

# Mind the Gap: The State of Skills in the U.S.



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## Takeaways

- Third Way conducted an original, multi-dimensional analysis of skill gaps across the country using five kinds of data to identify patterns in industry labor markets.
- The health care sector stands out as having the most dire skills shortages nationwide, and they'll only get worse as our population continues to age.
- Education and tech-related jobs are also facing serious skilled labor shortages across the country.
- Manufacturing labor shortages are not quite as bad as some say, but the shortage will worsen before it improves due to a pending wave of Baby Boomer retirements.

- Other shortages, such as those in construction or transportation jobs, vary by region and will also change with retirements.
- Many jobs with these shortages are middle-skill jobs that don't necessarily require a college degree but do require training and a credential. Stigma, poor delivery of information to students, and an education finance system focused on four-year degrees push too many people away from these jobs.

# Mind the Gap: U.S. Skill Gaps by Industry

Third Way's original analysis brings together five types of data that provide evidence on the existence of skills gaps. Any one type of data on its own has its shortcomings, but viewed holistically, these datasets make clear which industries are most challenged to fulfill skill requirements. Our analysis shows that health care, professional and business services, and education face the most serious gaps between skilled labor demand and the number of skilled workers ready to fill open jobs.

	Job Fill Rate	Wages	Education & Credentials	Employer Surveys	State Analyses	The Gap
<b>Health Care &amp; Social Assistance</b> Nursing, Home Aides, Day Care Workers	⬇️	⬇️	⬇️	⬇️	⬇️	Major shortages exist, and will increase as people age
<b>Professional &amp; Business Services</b> Tech Services, Accountants, Managers	⬇️	⬇️	⬇️	⬇️	⬇️	Shortages exist, mostly in tech-related occupations
<b>Education</b> Teachers, Assistants, Administrators	⬇️	⬇️	⬇️	⬇️	⬇️	Major mismatches exist, with shortages in STEM
<b>Manufacturing</b> Quality Control Technicians, Supervisors	⬇️	⬇️	⬇️	⬇️	⬇️	Shortages exist and will increase with retirements
<b>Financial Activities</b> Bankers, Real Estate Agents, Insurers	⬇️	⬇️	⬇️	⬇️	⬆️	Shortages are increasing as labor market tightens
<b>Information</b> Publishers, Broadcasters, Data Support	⬇️	⬇️	⬇️	⬇️	⬇️	Shortages exist, mostly in data support occupations
<b>Construction</b> Engineers, Builders, Plumbers, Electricians	⬇️	⬇️	⬇️	⬇️	⬇️	Shortages vary based on regional demands
<b>Trade, Transportation &amp; Utilities</b> Retail, Truck Drivers, Installation	⬇️	⬇️	⬇️	⬇️	⬇️	Minor shortages could increase with retirements
<b>Leisure &amp; Hospitality</b> Restaurant Staff, Hotel Staff, Entertainers	⬆️	⬆️	⬆️	⬇️	⬆️	No gap, but increasing demand for workers
<b>Natural Resource Extraction</b> Loggers, Miners, Oil & Gas Extractors	⬆️	⬆️	⬆️	⬆️	⬆️	No gaps observed at the national level
<b>Agriculture</b> Crop and Animal Producers	N/A	⬆️	⬆️	N/A	⬆️	No gaps observed at the national level

⬇️ Significant gap or shortage   ⬇️ Moderate gap or shortage   ⬇️ Neutral or mixed evidence   ⬆️ No gap or shortage appears in this data

Original analysis by the author of data from: U.S. Bureau of Labor Statistics (BLS) Job Openings and Labor Turnover Survey, Occupational Employment Statistics, and Occupational Outlook; U.S. Census Bureau American Community Survey, multiple surveys of employers; and state Workforce Innovation and Opportunity Act (WIOA) strategic plans submitted to the U.S. Department of Labor. Industry categories are based on BLS Supersector categories, with the following modifications made to better reflect categories captured in the data: the Education and Health Services supersector was split into Education and Health Care & Social Assistance categories, and the Natural Resources & Mining supersector was split into Natural Resource Extraction and Agriculture categories.  
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## The Debate

