing the program. Furthermore, learners who do complete these programs may be participating for an inadequate amount of time. On average, adult learners reported having spent only somewhere between 80 and 100 hours in programs, and of those learners, only one-third gained one or more educational levels during the year (Tamassia et al., 2007)).

[39] Bettinger and Long (2007). Breneman and Haarlow (1997). "Remedial Education: Costs and Consequences." Remediation in Higher Education. Washington, D.C.: Thomas B. Fordham Foundation.

[40] Grubb and Associates (1999), as discussed in Levin and Calcagno (2007).

when it comes to course selection and degree planning can overwhelm and frustrate students, and thereby impact their probability of success.[41] Research appears to suggest that overcrowding also inhibits attainment, particularly when the result is that students are unable to register for required classes.[42] Decaying and outdated facilities is a problem in other places where classrooms have not been updated or renovated to meet the current needs of students.[43]

Finally, costs figure prominently into the attendance and persistence decisions of prospective students. Not only is tuition a burden but a growing proportion of post-secondary students are non-traditional, a category which includes those students that are older-than-typical, financially independent, and attending school part-time. These students are substantially less likely to complete bachelor's degrees than are traditional students.[44]

VII. Elements of a More Effective Post-High School Education and Training System

A stronger post-high school education and training system would recognize that education is a life-long endeavor, with each component a natural continuation of the high-quality education that preceded it. The foundation would be a high quality early childhood, elementary, and secondary education system. Post-secondary students would have access to timely and appropriate financial aid to help finance the cost of education and training. Further, all components would share common – or aligned – goals and the classes and programs would be cumulative.

As students juggle many responsibilities, education and training in such a system would be provided in a flexible manner with appropriate services to help students stay in school. Programs would be built on appropriate and innovative curricula and pedagogy, and those that are occupationally-focused developed in close collaboration with local employers and other workforce stakeholders. The funding streams and reporting requirements of Federal and state workforce programs would allow for innovation in the delivery of services. Finally, programs and institutions would have an incentive to continually improve and would be held accountable for their results. These critical elements apply to individual programs and institutions, as well as to Federal and state workforce systems. We elaborate below.

- *The most important "post-high school" education and training reform is a strong early childhood and elementary and secondary education system.*

While the focus of this report is on the post-high school education and training system, the first step to a highly skilled workforce is a high-quality early childhood, elementary and secondary education system that provides children with the basics they need to thrive in post-secondary education and in the workplace.

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[41] Rosenbaum, Deil-Amen, and Person (2006).

[42] For example, research by Bound and Turner (2007) strongly suggests that a significant portion of the recently documented lengthening time to degree among college students can be explained by overcrowding, particularly for community college students.

[43] *Community College Times*, June 4, 2008.

[44] Horn and Carroll (2004). U.S. Department of Education (1996).

A growing body of rigorous evidence suggests children who attend high quality pre-school are more likely to complete more years of education, attend four-year colleges, go on to hold skilled jobs, and earn higher wages.[45]

Strong elementary and secondary schools are the next building block of a strong foundation for future workforce success. At each level, effective principals and teachers are at the core of helping students to master new material and mature into creative, highly capable, responsible adults. Along with quality instruction, high standards, rigorous assessments, and strong accountability can also significantly improve academic performance.[46] The secondary school goals and curriculum must be aligned with the goals and curricula of post-high school institutions. This alignment can occur through rigorous academic standards and accountability. In addition, programs such as "Tech-Prep" and "2+2" that either allow students to acquire college credit while still in high school or to start a four-year (often technical) program during the last two years of high school and then continue through two years of community college can help to bridge the gap between secondary school and post-secondary education and training.

