



Achieve

The Future of the U.S. Workforce

Middle Skills Jobs and the Growing Importance of Postsecondary Education



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Editorial assistance and design: KSA-Plus Communications, Inc.

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Executive Summary



The U.S. workforce has undergone significant changes in the past few decades. Increasingly sophisticated technology, changes in the structure of the economy and the growing global marketplace have resulted in employers putting a higher premium than ever on educated workers. Coupled with the fact that the United States has lost its historical global competitive advantage in postsecondary educational attainment, the growing focus among policymakers on how to ensure that the United States has the educated and skilled workforce it needs to compete in the global economy is no surprise, especially as the U.S. economy struggles to recover from the recent recession.

Much has been said about the importance of increasing the labor supply for “middle skills jobs,” or those jobs that now (compared to decades past) require more than a high school education but less than a bachelor’s degree (e.g., associate degree, postsecondary certificate, apprenticeship, etc.). Middle skills jobs now comprise about half of all U.S. jobs, generally offer solid wages and pathways to advancement, and in many cases, are going unfilled even as overall unemployment remains high.

In the past few years, floods of research reports and analyses have explored the growth, demographics, characteristics and importance of middle skills jobs in the United States. *The Future of the U.S. Workforce: Middle Skills Jobs and the Growing Importance of Postsecondary Education* seeks to summarize and synthesize that research to help policymakers and advocates understand the research base and its connection to college- and career-ready reforms. If today’s students are going to be able to access middle and high skills jobs, they need to graduate from high school with the core knowledge and skills that will prepare them for success in postsecondary education and training — and for success in the careers of their choice. With chronically high remediation and low completion rates at two-year and technical colleges, broadening access to postsecondary programs alone is not enough to ensure individuals’ access to and success in middle skills jobs. Rather, increased access must be coupled with increased preparation — starting with a strong K–12 foundation.

Specifically the paper includes sections on:

The Future of the U.S. Workforce

- » Between 2008 and 2018, the United States will experience economic growth, and the labor market will increase **10.1 percent**, adding **15.3 million** jobs.¹
- » By 2018, **63 percent** of all jobs will require some kind of postsecondary education and training.
- » Including both new job openings and the replacement of retirees, high skills jobs will represent **33 percent** of job openings, low skills jobs **22 percent** and middle skills jobs **45 percent** through 2014.² This means roughly **78 percent** of all available jobs will require education beyond high school.
- » These projections of high, middle and low skills jobs are **fairly consistent** across all states.

The Mismatch between Workers' Skills, Education Levels and Job Requirements

- » By 2018, the United States will have **46.8 million** job openings. **Thirty million** of these jobs will require some kind of postsecondary education, and there will be a shortfall of **3 million** individuals with the appropriate level of education to fill them.³
- » **Sixty percent** of employers report that candidates applying for jobs lack the necessary skills to fill available positions.⁴
- » Another survey found **seven of the top 10** jobs employers cited as being the most difficult to fill were middle skills.⁵
- » In **nearly every state**, the workforce and labor demands are mismatched, with the mismatch most prevalent between the number and type of middle skills jobs available and the number of workers who can fill them.

Many Paths to Education for Middle Skills Jobs

- » In 2010, nearly **850,000** associate degrees were awarded in the United States.
- » In the 2009–10 academic year, almost **1 million** sub-baccalaureate certificates were awarded.
- » In 2008–09, certificate earners were largely women (women earned more than **60 percent** of short- and longer-term certificates) as well as minority students (black and Hispanic individuals earned about **a third** of short- and longer-term certificates).

Middle Skills Jobs and Access to Middle Class Jobs

- » **Forty-five percent** of individuals with some college and **45 percent** of individuals with associate degrees (those most likely to be employed in middle skills jobs) were in the middle income classes in 2007.
- » More than **85 percent** of the nearly **73 million** individuals who earned minimum wage or less in 2010 did not have a postsecondary degree — and nearly **60 percent** had only a high school diploma or less.

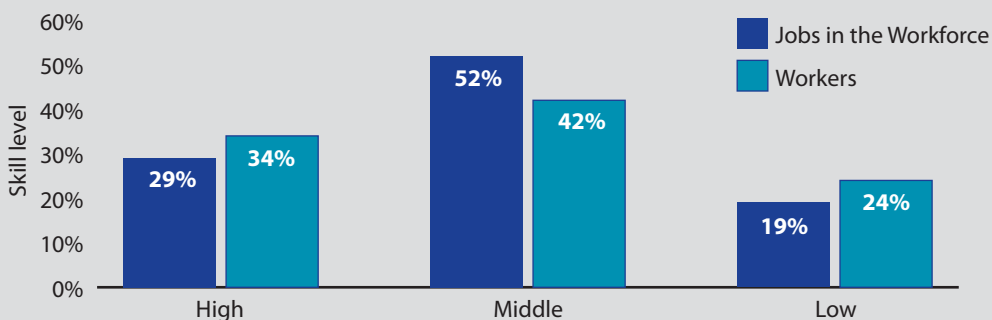
Introduction

The U.S. workforce has undergone significant changes in the past few decades. Increasingly sophisticated technology, changes in the structure of the economy and the growing global marketplace have resulted in employers putting a higher premium than ever on educated workers. Even in the face of the recent recession and sustained high overall unemployment, a limited supply of educated workers⁶ is available to fill America's current and growing jobs, further threatening the recovery. In 2011, 52 percent of U.S. employers cited difficulty in finding the "right" talent, up from just 14 percent of employers in 2010.⁷

At the same time, there is broad concern that the United States has lost its historical competitive advantage in postsecondary educational attainment, with the youngest Americans (ages 25–34) now ranked 12th internationally.⁸ The recent attention on ensuring that America regains its top international ranking in percentage of adults completing college degrees should help address concerns about the diminishing supply of workers for "high skills" jobs, generally defined as those jobs that require at least a bachelor's degree. High skills jobs have and will continue to make up about 30 percent of all jobs in the United States.

Equally, if not more, important is the need to educate and train workers to fill growing "middle skills" jobs, or those jobs that require more than a high school education but less than a bachelor's degree (e.g., associate degree, postsecondary certificate, apprenticeship, etc.). Middle skills jobs comprise about half of all U.S. jobs. Historically, these jobs were available to those with a high school diploma (sometimes less), but changes in production and increasingly sophisticated technology now require more education and preparation for this growing group of jobs than ever before. Additional education and training beyond high school is now the norm for access to middle skills positions.

Figure 1. High, Middle and Low Skills Jobs in the Labor Market and Percentage of Workers Available To Fill Them



Source: www.nationalskillscoalition.org/assets/reports/-the-bridge-to-a-new-economy.pdf

On a societal level, the benefits of middle skills jobs are twofold. First, having a more robust supply of middle skills workers will help the United States remain competitive by ensuring that jobs are filled and productivity remains strong. Second, much of the growth in middle skills jobs will support changing national demographics. For instance, health care is a growth industry — particularly given the graying baby boomers — and many of those jobs require at least some postsecondary education. On an individual level, middle skills jobs typically offer family-sustaining wages and opportunities for advancement. They represent a foothold into the middle class.

In the past few years, floods of research reports and analyses have explored the growth, demographics, characteristics and importance of middle skills jobs in the United States. This paper explores and synthesizes this research base — with an emphasis on understanding the requirements needed for future workers to be qualified to fill these jobs given the changing demands of the U.S. labor market. Given the current mismatch between the demand for middle skills jobs and the supply of workers with the appropriate education level to fill them (see Figure 1), another goal of this paper is to help inform U.S. education and workforce policy discussions.