The idea that there is a “skills gap” in the United States is widely debated, and that debate has been pushed to the forefront with the Trump Administration’s recent focus on apprenticeships.<sup>1</sup> Some question whether a skills gap really exists, or if employers are just struggling with a tightening labor market and aim to shift responsibility for training to

educators and government. Others say the gap is real and has been around a long time. It's made headlines for years, even before the recession, and the workforce development field almost takes it as a given.

Unfortunately, no one data source can fully address the question. There is little national-level data because much of the data is gathered regionally or is incomplete. This makes it hard to get an accurate picture of how many workers have certain skills and credentials, and which skills or credentials employers really need. Proponents and skeptics of skills gaps each point to different types of data to make their case, or interpret the same data differently. We take a different approach. Instead of relying on any one type of data to draw a conclusion, we looked for patterns across five types of data that are commonly used as evidence either for or against the existence of skills gaps, broken down by industry sector. We found that patterns emerge that make it clear that several industries are, in fact, facing growing shortages of workers with the right skills for their jobs.

## The Data

No one type of data we used can truly answer the skills gap question on its own, but, taken together, the patterns that emerge indicate which industries and occupations are facing the most serious challenges when it comes to hiring skilled workers. The five types of data we used for this analysis are as follows, and a more detailed examination of these sources can be found in the appendix:

- **Job fill rate:** This is the ratio of new hires in a month to the number of unfilled job openings at the end of that month. A fill rate less than 1 means there are more job openings than new hires each month, which may indicate hiring difficulty (such as from a lack skilled workers). A fill rate greater than 1 indicates little or no hiring difficulty.
- **Wage gains:** Traditional economic theory tells us that when skilled workers are scarce, employers will raise wages to attract them. Wage trends indicate whether employers are feeling pressure to take action in response to a short supply of skilled workers.
- **Education and credential attainment:** One way to measure the supply of skilled workers available for certain jobs is to measure the number of working-age people with a certain level of education or job-specific credential (like a license or a certificate). We can compare this to skill level, education, and/or credential requirements for available jobs to get a sense of whether people do or do not have “enough” skills or the “right” skills for in-demand work.

- **Employer surveys:** Surveys of employers are regularly conducted by consulting groups, industry associations, higher education institutions, government agencies, and researchers. A potential downside is that employers may sometimes see skills shortages among their applicants where, in fact, a little more employer-provided training for new hires is all that is needed. As a result, looking only at employer surveys can provide an incomplete picture. However, employer surveys do provide helpful insights when examined alongside the other data presented here.
- **State analyses of labor supply and demand:** Each year, states submit workforce development plans to the Department of Labor as a condition for receiving federal job training funds. Those plans include an analysis of skills gaps based on supply and demand for education and credentials. We assessed analyses done by states that meet high data quality standards according to the Workforce Data Quality Campaign.<sup>2</sup>

## Our Findings

Based on our original analysis, we found seven trends of industry skill gaps in the United States:

1. Dire shortages of health care workers will worsen as people age.
2. Tech jobs across sectors lack qualified candidates.
3. More workers with different skillsets are needed for the growing education sector.
4. Shortages of skilled manufacturing labor will increase with retirements.
5. Tightening labor markets are creating shortages in financial services.
6. Construction worker shortages vary by region.
7. Sectors with smaller shortages will be squeezed by retirements.

### **1. Dire shortages of health care workers will worsen as people age**

“Health care and social assistance” is one of the fastest-growing employment sectors across the U.S., from Connecticut to Mississippi to Utah. And the sector is experiencing the biggest across-the-board shortages in skilled workers of all major industry sectors. This is why we rate health care and social assistance as having a high-grade skills shortage. The Georgetown Center for Education and the Workforce estimated the U.S. would be short 193,000 nursing professionals by 2020—and that’s just one subset of health care workers.<sup>3</sup> The shortage will

only get worse as our population continues to age and live longer, and as demand for health services continues to rise.