- *All students should have access to financial support to improve valuable workforce skills.*

While the Federal government currently makes over $21 billion in grants, $7 billion in tax credits, and $67 billion in student loans available each year, the Free Application for Federal Student Aid (FAFSA) is overly cumbersome and time-consuming.[47] As a result, over a million students are estimated to be eligible for aid but do not even apply.[48] Simplification of the form will improve access to higher education and training for many deserving students.[49] More generally, much of the currently available financial aid is marketed around the needs of traditional students as opposed to older, working students who are enrolled part-time. In order to engage in lifelong learning, students need to know how to access today's financial aid programs in ways that address their changing needs.

- *The goals of components of the post-high school system should be aligned and the curriculum cumulative.*

Many individuals go through multiple spells of attendance at various post-secondary institutions and the resulting credits frequently do not add up to a meaningful credential or degree.[50] One approach to helping students put together courses that generate marketable skills even if the student is not continually enrolled is "career pathway" (or "career cluster") programs. These programs typically involve a careful map of required courses and training, designed to be internally coherent and linked to the demands of specific jobs. Career pathways can begin as early as middle school and can include accelerated programs that blend basic skills and occupational training.

[45] See, for example, Barnett (2008).
[46] See, for example, Rouse et al. (2007).
[47] The College Board (2008).
[48] The Institute for College Access & Success (2007).
[49] Dynarski and Scott-Clayton (2007).
[50] U.S. Department of Education. (2002).

One example of a career pathway approach is Washington State's Integrated Basic Education and Skills Training (I-BEST) program, which is currently offered in all of its 34 community colleges (see box). I-BEST incorporates more than 100 distinct tracks, each building toward a degree or certificate and designed to prepare students for employment in a variety of fields.[51]

- *Education and training should be provided in a flexible manner with an appropriate curriculum and students should have access to adequate levels of support services.*

Another common element of successful programs is that they are based on appropriate curriculum and pedagogy. Washington State's I-BEST program, for example, blends basic skills and occupational training to generate more contextualized learning, where traditionally these have been segregated into distinct programs. The result is a more effective approach to teaching adults who need both basic skills and job skills. A recent analysis conducted by researchers at the Community College Research Center at Columbia University's Teachers College suggests that it is highly effective. I-BEST students were far more likely than similar basic skills students to improve basic skills and earn college-level credits.[52] As another example, Alan Krueger and Cecilia Rouse studied a workplace education program that also taught basic skills in an occupational context.[53] The authors report positive impacts on earnings, job promotion, performance awards, and job attendance.

Washington State's I-BEST Program

Washington State's Integrated Basic Education and Skills Training (I-BEST) programs build toward degrees and certificates and prepare students for employment in fields including commercial driving, nursing assistance, manufacturing, automotive technology, corrections, early childhood education, and office reception work.

I-BEST requires that at least 50% of classroom time include both literary and workforce training simultaneously, with both instructors in the room. For example, an I-BEST student in a nursing program might learn technical medical language, while having an English instructor on hand to aid in general vocabulary development.

In addition to basic skills and workforce training, I-BEST can establish a pathway toward an associate's degree. I-BEST programs also include guidance and advising to help mitigate barriers to success such as limited English vocabulary, housing affordability, lack of reliable transportation, and child care issues. To provide such services each campus has an I-BEST coordinator to provide one-on-one contact with students and help guide them through the educational system and identify needs and next steps.

Many students must juggle different responsibilities, are the first in their family to attend a post-secondary institution, or have been out of school for an extended period. This imposes unique demands on the education and training system, and an adequate student support service system is another element of effective post-high school education and training programs. Results from a randomized study in two community colleges indicate that enhanced counseling can improve attendance and completion.[54] We highlight that both I-BEST and the sectoral training

[51] Washington State Board for Community and Technical Colleges.
[52] Jenkins, Zeidenberg, and Kienzl (2009).
[53] Krueger and Rouse (1998).
[54] Scrivener and Au (2007), Scrivener and Pih (2007).

programs described below include additional counseling and support services (e.g., child care, transportation, and housing).