DEFINING JOBS BY SKILLS LEVEL

Many labor researchers and workforce experts divide jobs into three basic skill categories: high, middle and low. Generally, these classifications correspond with the level of workers' education and training:

- » **High skills jobs** are filled typically by individuals who have bachelor's degrees or higher;
- » **Middle skills jobs** generally require workers to have some education and training beyond their high school diploma but less than a bachelor's degree; and
- » **Low skills jobs** can be filled by those individuals who have completed a high school diploma or less.

Within these seemingly straightforward definitions, a lot of variation exists. The practice of using education level as a proxy for skill levels is common, but it is still just a proxy. Furthermore, "education" and "training" can encompass a wide variety of activities and programs. Education can encompass a traditional certificate or degree program from a postsecondary education institution or training through employer-provided programs, special military training, or internships and apprenticeships, to name a few options.⁹ Competencies required for middle skills jobs in some industries also can be acquired through significant on-the-job training in lieu of a formal postsecondary degree or certificate.¹⁰

Even with these many pathways to middle skills jobs, the importance of postsecondary education of some kind is undeniable. Individuals with a postsecondary credential or degree are more likely to secure the types of jobs that provide employer training and are more likely to receive the benefit of a formal on-the-job training program. In many cases, formal education and on-the-job training seem to be complementary, rather than substitutes for one another. According to one study, about 23 percent of college graduates received formal company training (and 17 percent received informal company training) compared to just 13 and 15 percent of high school graduates, respectively.¹¹

WHAT JOBS ARE MIDDLE SKILLS?

"Middle skills jobs" encompass a wide variety of occupations and occupational groups.

Often cited are:

- plumbers;
- electricians;
- health care workers/technicians;
- legal assistants;
- machinists; and
- police officers.¹²

Other types of jobs classified as middle skills include:

- firefighters;
- clerical workers;
- engineering technicians; and
- green technology jobs.

Understanding Jobs Classifications

Different groups use different techniques for classifying jobs into the high, middle or low skills categories. Table 1 summarizes three different methodologies. In all three, although the details of how jobs are classified into skill levels differ, the basic constructs are the same:

- » The **National Skills Coalition** methodology is based on occupational groupings described by the U.S. Bureau of Labor Statistics (BLS). High skills jobs tend to be professional or technical and managerial. Middle skills jobs are clerical, sales, construction installation/repair, production and transportation/material moving.¹³ Low skills jobs are service and agricultural. BLS itself does not use *high skills*, *middle skills* and *low skills* as terms to classify jobs; instead, it classifies jobs based on the typical education and training level of the workers in those jobs.¹⁴
- » The U.S. Department of Labor’s database of occupation and occupational descriptions, **O*NET**, classifies jobs into five zones based on the education, experience and training necessary to be proficient at those jobs.
- » **ACT** uses the percentage of jobs within a given industry that require a certain level of education to determine the “skills” status of occupations, which are also aligned with scores on ACT’s WorkKeys assessments.

Table 1. **Methodologies for Classifying Jobs by Skill Level**

	National Skills Coalition	O*NET	ACT
Method of classifying jobs	Occupational category	Education, experience and training necessary	Level of education and WorkKeys skill level (range is 3–7)
High Skills	<ul style="list-style-type: none"> ‣ Professional/technical ‣ Managerial 	Job Zones 4 and 5: Considerable to extensive preparation needed	<ul style="list-style-type: none"> ‣ At least bachelor’s degree ‣ WorkKeys score of 6+
Middle Skills	<ul style="list-style-type: none"> ‣ Clerical ‣ Sales ‣ Construction installation/repair ‣ Production ‣ Transportation/material moving 	Job Zone 3: Medium preparation needed	<ul style="list-style-type: none"> ‣ Associate degree, postsecondary award or on-the-job experience ‣ WorkKeys score of 5 (sometimes 6)
Low Skills	<ul style="list-style-type: none"> ‣ Agriculture ‣ Service 	Job Zones 1 and 2: Little or no to some preparation needed	<ul style="list-style-type: none"> ‣ On-the-job training (short, moderate, long) ‣ WorkKeys score of 4 or 5

The Future of the U.S. Workforce

Future Demand by Skills Level

for higher education and more technical skills from employers, many policymakers and economists are justifiably concerned about the ability of the U.S. labor market to fully recover and grow. According to U.S. Bureau of Labor Statistics (BLS) labor market projections released in 2012, the United States will experience economic growth between 2008 and 2018, and the labor market will increase 10.1 percent, adding 15.3 million jobs.¹⁵ Much of this growth will be due to the ongoing recovery from the recent recession. Further, between 2008 and 2018, the fastest growth will be in occupations that require associate degrees.¹⁶

Reports are mixed on how much middle skills jobs will increase (or decrease) as a proportion of all jobs in the United States, relative to high and low skills jobs.^{17, 18, 19} Some predictions — based on an assumed “dumbbell” effect for the labor market — claim that a polarization of the American workforce will result in the growth of high and low skills jobs and a decrease in middle skills jobs, yet the job projection data demonstrate that if there is a dumbbell effect, it will be marginal at best, given that high, middle and low skills jobs are all projected to grow through 2014. Including both new job openings and the replacement of retirees, high skills jobs are expected to represent 33 percent of job openings, low skills jobs 22 percent and middle skills jobs 45 percent.²⁰

These predictions through 2014 are based on historical trends and are only part of the story; they assume the status quo and do not reflect how new industries or innovations (e.g., biotechnology, the growing “app” market, natural gas and green technology) will change the U.S. labor market. In the current global economy, demand clearly will continue to be strongest for middle and high skills jobs, and these jobs will continue to help grow the U.S. economy.

According to a recent survey of human resource managers, a majority (60 percent) expect they will have more jobs with technical requirements over the next three to five years than they do today, and almost half (49 percent) expect higher education levels will be required for most jobs.²¹

Future Demand by State

Across states, both the market share and the types of middle skills jobs that are the most prevalent vary. For example, in California, middle skills jobs account for about 43 percent of the workforce, and in Michigan, middle skills jobs make up about 49 percent of the state’s jobs, with a higher than average number of production jobs helping to drive that figure.²² Table 2 displays state-level projections for jobs by skills level. Data from state-level offices are somewhat inconsistent when compared to projections derived from national sources. However, the general story line is the same.

Between 2008 and 2018, the fastest growth will be in occupations that require associate degrees.

Table 2. Projections for Jobs by Skills Level Based on State Data

	2008			2018		
	Low	Middle	High	Low	Middle	High
Arkansas ^a	17%	54%	29%	18%	52%	30%
California	22%	46%	32%	23%	44%	33%
Colorado ^b	20%	46%	34%	23%	43%	34%
Connecticut	21%	45%	34%	21%	43%	36%
Florida ^c	23%	48%	29%	23%	48%	29%
Illinois	18%	50%	32%	20%	47%	33%
Indiana	19%	56%	25%	20%	54%	26%
Iowa	19%	50%	31%	19%	49%	32%
Kentucky	20%	54%	26%	20%	52%	28%
Louisiana	21%	53%	26%	23%	51%	26%
Maine	22%	49%	29%	22%	48%	30%
Maryland	20%	45%	35%	20%	43%	37%
Massachusetts ^a	19%	44%	37%	20%	42%	38%
Michigan	20%	49%	31%	21%	47%	32%
Minnesota ^b	21%	45%	34%	22%	43%	35%
Mississippi	22%	52%	26%	22%	51%	27%
Missouri	20%	51%	28%	21%	49%	30%
New Hampshire ^a	17%	52%	31%	18%	49%	33%
New Jersey	19%	48%	33%	21%	45%	34%
New Mexico	23%	48%	29%	24%	46%	30%
New York	21%	46%	33%	22%	44%	34%
North Carolina ^a	19%	52%	29%	20%	50%	30%
Ohio	20%	51%	29%	21%	49%	30%
Oregon	21%	50%	29%	21%	49%	30%
Pennsylvania ^d	19%	51%	30%	19%	51%	30%
Rhode Island	23%	46%	31%	24%	43%	32%
South Carolina	22%	52%	26%	22%	51%	27%
Tennessee	20%	52%	28%	21%	50%	29%
Texas	20%	49%	31%	21%	47%	32%
Vermont	20%	48%	32%	21%	46%	33%
Virginia	20%	47%	33%	20%	44%	36%
Washington	23%	41%	36%	24%	39%	37%
West Virginia	20%	53%	27%	20%	52%	28%
Wisconsin	20%	51%	29%	21%	49%	30%