## **What do the numbers tell us?**

Over the last decade, the job fill rate in the “health care and social assistance” sector has fluctuated between 0.6 and 0.9, meaning there have consistently been more open jobs at the end of a month than new hires during the same month—possibly due to challenges in finding skilled labor. For the last two years in a row, the average monthly fill rate was just 0.6.

State-level analyses of labor supply and demand also signal widespread challenges in finding skilled workers. Mississippi already reports an annual shortage of 150 health care support workers, and like most states, it expects these gaps to worsen. <sup>4</sup> Connecticut estimates that over the next five years, the state will need twice as many graduates from nursing assistant programs as currently graduate each year. <sup>5</sup>

On its surface, the wage data seems to undermine the notion of a skills shortage in health care. But we shouldn’t assume that flat wages means there’s no problem finding skilled workers—especially given what all the other data tell us. While stagnant wages are not consistent with a skills shortage or a tightening labor market, wages in the health care sector are largely controlled by public health care funding and insurance markets. Thus, we can’t necessarily expect wages to behave the same way we would in most labor markets. This means that despite their high value, these jobs pay a range of wages from the very high end to the low end. For example, the median wage for registered nurses (RNs) is \$68,000 per year, but is just \$26,000 for certified nursing assistants (CNAs). <sup>6</sup>

## **2. Tech jobs across sectors lack qualified candidates**

A wide variety of tech-related jobs are growing in demand but have a hard time finding qualified candidates. These jobs range from IT support to programming to data support—and this range of jobs offers opportunities for a range of skill levels, from middle- to high-skill. Salaries range from \$50,000 to upwards of \$100,000 per year for middle-skill tech jobs, putting them among the highest-paying jobs a person can get without a four-year college degree. <sup>7</sup>

## **What do the numbers tell us?**

The Bureau of Labor Statistics (BLS) divides occupations into industry “supersectors,” and most tech jobs fall into one of two supersectors: “professional and business services” and “information.” Over the last two years, the job fill rates in these broad sectors have hovered just above or below 1. This suggests the problem may not be too bad just yet, since that means there have been roughly similar numbers of job openings and new hires each month. Wages, however, have risen over the last few years in both sectors—consistent with what we’d expect

if employers are having increasing trouble finding skilled candidates. But this could be simply due to tightening labor markets leading to more competition among employers for skilled workers.

When you look specifically at tech jobs within these sectors, there are bigger challenges. In their 2016 reports to the U.S. Department of Labor, seven of the nine states with high-quality data (California, Colorado, Missouri, New York, Rhode Island, Washington, and Connecticut) all reported serious concern about filling tech jobs over the next few years. Employers have also regularly signaled increasing challenges in surveys, and shortages vary depending on occupation, sector, and region. Jobs like “computer user support specialists” are in high demand and hard to fill in many states, from Missouri to California.<sup>8</sup> Other jobs like software developers and computer programmers have shortages that are more concentrated in certain regions, like Washington, D.C. and New York.<sup>9</sup>

### **3. More workers with different skillsets are needed for the growing education sector**

Schools across the country fear a future in which they may not have access to enough highly-qualified K-12 teachers, but right now, the problem is more of a mismatch than a shortage. While the prevalent narrative suggests that the U.S. is facing a nationwide teacher shortage crisis, a more nuanced look at the data suggests that there are regional and subject-specific variations when it comes to educator supply and demand.

#### **What do the numbers tell us?**

The fill rate for jobs in education has hovered just below 1 for over a decade, suggesting that while these positions have never been very easy to fill, shortages haven’t been getting worse. Similar to the fill rate, education wages haven’t changed much, either; median salaries remain around \$55,000-\$60,000 for elementary, middle, and high school teachers.