- *The curricula for occupationally-oriented programs should be developed in close collaboration with local employers and other workforce stakeholders.*

One of the great virtues of many "sub-baccalaureate" training providers – such as community colleges – is that they can be nimble allies of employers and other workforce partners in providing customized training that is specific to the needs of a particular employer or industry. Individual members of PERAB have also emphasized that in order for programs to be more effective they must be focused on industry needs and allow "ownership" at the company level in order to foster a greater tie-in with local economic development authorities. Clearly, collaboration between training providers and employers is important for ensuring that the skills students acquire are those employers need.

Sector-focused training programs that attempt to organize employers within an industry to address its workforce needs through well-targeted training programs are one promising approach to fostering such collaboration. Public/Private Ventures recently released a randomized study of the effectiveness of such programs for low-income workers. The study finds that participation in the skills-training programs increased wages and earnings, raised the probability and consistency of employment, and led to work in higher-quality jobs.[55] Many program participants obtained jobs in targeted sectors. They also believed the programs helped them achieve success in the labor market, with 78% saying the program had improved their chances of getting a job.[56]

Apprenticeship programs, currently most common in construction, manufacturing, public safety and some military occupations, provide another excellent source of training that is developed with the needs of both the worker and employers in mind.[57] Individual employers, groups of employers, or joint union-employer groups sponsor and design the curriculum and organize the actual training. The programs are then registered with either the Federal Office of Apprenticeship or a state apprenticeship agency. These programs often offer basic skills training that is taught in the context of the needs of a particular employer (or employers). While still small compared to other countries, apprenticeships in the United States provide valuable training to an increasing number of individuals. Indeed, a recent study of apprenticeship programs in Washington State finds that, following training, participants earned substantially more than a group of similar non-participants.[58]

- *The Federal job training system needs to be simplified and made more coherent.*

Many of the components of the Obama Administration's vision of a well-functioning post-high school education and training system cannot be achieved with the current, often conflicting and confusing, maze of job training programs spread across several Federal agencies.

[55] Maguire et al. (2009).
[56] Roder, Clymer, Wyckoff (2008).
[57] Lerman (2009).
[58] Hollenbeck (2008).

For example, as discussed above, one of the more promising curricular innovations that helps to improve student success is "contextualized learning," in which adults obtain basic skills in the context of occupational training. Not only does this allow the students to progress through the programs more quickly but it also helps to keep them engaged with relevant examples and applications. However, the Federal system can be a hindrance to the development of such programs. Representatives from Washington State report to CEA that it is very difficult to fund their I-BEST program with Federal dollars because basic skills and occupational training are funded under different streams, each with its own requirements and restrictions.

A new initiative in Michigan provides another example of the sort of innovation that is often stifled by the Federal job training system. In 2007 Michigan launched a new program – "No Worker Left Behind" – that streamlines access to training and skill development programs. Any unemployed or displaced worker is eligible to receive up to two years of free tuition at any community college, university, or approved training program (up to $5,000 per year) to pursue a degree or occupational certificate in a high-demand occupation or emerging industry.[59] Representatives from Michigan report to CEA that to be able to offer such a generous training grant as well as other services to all eligible workers, the Michigan Works! Agencies and training providers cobble together funding from diverse programs, such as the different titles within WIA, Trade Adjustment Assistance (TAA), Temporary Assistance to Needy Families (TANF), Vocational Rehabilitation Client Services, and the Food Assistance Employment and Training Program. Each program has its own eligibility and reporting requirements, and managing these multiple reporting requirements adds administrative costs and headaches and discourages the creation of new, more effective, training models.

While it is easy to identify the need to simplify, it is a far greater challenge to streamline in a way that improves efficiency, maintains accountability, and reduces duplication of services but does not undermine the effective targeting of resources to populations in need. Nevertheless, this is crucial to the design of a more effective system.