Notes: Some states' data are reported for different periods: a: 2006–19, b: 2009–19, c: 2010–18, d: 2004–14.
 Sixteen states did not have reported data: Alabama, Alaska, Arizona, Delaware, Georgia, Hawaii, Idaho, Kansas, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Dakota, Utah and Wyoming.

Source: National Skills Coalition, State FactSheets, state office reports. www.nationalskillscoalition.org/resources/fact-sheets/state-fact-sheets/

While a total of 21 million jobs are needed to put Americans back to work at precession rates, six sectors (health care, business, leisure and hospitality, construction, manufacturing, and retail) are projected to contribute to the majority of the growth. ... [T]he recession accelerated the loss of many low skills jobs in the U.S. labor force and is driving the economy toward middle and high skills jobs.

Demand by Occupational Sector/Cluster

The growth predicted at an aggregate level does not tell the whole story given that growth will vary significantly across occupations. While a total of 21 million jobs are needed to put

Americans back to work at prerecession rates, six sectors (health care, business, leisure and hospitality, construction, manufacturing, and retail) are projected to contribute to the majority of the growth.²³ A wide range of job types and skills are needed within these sectors, and the combined sectors are expected to grow from 66 percent of employment to about 85 percent by 2020.²⁴

According to work done by the Georgetown University Center on Education and the Workforce, one thing is clear: Future demand will be for workers who have some kind of postsecondary training or education. The center's analysis found that the recession accelerated the loss of many low skills jobs in the U.S. labor force and is driving the economy toward middle and high skills jobs.²⁵

Specifically, the center's exploration of the job opportunities and skill requirements through 2018 reveals that 63 percent of all jobs will require some kind of postsecondary education and training by 2018. Furthermore, 29 percent of all the job *openings* between 2008 and 2018 will be for workers with associate degrees or some college experience (which could include earning a certificate), demonstrating that the demand coming from jobs will be in the middle skills space.²⁶

Middle skills jobs for workers will be concentrated in six occupational clusters (compared to four for those with a high school diploma or less). About two-thirds of all new and replacement middle skills jobs in the U.S. economy between 2008 and 2018 will be in hospitality and tourism (16 percent); business, management and administration (13 percent); health science (10 percent); marketing, sales and service (9 percent); transportation, distribution and logistics (9 percent); and manufacturing (8 percent).²⁷ Note that these are essentially the same sectors described in the paragraph above but use the National Career Cluster-defined industries, rather than the BLS-defined industry sectors.

By 2018, the United States will have 46.8 million job openings. Thirty million of these jobs will require some kind of postsecondary education, and there will be a shortfall of 3 million individuals with the appropriate level of education to fill them.

The Mismatch between Workers' Skills, Education Levels and Job Requirements

Much of the concern about the limited supply of middle skills workers has to do with the documented skills gap — the difference between the skills required by occupations in the labor market and the skills workers in the labor market possess. The severity of the skills mismatch depends greatly on the approach used to measure it. A BLS analysis combining the education required by occupations and the educational attainment of workers in those occupations suggests that, by and large, workers in most occupations have education levels consistent with the level of education required by that occupation, although the match might not be exact.²⁸

A less optimistic picture is painted by ACT's analysis of the skills gap. Using its JobPro database, ACT analyzed the set of skills (as determined by WorkKeys, a set of skills assessments) possessed by individuals at high, middle and low education levels in comparison to the skills required for high, middle and low skills occupations. Across four industries (manufacturing, health care, energy and construction), significant gaps existed between the skills required for jobs at all three skill levels and the skills of assessment-takers with a similar education level. By and large, individuals lacked the skills necessary for success in those industries.²⁹

Importantly, the skills mismatch between middle education workers and middle skills jobs was the most pronounced. For example, in both the manufacturing and construction industries, only 30 percent of those with middle levels of education (associate degree, postsecondary award or significant work experience) met or exceeded the level of reading comprehension skills required for middle skills jobs. Across all four industries, only 27 percent of those with middle levels of education met or exceeded the level of locating information skills required for middle skills jobs.³⁰

While a number of factors likely contribute to this mismatch — such as young adults not getting information on high-demand industries and fields, limited workforce training, and the rising cost of higher education — lack of preparation for postsecondary education is certainly part of the problem. About 50 percent of individuals seeking an associate degree at a public institution of higher education are placed in remedial math and/or English courses, and fewer than 10 percent of those students go on to earn their associate degree within three years.³¹

One thing is certain: Middle skills jobs are available, if workers are qualified to fill them. The availability of middle skills jobs was relatively robust prior to the 2007 recession. Even then, 60 percent of employers reported that candidates applying for jobs lacked skills to fill available positions.³² In Manpower, Inc.'s *2011 Talent Shortage Survey Results*, seven of the top 10 jobs employers cited as being the most difficult to fill were middle skills jobs (e.g., technicians, sales representatives, skilled trades workers, secretaries/office support staff).³³

One thing is certain: Middle skills jobs are available, if workers are qualified to fill them. ... In Manpower, Inc.'s 2011 Talent Shortage Survey Results, seven of the top 10 jobs employers cited as being the most difficult to fill were middle skills jobs (e.g., technicians, sales representatives, skilled trades workers, secretaries/office support staff).

Skills and Education Mismatch by State

meet the demands of that state's employers? Data show that in nearly every state, the workforce and labor demands are mismatched. Some states — most notably southern and traditional “rust belt” states — have substantially more low skills workers than low skills jobs. For example, 29 percent of the Arkansas workforce is considered “low skills” while 18 percent of its jobs are low skills. On the other side of the coin, in some states (mostly northeastern states), the percentage of high skills workers in the state is outpacing the workforce demand. In Massachusetts, for example, 47 percent of the workforce is high skills, while only 37 percent of the jobs are classified as such.

What is common across every single state, except one, is that there are more middle skills jobs available than there are middle skills workers. (Washington has even percentages of middle skills workers and jobs.) Importantly, a number of states have oversupplies of both low skills and high skills workers, which makes the mismatch between their middle skills workers and jobs particularly great. For example, in California, there are more low skills and high skills workers than jobs in those categories, while the percentage of middle skills jobs is nine percentage points higher than the percentage of workers at that skill level.