While traditional economic theory maintains that the lack of wage growth means employers have no trouble attracting skilled candidates, education wages, like health care wages, do not operate in a completely free market. First, most teachers are compensated using step-and-ladder pay scales that take into account only years of experience and degrees earned. Second, wages for public school teachers are dictated by school system decisions, including federal, state, and local funding that is often out of a school district’s control.

When we look at the state data alongside these more ambiguous sets of national-level data, we see that rather than a broad shortage in numbers of total teachers, there is a mismatch between the types of educators we have and what we need. This mismatch varies from state to state and between class subjects. With more than 3.5 million Americans employed in education, the biggest shortages are in STEM classrooms. While we actually have a surplus of

elementary teachers, we don't have enough educators being prepared for or entering into STEM teaching roles.<sup>10</sup>

There are also shortages of qualified workers for other education jobs. Washington, D.C., California, and Utah need more teaching assistants, a job that typically does not require a four-year college degree.<sup>11</sup> Utah also has growing demand for people in educational support services, which cover things like security, health care, and administrative support for schools.<sup>12</sup>

## **4. Shortages of skilled manufacturing labor will increase with retirements.**

Manufacturing skill gaps make headlines, but the data suggests that the problem isn't quite as big as some say. Even so, we rate manufacturing as having a medium-grade skills shortage because its worker shortages are meaningful and growing. These are the kinds of shortages that, if sustained, could cause the U.S. to lose even more manufacturing jobs as companies relocate to countries with a larger supply of qualified workers.

### **What do the numbers tell us?**

Shortages of manufacturing workers vary regionally. Some states, like Missouri, report an oversupply, while others already have major shortages. Further some are doing well enough for now but lack a talent pipeline to fill the jobs that will open as Baby Boomers retire.<sup>13</sup> Again, demands vary by state, depending on which industries locate there. The fastest-growing occupation in Utah, for example is in assembling aircrafts, but the state reports it may not have enough workers completing the necessary training to meet rising demand.<sup>14</sup> Mississippi needs over 1,000 more advanced manufacturing workers than it currently has.<sup>15</sup> Meanwhile, there's a shortage of everything from assemblers to inspectors in Connecticut manufacturing plants.<sup>16</sup>

The manufacturing job fill rate has been below 1 since 2012 and fell to 0.8 in 2016, signaling a gradually increasing difficulty in attracting workers. As college attendance has increased, fewer workers are attracted to the types of training programs that lead to manufacturing jobs—even though they pay good wages (usually upwards of \$20 per hour for frontline employees) and don't require college degrees.<sup>17</sup>

For several years, the lack of wage growth has offered a counter to the dozens of frequently-cited employer surveys in studies by consulting firms that conclude there's a skills gap. Wages only grew by 1% between 2006 and 2015.<sup>18</sup> But over the last couple of years, manufacturing wages have gotten a small bump, rising by over \$600 per year in 2015. This suggests that employers are increasingly worried about attracting workers and are starting to take action to attract and build a pipeline.



## **5. Tightening labor markets are creating shortages in financial services**

A low unemployment rate means available labor is scarcer across several sectors, and this includes jobs in finance.<sup>19</sup> Jobs like bankers, insurance claim adjusters, and realtors are in high demand but are showing signs of a growing shortage of skilled workers entering these fields.

### **What do the numbers tell us?**

The job fill rate and wage data over the last three to four years is consistent with a skilled labor shortage. The average monthly job fill rate reached its peak at 1.1 in 2008 and 2009, during the Great Recession, and declined steadily over the following years to 0.6 in 2016. Median wages, meanwhile, have increased year over year since 2012, with a particularly sharp increase in the last few years. Median wages for finance, insurance, and real estate activities, for example, rose from \$40,353 in 2013 to \$41,950 in 2015 in constant 2015 dollars—a real increase of almost 4% over two years. All of this may point to structural worker shortages, or to a generally tightening labor market.