- *Programs and institutions should have an incentive to continually improve and should be held accountable for their results.*

Poor completion rates plague most of the programs that provide post-high school education and training, but institutions have little incentive to improve. Indeed, because many institutions cannot track students after they leave or even keep track of the programs in which the students participate, many of them cannot quantify the problem.[60]

Without data on where students are going and where they have been, it is difficult to align and integrate education and training services. Without information on labor market outcomes, it is difficult to tie educational programs closely to employer needs.

[59] http://www.michigan.gov/documents/nwlb/NWLB_Fact_Sheet_Final_203216_7.pdf

[60] Even within the Federal workforce system (through WIA), the One-Stop Career Centers provide only limited information on participants receiving training. We have very little knowledge about which institutions they attended, the programs in which they participated, and their post-program outcomes.

A related problem is a maze of poorly structured, and often inconsistent, accountability systems for the various programs that fund post-secondary education and training. A consequence of the complexity is that institutions have – at best – little feedback on their performance and – at worse – little or no incentive to improve. Most state funding formulas for institutions of higher education are entirely based on enrollment rather than on student outcomes. This gives institutions an incentive to increase enrollments but does not hold them accountable for providing quality programs geared towards maximizing student success.[61]

While education and training institutions must be held accountable for their results, it is not easy to craft effective accountability systems. Without a very careful design, accountability systems that focus on outcomes can have the unintended consequence of encouraging providers to "cream skim," meaning that they try to enroll only those individuals who are the most likely to land in good jobs or succeed educationally even without assistance.[62] Careful design with particular attention to intended – and unintended – consequences is critical to generating the types of incentives that will lead to an effective workforce system.

VIII. CONCLUSION

This report presents analysis suggesting that the U.S. economy will likely emerge from the current economic downturn with a job composition that largely resembles the one of today. There will be some changes, however. There will be robust growth over the next five to ten years in industries such as health care, education, transportation, and construction. There will also be strong growth in employment in industries devoted to the production and distribution of clean energy.

In general, the U.S. economy appears to be shifting towards jobs that require workers with greater analytical and interactive skills – skills that are typically acquired with some post-secondary education. Many of the fastest growing jobs – including the aircraft equipment mechanic and environmental engineering technician jobs we highlighted – will require completion of an associate's degree or certificate program.

Therefore, we need a comprehensive strategy to ensure that our education and training systems are strong and effective. While the current system has been shown to provide valuable labor market skills to participants, it could be more effective at encouraging completion and responding to the needs of the labor market.

An effective system would include a solid early childhood, elementary, and secondary system that bestows strong basic skills on students; institutions and programs that have goals that are aligned and curricula that are cumulative; close collaboration between training providers and employers to ensure that curricula are aligned with workforce needs; flexible scheduling,

[61] For example, see Midwestern Higher Education Compact (2009).

[62] For example, many argue that just such poor design in WIA has discouraged providers from serving low-income or low-skilled individuals – the very individuals they were designed to serve (Center for Law and Social Policy (2008), Jacobson (2009)).

appropriate curricula, and financial aid designed to meet the needs of students; incentives for institutions and programs to continually improve and innovate; and accountability for results.

CEA's projections, while relying on the most recent data available, are by definition based on the jobs of today. Undoubtedly, some of the fastest growing jobs over the next decade have yet to be identified in these – or other widely available – data. For example, in 2003, a quarter of today's workforce is in jobs that were not even listed among the Census Bureau's Occupation codes in 1967, and technological change has only accelerated since then.[63] Environmental-related occupations – which are expected to experience tremendous growth over the next decade – did not exist in comparable data prior to 2000.[64] Although we cannot predict with certainty what the jobs of the future will be, the evidence strongly suggests that high quality education and training is the best way to prepare the workers of today for the jobs of tomorrow.

[63] Krueger (2003).

[64] We observed this in BLS Occupation Projections published in various *Monthly Labor Reviews* from the past decade.

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