Future Supply

Unsurprisingly then, while demand for workers with postsecondary education will continue to be strong in the next decade, supply may not be able to meet the demand. According to one set of projections, by 2018 the United States will have 46.8 million job openings. Thirty million of these jobs will require some kind of postsecondary education, and there will be a shortfall of 3 million individuals with the appropriate level of education to fill them.³⁴

There is already some evidence of this shortfall, particularly with middle skills positions. According to surveys in several states, the majority of vacant jobs require some postsecondary education but less than a bachelor's degree — in other words, middle skills jobs.³⁵

Other studies give more cause for hope. The supply of educated workers is driven by changes in return on educational investment. When the return on investment is high, supply grows; when it is low, supply declines.³⁶ Given that the return on investment for middle skills jobs seems to be, by and large, comparatively high, supply should grow (see “Middle Skills Jobs and Access to Middle Class Jobs,” page 16). Additionally, current trends show that postsecondary certificates make up a rapidly growing proportion of the awards earned by students, especially students of color and women.³⁷

Yet even if certificate attainment is increasing, particularly among individuals who have traditionally held the majority of low skills positions, the education opportunities and labor opportunities may continue to be misaligned. All too often, students do not pursue education in the fields that are most demanded by employers. Furthermore, students in K–12 and institutions of higher education do not receive sufficient information about where demand is for workers (in terms of what industries in the region have large growth). Therefore, too few students attending college or technical schools choose programs that will have high returns on investment.³⁸ This trend suggests that there is a lack of useful, and ongoing, career counseling to help students and parents make informed choices, as well as a lack of data being shared with schools about the state's or region's economic outlook and career opportunities.

What is common across every single state, except one, is that there are more middle skills jobs available than there are middle skills workers.

Table 3. Supply of Jobs and Supply of Qualified Workers, by State (2009)

	Low skills jobs	Low skills workers	Middle skills jobs	Middle skills workers	High skills jobs	High skills workers
United States (2008)	19%	24%	52%	42%	29%	34%
Arkansas (2007)	18%	29%	57%	49%	25%	22%
California	20%	27%	47%	38%	33%	35%
Colorado	20%	18%	47%	36%	33%	46%
Connecticut	20%	20%	45%	37%	35%	43%
Florida	23%	23%	51%	43%	26%	34%
Illinois	19%	23%	50%	41%	31%	36%
Indiana	20%	26%	55%	49%	25%	25%
Iowa	19%	23%	54%	49%	27%	28%
Kentucky	19%	27%	54%	45%	27%	28%
Louisiana	20%	27%	53%	44%	27%	29%
Maine	21%	21%	49%	44%	30%	35%
Maryland	20%	19%	44%	38%	36%	43%
Massachusetts	20%	18%	43%	35%	37%	47%
Michigan	20%	21%	50%	45%	30%	34%
Minnesota	20%	18%	47%	43%	33%	39%
Mississippi	21%	30%	54%	47%	25%	23%
Missouri	20%	24%	51%	48%	29%	28%
New Hampshire (2007)	18%	19%	52%	42%	30%	39%
New Jersey	19%	21%	48%	35%	33%	44%
New Mexico	23%	30%	47%	44%	30%	26%
New York	21%	23%	46%	39%	33%	38%
North Carolina	24%	20%	51%	43%	29%	33%
Ohio	21%	24%	51%	48%	28%	28%
Oregon	20%	21%	49%	43%	31%	36%
Pennsylvania (2007)	19%	27%	53%	42%	28%	31%
Rhode Island	23%	24%	46%	40%	31%	36%
South Carolina	21%	25%	53%	47%	26%	28%
Tennessee	19%	27%	54%	44%	27%	29%
Texas	20%	29%	51%	40%	29%	31%
Vermont	20%	22%	47%	43%	33%	35%
Virginia	19%	20%	47%	39%	34%	41%
Washington	20%	18%	48%	48%	32%	34%
West Virginia	20%	29%	54%	45%	26%	26%
Wisconsin	21%	20%	52%	46%	27%	34%

Notes: Sixteen states did not have reported data: Alabama, Alaska, Arizona, Delaware, Georgia, Hawaii, Idaho, Kansas, Montana, Nebraska, Nevada, North Dakota, Oklahoma, South Dakota, Utah and Wyoming.

Source: National Skills Coalition, State FactSheets, state office reports. www.nationalskillscoalition.org/resources/fact-sheets/state-fact-sheets/; U.S. data from www.nationalskillscoalition.org/assets/reports-/the-bridge-to-a-new-economy.pdf

Many Paths to Education for Middle Skills Jobs

Historically, federal and state policy has focused on increasing the number of U.S. college graduates — from both two- and four-year institutions of higher education — to strengthen the workforce and U.S. competitiveness. Yet the preparation for middle skills jobs is diverse and implicates every type of postsecondary institution and training. Therefore, it is little surprise that, in recent years, states have been focusing on improving access to community colleges, along with expanding partnerships between those two-year institutions and local business to ensure a smooth transition from the classroom to the (often middle skills) workplace. Community colleges are a major source of training for workers who will be employed in middle skills jobs; for example, about 80 percent of all firefighters, law enforcement officers and emergency medical technicians and 60 percent of all nurses were trained at community colleges.³⁹

Outside of community colleges, remaining middle skills workers are educated at four-year institutions; through formal on-the-job training (on or off site); or through other industry training programs, such as apprenticeship or vocational certification programs.⁴⁰

Associate Degrees

For the most part, two-year institutions award associate degrees including, but not limited to, associate of arts, degrees that typically are considered to be “transfer” degrees preparing students for continuing their education at a four-year institution; associate of science, degrees that typically prepare students both for a specific area of work and potentially for transfer to a four-year institution; and associate of applied science, degrees that are typically intended to be terminal and linked to a specific profession.

Increasingly, the line between institutional sectors is blurring as many four-year institutions also award associate degrees and two-year institutions award bachelor’s degrees. In 2010, about 850,000 associate degrees were awarded in the United States. Two-year institutions awarded almost 600,000, and four-year institutions awarded about 250,000 — split approximately evenly between public and private (about 107,000) and for-profit, four-year institutions (about 102,000), with only a small number of certificates awarded by private, nonprofit institutions (about 41,000).⁴¹ As noted previously, between 2008 and 2018, the fastest growth will be in occupations that require associate degrees.⁴²

Certificates

Some of the formal education required for middle skills jobs takes the form of sub-baccalaureate certificates. These types of awards provide technical and vocational education and typically take less time to earn than a full degree. Generally speaking, and as collected in the federal Integrated Postsecondary Education Data System (IPEDS), there are three types of sub-baccalaureate certificates: less than one year, between one and two years, and between two and four years.

In the 2009–10 academic year, almost 1 million sub-baccalaureate certificates were awarded. About a third (365,000) of these were awarded by public two-year institutions, while more than 250,000 were awarded by non-degree granting institutions and another 150,000 by private for-profit, two-year institutions. Unsurprisingly, four-year institutions awarded fewer than 10 percent of sub-baccalaureate certificates.⁴³ Most sub-baccalaureate certificates were in health care, business and technology.⁴⁴

Importantly, the earnings gains from certificates are most strongly found for those programs that are at least a year long and are in a high-demand field.^{45, 46} Forty-three percent of certificate holders earn more than people with associate degrees, and 27 percent earn more than people with bachelor's degrees.⁴⁷

On average, certificate holders earn 20 percent more than high school graduates, accounting for an additional \$240,000 in lifetime earnings. More than 60 percent of certificates have a clearly demonstrated economic payoff over a high school diploma, defined in this case as earnings 10 percent higher than the median high school graduate.⁴⁸

In Kentucky, for example, the average return on the investment for those who earned a certificate of at least one year is comparable to the returns of earning an associate degree (\$8,000 per year for women and \$7,000 for men). Additionally, demographic groups that traditionally have lower wages, such as minority or low-income youth, are more likely to earn certificates, on average. In 2008–09, certificate earners were largely women (women earned more than 60 percent of short- and longer-term certificates) as well as minority students (black and Hispanic individuals earned about a third of short- and longer-term certificates) — although there is still a lot of variability when looking at the demographics across the fields of study and certificate-granting institutions.⁴⁹ Also important to note is that there has been limited research on the long-term value of certificates and the resiliency of the individuals who earn them throughout economic downturns. Whether certificate holders can weather times of economic instability — like individuals with bachelor's degrees — is still unclear.

[T]he earnings gains from certificates are most strongly found for those programs that are at least a year long and are in a high-demand field.

Additional Certification

For many middle skills jobs, training received through formal education or through on-the-job training or work experience is sufficient.

However, some middle skills jobs require additional certification. The dental hygienist position, for example, is cited in the literature often as a middle skills job that will experience significant growth. Most dental hygienist programs offer a certificate or an associate degree, and dental hygienists generally also need to be licensed by the state in which they are employed. In many cases, the degree programs are aligned directly with preparing their students for those licenses or certifications.⁵⁰ According to one analysis, one-third of certificate holders also have an associate, bachelor's or master's degree — with two-thirds of these certificate holders having earned their certificate before going on to earn another degree and one-third earning a certificate after earning their postsecondary degree.⁵¹

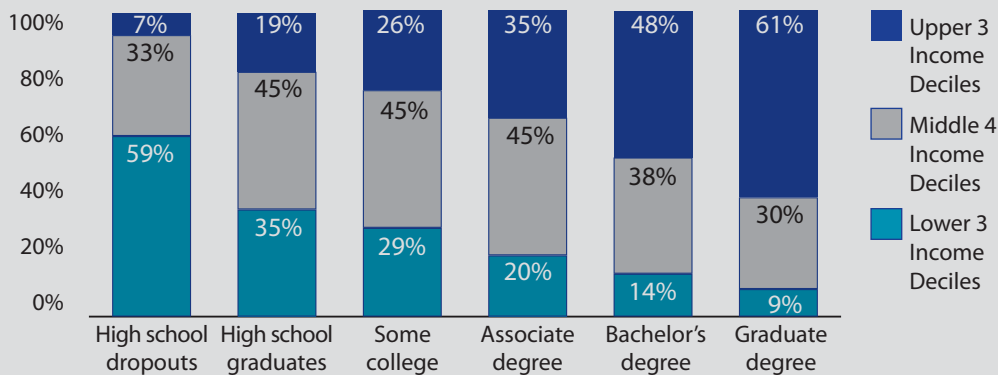
Middle Skills Jobs and Access to Middle Class Jobs

Discussion of jobs in terms of high, middle and low skills generally has focused on the type or length of education or training, not on wage earning power. But the question remains: Do middle skills jobs equal middle class jobs? In short, the answer is yes. Yet there is more to the story.

While there is no clear definition of “middle class,” income levels often are used to delineate upper, middle and lower class earners. U.S. Census Bureau data do suggest that individuals with middle skills jobs are the middle income class (in that they are in the middle four income deciles). Forty-five percent of individuals with some college and 45 percent of individuals with associate degrees (those most likely to be employed in middle skills jobs) were in the middle income classes in 2007. Notably, more than a third of associate degree earners were in the top income deciles. The remainder of those with some college was split fairly evenly between the low and high income deciles.⁵²

Explored another way, more than 85 percent of the nearly 73 million individuals who earned minimum wage or less in 2010 did not have a postsecondary degree — and nearly 60 percent had only a high school diploma or less.⁵³

Figure 2. Education Level and Income Deciles



Source: Carnevale, A. P., Smith, N., and Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf

JOB PROJECTIONS

CareerOneStop, a website sponsored by the U.S. Department of Labor, Employment and Training Administration, is a useful tool for exploring job projection data, as well as state-specific and national information (e.g., median wages, projected growth, the distribution of educational attainment) on all BLS-categorized jobs. For more, see www.careeronestop.org.

Wages for Middle Skills Jobs by Field, Skills Required and Type of Education

fields.⁵⁴ Wages are not going to be high in every field, as the specific work tasks and skills required to successfully perform a job can be very strong predictors of salary.⁵⁵ For example, in 2010, the median salary was \$31,900 for secretaries and administrative assistants, \$45,300 for firefighters, and \$52,500 for telecommunications equipment installers and repairers — all considered middle skills jobs.⁵⁶

In many cases, middle skills jobs allow workers to earn better than average wages. The median national salary was about \$37,000 in 2010. But many middle skills jobs have higher median salaries, even given the variation that exists across

Using the O*NET classifications and data, the median annual salary for individuals in Job Zone 3/ middle skills jobs (defined as jobs that require medium preparation, rather than any specific degree) is \$43,520, compared to \$31,780 for Job Zone 2 and \$22,035 for Job Zone 1 occupations.⁵⁷

FOCUS ON STEM

Occupations in the science, technology, engineering and mathematics (STEM) fields are often thought to be an important driver of innovation and economic competitiveness. The U.S. workforce lost STEM jobs during the recession and currently has a small proportion of STEM jobs overall.⁵⁸ However, STEM jobs are expected to grow at a rate of 17 percent while non-STEM jobs will grow at a rate of 10 percent by 2018.⁵⁹ The STEM challenge is twofold: ensuring not only that these types of jobs are created through innovation and expansion but also that workers are available to fill the jobs.

In the discussion of the relationship between wages and education, STEM occupations, in particular, generate a lot of interest. While most of the STEM jobs by 2018 will require at least a bachelor's degree, there are two STEM occupations (electrical and electronic engineering technicians and surveying and mapping technicians) in which students with either some college (including postsecondary certificate holders) or associate degrees will earn more on average than workers who hold bachelor's degrees — although the differences are rather small. Additionally, workers with some college (including postsecondary certificate holders) will earn higher wages on average than associate degree holders in eight STEM occupations by 2018.⁶⁰

Both the level and type of education have an effect on wage earning potential. In a study of Florida students, researchers found that, among the group of students that had no college education, earnings were highest for those who had completed some kind of technical education along with a New Basics curriculum (consisting of four years of English and three years each of math, science and social studies) in high school.⁶¹ This finding also was true of the Florida students who had completed a college degree: Those with a technical education earned more than those without.⁶² Although most of the research about middle skills jobs and education suggests that a certain level of education is necessary, field of education can be just as important as length of education.⁶³

This finding is supported by analyses showing that even jobs that require some on-the-job training can have higher median wages than those that require a bachelor's degree, particularly jobs that require specialized skills or are in high demand. For example, the 2010 median salary for elevator technicians was almost \$70,000, while the median salary for occupations requiring a bachelor's degree was just above \$57,000.⁶⁴

THE IMPACT OF THE SKILLS MISMATCH ON THE RECESSION

According to some analyses, the level of unemployment experienced during the recession would not have been so high had proper investment been put into educating, training and retraining workers for the new economy. Industries were transforming, but workers' skills were not being upgraded, leaving many individuals unemployed and unable to find jobs.⁶⁵

Policy Implications and Initiatives To Address Middle Skills Jobs Demand

Increasing access to postsecondary education alone is not enough to keep up with the demand for middle skills workers (although it is an important piece of the puzzle). Additional efforts need to be made to educate and train a middle skills workforce, including creating education/sector partnerships and clearly articulated career pathways.⁶⁶ Increasing the information given to students and adult workers is of paramount importance. Students and parents are not always given the information they need, such as data on high-growth or high-demand industries in their regions, entrance requirements to programs, and the success rates at local postsecondary and training institutions, to complete education that will result in employment in a high-return occupation — or employment at all.⁶⁷

The federal government, states and many policy organizations have been focused on ensuring that workers have the skills necessary to fill the available jobs. For example:

- » **Skills2Compete** is an initiative of the National Skills Coalition (formerly The Workforce Alliance) that brings attention to the need to increase the supply of middle skills workers. The campaign issued a call to action in 2007 through reports highlighting the future demand for middle skills workers both nationally and at the state level. So far, 13 states have worked with the National Skills Coalition to develop their own Skills2Compete campaigns.⁶⁸
- » In 2006, ACT initiated the **National Career Readiness Certificate** (NCRC) program, which is not a training program but a way of certifying workers' skills and potential for success using assessments from the WorkKeys test. More than 40 states use the NCRC in some capacity.⁶⁹

THE OPPORTUNITIES AND CHALLENGES OF CERTIFICATES

Although the current policy environment is pro-certificate, many unknowns remain. For one, because certificate programs are so specifically targeted, postsecondary certificate holders' skills may be less transferable than if they had attained an associate degree and almost certainly a bachelor's degree. Additionally, current data indicate that four-year college degree holders are able to weather economic fluctuations better than other individuals, including two-year degree holders, with lower unemployment rates, poverty rates and likelihood of earning only minimum wage. However, the effect of fluctuations on certificate holders is not understood because available data sources to perform this type of analysis (mostly U.S. Census Bureau data) lump certificate holders in with "some college," which includes people who attended any amount and level of postsecondary education but do not have an award.

In any event, many postsecondary institutions, particularly community colleges and technical schools, are taking steps to map or stack certificate curricula into associate degree pathways as a means for optimizing flexibility and future opportunity for people pursuing certificates.

- » On October 4, 2010, President Obama announced **Skills for America’s Future**, an initiative now housed at the Aspen Institute, which is intended to build a national workforce by improving industry and community college relations. The employer-led initiative is focused on building a network of partnerships among employers, community colleges, industry associations and other key stakeholders.⁷⁰
- » Forty-two states joined together to develop the **Common Career Technical Core (CCTC)**, a shared set of career and technical education (CTE) standards for what students should know and be able to do at the end of a program of study within a particular career field.

Connecting employers with educators will help target essential skills and best practices for educating and training future workers. Many industry/education partnerships have already been formed. For example, the Manufacturing Institute received a grant in 2009 to work with colleges to plan programs that include the National Association of Manufacturers-endorsed Manufacturing Skills Certification System. The goal is to help train workers for more advanced jobs in manufacturing by offering “stackable” certificates.⁷¹ Companies such as Oracle, Microsoft and Cisco also offer industry certification programs in an effort to train workers for jobs.

It is also critical that all students in the K–12 education system graduate with the academic foundation they need to pursue the career of their choice — and the postsecondary education and training needed for entry into that career. When students are forced to take remedial courses, the likelihood that they will complete their postsecondary education at all, much less on time, drops from 13.9 percent to 9.5 percent for an associate degree and from 22.6 percent to 13.1 percent for a one- to one-and-a-half-year certificate.⁷² With chronically high remediation rates at two-year colleges, broadening access to postsecondary programs clearly is not enough without also ensuring that students are prepared for success in those programs with a strong K–12 foundation.

Recommendations

- » **Ensure that all students graduate** high school having taken a rigorous, **college- and career-ready curriculum.**
- » **Provide a range of career exploration activities for students**, including CTE courses, work-based learning opportunities and dual enrollment.
- » **Provide opportunities for educators to integrate academic and CTE coursework and instruction**, so students can experience high-quality, technical training in high school that also reinforces their mastery of core academic content (and are applying content in truly authentic ways in their academic classes).
- » **Conduct an analysis comparing the industries or career opportunities** with the highest level of demand in the state, region and/or district **with the program offerings** at local institutions of higher education.

- » **Improve the flow of information to high school and postsecondary students, parents and the public on high-demand careers and available apprenticeship, certification and/or degree programs**, including their costs, admissions requirements and return on investment, if available. This information certainly can be, and often is, embedded in CTE programs, but it should not just be limited to those students pursuing a CTE pathway. Hosting career days with a focus on the specific types of preparation necessary for certain careers, providing information through guidance/career counselors and building specific postsecondary options into high school students' individual education/graduation plans (which a number of states require for all students) are just a few ways to make the information available and actionable for students.
- » **Provide incentives for institutions of higher education to work with their economic development and business communities** and focus on providing those certifications or degrees that meet the needs of students, maximize potential for student and programmatic success, have a significant return on investment, and are aligned to high-demand and/or high-growth industries.
- » **Better align employment and economic data collection with today's realities.** For example, the U.S. Census Bureau's educational attainment categories do not include individuals who have earned a certificate but rather jump from "some college" to "associate degree." The lack of data about such an important population certainly affects, and limits, accurate analyses and projections. States can help address this lack through their own data collection efforts.

With chronically high remediation rates at two-year colleges (which lower the likelihood that students will earn an associate degree from 13.9 percent to 9.5 percent and a one- to one-and-a-half-year certificate from 22.6 percent to 13.1 percent, let alone on time), broadening access to postsecondary programs clearly is not enough without also ensuring that students are prepared for success in those programs with a strong K–12 foundation.

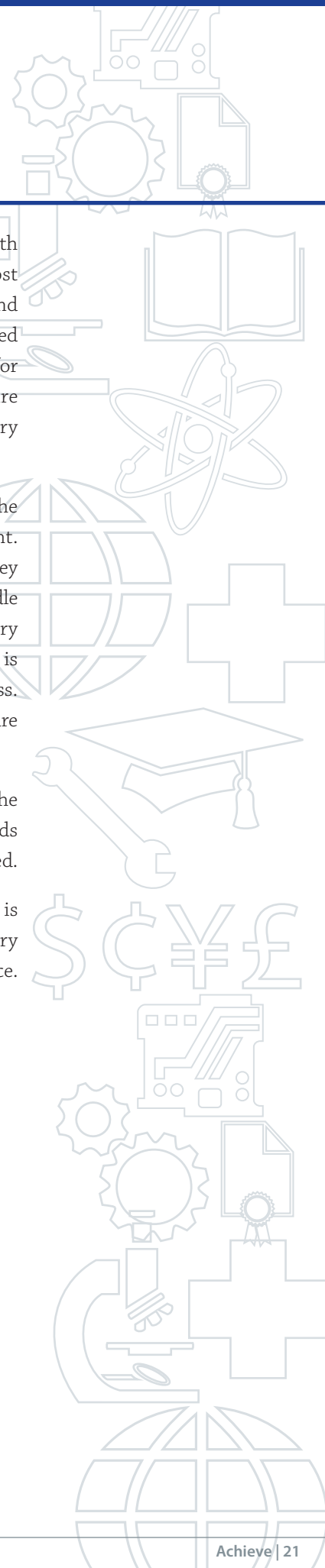
Conclusion

The United States' workforce and economy have always been important areas of study for both researchers and policymakers, particularly strategies to ensure that the U.S. workforce is the most highly educated and skilled in the world — and therefore, the most competitive. Current and growing jobs projections, particularly those conducted after the recent recession, show a continued growth in high and middle skills jobs and increasing education requirements, particularly for today's increasingly sophisticated middle skills jobs. Because nearly all middle skills jobs require postsecondary education, all high school students need to graduate ready to enter postsecondary education — without the need for remediation — to have access to their careers of choice.

Middle skills jobs are a critical piece of the American workforce and economy, now and in the future. But ultimately, the policy discussion is not solely about increasing educational attainment. Policymakers are rightly concerned about ensuring that individuals have the education and skills they need to access the good jobs that offer opportunities for advancement, as well as reach the middle class. The link between a strong academic foundation that prepares individuals for postsecondary college and careers and increased wages, increased security and increased lifelong opportunities is clear. Policymakers also are rightly concerned about the nation's global economic competitiveness. Increasing the number of educated and skilled workers — especially to meet, and help create, future demand — is one way to ensure that the United States remains competitive and innovative.

While the effects of such a focus may be somewhat speculative, history is a powerful teacher. If the demand for educated workers is not met here and if workers' education is not aligned with the needs of industry, then industries will locate where they can be assured of finding the workforce they need.

For these reasons, continuing to grow our knowledge and understanding of middle skills jobs is critical. Policymakers at the national, state and local levels must ensure that pathways to the necessary education and training are available, accessible and aligned to the needs of those in the U.S. workforce.



Endnotes

- 1** U.S. Bureau of Labor Statistics. www.bls.gov/news.release/ooh.nr0.htm
- 2** Holzer, H. J. and Lerman, R. I. (2009). *The Future of Middle-Skills Jobs*. Washington, DC: Brookings Institution. www.brookings.edu/~media/Files/rc/papers/2009/02_middle_skill_jobs_holzer/02_middle_skill_jobs_holzer.pdf
- 3** Carnevale, A. P., Smith, N., and Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf
- 4** Business Roundtable. (2009). *Getting Ahead — Staying Ahead: Helping America’s Workforce Succeed in the 21st Century*. Business Roundtable: The Springboard Project.
- 5** Manpower, Inc. (2011). *2011 Talent Shortage Survey Results*. http://files.shareholder.com/downloads/MAN/1823462201x0x469531/7f71c882-c104-449b-9642-af56b66c1e6d/2011_Talent_Shortage_Survey_US.pdf
- 6** Biroonak, A. and Kaleba, K. (2010). *The Bridge to a New Economy: Worker Training Fills the Gap*. Institute for America’s Future and National Skills Coalition. www.nationalskillscoalition.org/assets/reports-/the-bridge-to-a-new-economy.pdf
- 7** Manpower, Inc. (2011). *2011 Talent Shortage Survey Results*. http://files.shareholder.com/downloads/MAN/1823462201x0x469531/7f71c882-c104-449b-9642-af56b66c1e6d/2011_Talent_Shortage_Survey_US.pdf
- 8** Organisation for Economic Co-operation and Development. *Education at a Glance 2010*. (All rates are self-reported.) www.oecd-ilibrary.org/education/education-at-a-glance-2010_eag-2010-en
- 9** Biroonak, A. and Kaleba, K. (2010). *The Bridge to a New Economy: Worker Training Fills the Gap*. Institute for America’s Future and National Skills Coalition. www.nationalskillscoalition.org/assets/reports-/the-bridge-to-a-new-economy.pdf
- 10** Holzer, H. J. and Lerman, R. I. (2007). *America’s Forgotten Middle-Skills Jobs*. The Urban Institute. www.urban.org/publications/411633.html
- 11** Carnevale, A. P., Smith, N., and Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf
- 12** Brookings Institution Event Report. www.brookings.edu/events/2009/0226_middle-skill.aspx
- 13** Holzer, H. J. and Lerman, R. I. (2009). *The Future of Middle-Skills Jobs*. Washington, DC: Brookings Institution. www.brookings.edu/~media/Files/rc/papers/2009/02_middle_skill_jobs_holzer/02_middle_skill_jobs_holzer.pdf
- 14** U.S. Bureau of Labor Statistics. (2010). Education and Training Assignments. www.bls.gov/emp/ep_table_112.htm
- 15** U.S. Bureau of Labor Statistics. www.bls.gov/news.release/ooh.nr0.htm
- 16** Lacey, T. A. and Wright, B. (2009, November). “Occupational Employment Projections to 2018.” *Monthly Labor Review*, 134 (11), 82–123. Washington, DC: U.S. Bureau of Labor Statistics. www.bls.gov/opub/mlr/2009/11/art5full.pdf
- 17** Holzer, H. J. and Lerman, R. I. (2009). *The Future of Middle-Skills Jobs*. Washington, DC: Brookings Institution. www.brookings.edu/~media/Files/rc/papers/2009/02_middle_skill_jobs_holzer/02_middle_skill_jobs_holzer.pdf
- 18** Autor, D. H. (2010, April). *The Polarization of Job Opportunities in the U.S. Labor Market: Implications for Employment and Earnings*. Washington, DC: Center for American Progress and The Hamilton Project. www.americanprogress.org/issues/2010/04/pdf/job_polarization.pdf
- 19** Aspen Institute. (2003). *Grow Faster Together or Grow Slowly Apart: How Will America Work in the 21st Century?* Boulder, CO: Domestic Strategy Group.
- 20** Holzer, H. J. and Lerman, R. I. (2009). *The Future of Middle-Skills Jobs*. Washington, DC: Brookings Institution. www.brookings.edu/~media/Files/rc/papers/2009/02_middle_skill_jobs_holzer/02_middle_skill_jobs_holzer.pdf
- 21** Unreleased research from Achieve and the Society for Human Resource Management, 2012.
- 22** The Workforce Alliance. (2009). *Michigan’s Forgotten Middle-Skills Jobs*. A report for the Skills2Compete Campaign. www.nationalskillscoalition.org/assets/reports-/skills2compete_forgottenjobs_mi_2009-10.pdf
- 23** McKinsey Global Institute. (2011). *An Economy that Works: Job Creation and America’s Future*. Washington, DC: Author. www.mckinsey.com/mgi/publications/us_jobs/index.asp
- 24** *Ibid.*

- 25** Carnevale, A. P., Smith, N., and Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf
- 26** *Ibid.*
- 27** Carnevale, A. P., et al. (2011). *Career Clusters: Forecasting Demand for High School through College Jobs, 2008–2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/clusters-complete-update1.pdf
- 28** Ramsey, A. (2010). *Analysis of Education and Training Data*. U.S. Bureau of Labor Statistics. www.bls.gov/emp/ep_data_education_training.htm
- 29** ACT. (2011). *A Better Measure of Skills Gaps*. Iowa City, IA: ACT, Inc. www.act.org/research/policymakers/pdf/abettermeasure.pdf
- 30** *Ibid.*
- 31** Complete College America. (2011). *Time Is the Enemy: The Surprising Truth about Why Today's College Students Aren't Graduating ... and What Needs to Change*. www.completecollege.org/docs/Time_Is_the_Enemy.pdf
- 32** Business Roundtable. (2009). *Getting Ahead — Staying Ahead: Helping America's Workforce Succeed in the 21st Century*. Business Roundtable: The Springboard Project.
- 33** Manpower, Inc. (2011). *2011 Talent Shortage Survey Results*. http://files.shareholder.com/downloads/MAN/1823462201x0x469531/7f71c882-c104-449b-9642-af56b66c1e6d/2011_Talent_Shortage_Survey_US.pdf
- 34** Carnevale, A. P., Smith, N., and Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf
- 35** Holzer, H. J. and Lerman, R. I. (2007). *America's Forgotten Middle-Skills Jobs*. The Urban Institute. www.urban.org/publications/411633.html
- 36** Goldin, C. and Katz, L. F. (2009). *Education and Technology: Supply, Demand, and Income Inequality*. www.voxeu.org/index.php?q=node/3640
- 37** Mullin, C. (2011, October). *The Road Ahead: A Look at Trends in the Educational Attainment of Community College Students*. Washington, DC: American Association of Community Colleges.
- 38** Jacobson, L. (2011). *Improving Community College Outcome Measures Using Florida Longitudinal Schooling and Earnings Data*. Policy Brief of New Horizons Economic Research and CAN.
- 39** Biroonak, A. and Kaleba, K. (2010). *The Bridge to a New Economy: Worker Training Fills the Gap*. Institute for America's Future and National Skills Coalition. www.nationalskillscoalition.org/assets/reports-/the-bridge-to-a-new-economy.pdf
- 40** Holzer, H. J. and Lerman, R. I. (2009). *The Future of Middle-Skills Jobs*. Washington, DC: Brookings Institution. www.brookings.edu/~media/Files/rc/papers/2009/02_middle_skill_jobs_holzer/02_middle_skill_jobs_holzer.pdf
- 41** Knapp, L. G., Kelly-Reid, J. E., and Ginder, S. A. (2011). *Postsecondary Institutions and Price of Attendance in the United States: 2010–11, Degrees and Other Awards Conferred: 2009–10, and 12-Month Enrollment: 2009–10* (NCES 2011-250). U.S. Department of Education. Washington, DC: National Center for Education Statistics. <http://nces.ed.gov/pubs2011/2011250.pdf>
- 42** Lacey, T. A. and Wright, B. (2009, November). "Occupational Employment Projections to 2018." *Monthly Labor Review*, 134 (11), 82–123. Washington, DC: U.S. Bureau of Labor Statistics. www.bls.gov/opub/mlr/2009/11/art5full.pdf
- 43** U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System (IPEDS), Winter 2009–10, Human Resources component; Spring 2010, Enrollment component; and Fall 2010, Completions component. http://nces.ed.gov/programs/digest/d11/tables/dt11_196.asp
- 44** Knapp, L. G., Kelly-Reid, J. E., and Ginder, S. A. (2011). *Postsecondary Institutions and Price of Attendance in the United States: 2010–11, Degrees and Other Awards Conferred: 2009–10, and 12-Month Enrollment: 2009–10* (NCES 2011-250). U.S. Department of Education. Washington, DC: National Center for Education Statistics. <http://nces.ed.gov/pubs2011/2011250.pdf>
- 45** Bosworth, B. (2011). "Expanding Certificate Programs." *Issues in Science and Technology*, Fall. www.issues.org/28.1/bosworth.html
- 46** Bosworth, B. (2010). *Certificates Count: An Analysis of Sub-Baccalaureate Certificates*. Washington, DC: Complete College America. [www.completecollege.org/docs/Certificates Count FINAL 12-05.pdf](http://www.completecollege.org/docs/Certificates%20Count%20FINAL%2012-05.pdf)
- 47** Center on Education and the Workforce. (2009). *Valuing Certificates: Defining the Value of Certificates*. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/certificatesdone.pdf

- 48** Carnevale, A. P., Rose, S. J., and Hanson A. R. (2012). *Certificates: Gateway to Gainful Employment and College Degrees*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/Certificates.FullReport.061812.pdf
- 49** Center on Education and the Workforce. (2009). *Valuing Certificates: Defining the Value of Certificates*. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/certificatesdone.pdf
- 50** U.S. Bureau of Labor Statistics. (2012). Occupational Profile. www.bls.gov/oco/ocos097.htm
- 51** Carnevale, A. P., Rose, S. J., and Hanson, A. R. (2012). *Certificates: Gateway to Gainful Employment and College Degrees*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/Certificates.FullReport.061812.pdf
- 52** Carnevale, A. P., Smith, N., and Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf
- 53** U.S. Bureau of Labor Statistics. Characteristics of Minimum Wage Workers: 2010. www.bls.gov/cps/minwage2010tbls.htm
- 54** Carnevale, A. P., Smith, N., and Strohl, J. (2010). *Help Wanted: Projections of Jobs and Education Requirements through 2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/FullReport.pdf
- 55** Acemoglu, D. and Autor, D. (2011). "Skills, Tasks and Technologies: Implications for Employment and Earnings." In O. Ashenfelter and D. Card, (Eds.), *Handbook of Labor Economics*, Vol. 4, 1043–1171. Amsterdam: Elsevier-North Holland.
- 56** Career OneStop. (2012). www.careeronestop.org
- 57** Achieve. (2012). *The Future of the U.S. Workforce: The Limited Career Prospects for High School Graduates without Additional Education and Training*.
- 58** Carnevale, A. P., Smith, N., and Melton, M. (2011). *STEM: Science, Technology, Engineering, Mathematics*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/stem-complete.pdf
- 59** www.esa.doc.gov/sites/default/files/reports/documents/stemfinaljuly14_1.pdf
- 60** Carnevale, A. P., et al. (2011). *Career Clusters: Forecasting Demand for High School through College Jobs, 2008–2018*. Washington, DC: Georgetown University. www9.georgetown.edu/grad/gppi/hpi/cew/pdfs/clusters-complete-update1.pdf
- 61** Jacobson, L. and Mokher, C. (2009, January). *Pathways to Boosting the Earnings of Low-income Students by Increasing Their Educational Attainment*. The Hudson Institute and CNA.
- 62** *Ibid.*
- 63** Jacobson, L. (2011). *Improving Community College Outcome Measures Using Florida Longitudinal Schooling and Earnings Data. Policy Brief of New Horizons Economic Research and CAN.*
- 64** Ramsey, A. (2010). *Analysis of Education and Training Data*. U.S. Bureau of Labor Statistics. www.bls.gov/emp/ep_data_education_training.htm
- 65** Van Kleunen, A. (n.d). *Skills, The Recession, and a Tale of Two Economies*. National Skills Coalition. www.surdna.org/whats-new/commentary/273.html
- 66** Biroonak, A. and Kaleba, K. (2010). *The Bridge to a New Economy: Worker Training Fills the Gap*. Institute for America's Future and National Skills Coalition. www.nationalskillscoalition.org/assets/reports-/the-bridge-to-a-new-economy.pdf
- 67** Jacobson, L. (2011). *Improving Community College Outcome Measures Using Florida Longitudinal Schooling and Earnings Data. Policy Brief of New Horizons Economic Research and CAN.*
- 68** National Skills Coalition. (n.d.). *Skills2Compete*. www.nationalskillscoalition.org/the-issues/skills2compete.html
- 69** ACT. (2012). www.act.org/certificate/index.html
- 70** White House. (2010, October 4). *President Obama to Announce Launch of Skills for America's Future*. [Press release]. www.whitehouse.gov/the-press-office/2010/10/04/president-obama-announce-launch-skills-america-s-future
- 71** National Association of Manufacturers. "Manufacturing Institute Receives Gates Foundation Grant for National Skills Certification System." www.nam.org/Communications/Articles/2009/05/ManufacturingInstituteGatesFoundation.aspx
- 72** Complete College America. (2011). *Time Is the Enemy: The Surprising Truth about Why Today's College Students Aren't Graduating ... and What Needs to Change*. www.completecollege.org/docs/Time_Is_the_Enemy.pdf

The Future of the U.S. Workforce: Middle Skills Jobs and the Growing Importance of Postsecondary Education was the result of many months of hard work. Achieve would like to thank those individuals whose efforts made it possible:

We would first like to thank Jeffrey Stanley and Alli Bell of HCM Strategies for conducting the original research and drafting the report for Achieve.

A number of Achieve staff played a role in the release of this report. Kate Blosveren (associate director) led the development and writing of the report, and Sandy Boyd (senior vice president of strategic initiatives) provided overall leadership and guidance. Additional thanks to Chad Colby, Alissa Peltzman and Rebecca Wittenstein for their contributions.

Achieve would like to thank Kathy Ames, Emily Smith, Marisa McCrone and the team at KSA-Plus Communications, Inc., for their editorial and design contributions.

Finally, Achieve thanks the Bill & Melinda Gates Foundation and GE Foundation for their support of the *Future of the U.S. Workforce* series.

Michael Cohen

President
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