In some regions, the problem does appear to be a structural shortage of qualified workers in finance. Connecticut needs twice as many claims adjusters and insurance underwriters as the state has now.<sup>20</sup> Colorado currently has shortages in accounting and auditing, and reports that shortages will worsen if current education and training trends persist, since in Colorado, these jobs tend to employ older-age workers.<sup>21</sup>

These reports may reflect a broader trend in which younger skilled workers are drawn more to other industries and away from financial services, particularly at the middle-skill level. At the same time as the financial services workforce is aging, which could lead to bigger shortages in the future.

## **6. Construction worker shortages vary by region**

Like manufacturing, worker shortages for construction jobs make headlines, but national-level data suggest that this is not a huge issue everywhere—at least not yet. This is why we rate construction as having a low-grade skills shortage. Some regions do face very real shortages of construction workers right now, while others don't have a challenge at the moment. Shortages are, however, likely to increase as more construction workers retire and the industry struggles to build a pipeline of workers to replace retirees.

### **What do the numbers tell us?**

The fill rate for construction jobs remains above 1, which may suggest that hiring challenges nationally are not yet dire, but the fill rate has been steadily declining over the last few years,

dropping from 2.3 in 2015 to 1.5 in 2016. Wages in this sector have been rising over the last couple of years as well. This tells us that it's gradually getting harder and harder to find skilled construction workers, even if it's not yet a huge problem across the entire country. Some areas have a surplus of certain kinds of workers: Washington, D.C. has over 1,000 more construction engineers than their market demands, and Missouri has an 8% oversupply of lower-level construction workers.<sup>22</sup> But shortages are growing in other regions. Connecticut has less than a third as many carpenters as it needs.<sup>23</sup> Three of Utah's four fastest-growing occupations are electricians, brick masons and block masons, and their assistants. But Utah doesn't have enough students earning middle-skill credentials like the ones needed for these jobs.<sup>24</sup>

These shortages have ripple effects: real estate prices are rising quickly as labor costs rise 4% to 5% a year (outpacing inflation) in response to worker shortages. Some subcontractors, like Gaylor Electric Inc. of Indianapolis, are even refusing to bid on new projects solely because they don't have enough workers to do the job.<sup>25</sup>

Further, the skills required to do construction work are changing with the advancement of new technologies. It is clear that these shortages need to be addressed soon if we want to take full advantage of the economic opportunities presented in this sector.

## **7. Sectors with smaller shortages will be squeezed by retirements**

Those especially pessimistic about the effect of automation on jobs often point to truck drivers as an endangered species. But trucking industry employers are worried about filling the jobs they have open now and the jobs they know will be open over the next few decades. The American Trucking Association reported a shortage of 38,000 drivers in 2014, and the shortage is poised to get worse.<sup>26</sup> In 2015, the average truck driver was 49 years old, meaning tens of thousands more drivers will need to be replaced in 15 years or less as they retire.<sup>27</sup> And trucking is not alone—there are numerous other sectors who are looking at the threat of retirements.

### **What do the numbers tell us?**

The average job fill rates for trade, including wholesale and retail trade, and for transportation and utilities in 2016 were 1.1 and 0.9, respectively. While both are close to 1, those rates have been declining since 2014, and so far this year they've declined further to 0.8 and 0.6, respectively. This means there are now more openings than hires at the end of each month, which may be because it's getting harder to find skilled workers who are attracted to these jobs. Wages have increased since 2014 as well, strengthening the implication that employers now have to work harder to attract workers across these sectors.

Most occupations in these sectors require job-specific credentials like a license or certification, but not a four-year or, in many cases, not even a two-year college degree. The payoff can be significant: the median wage for all truck drivers was \$41,240 in 2016, and it can exceed \$70,000 for drivers employed by large private companies.<sup>28</sup> The data on education attainment suggests that, in general, not enough workers are getting these kinds of credentials (for more on education and credential attainment, see Appendix).

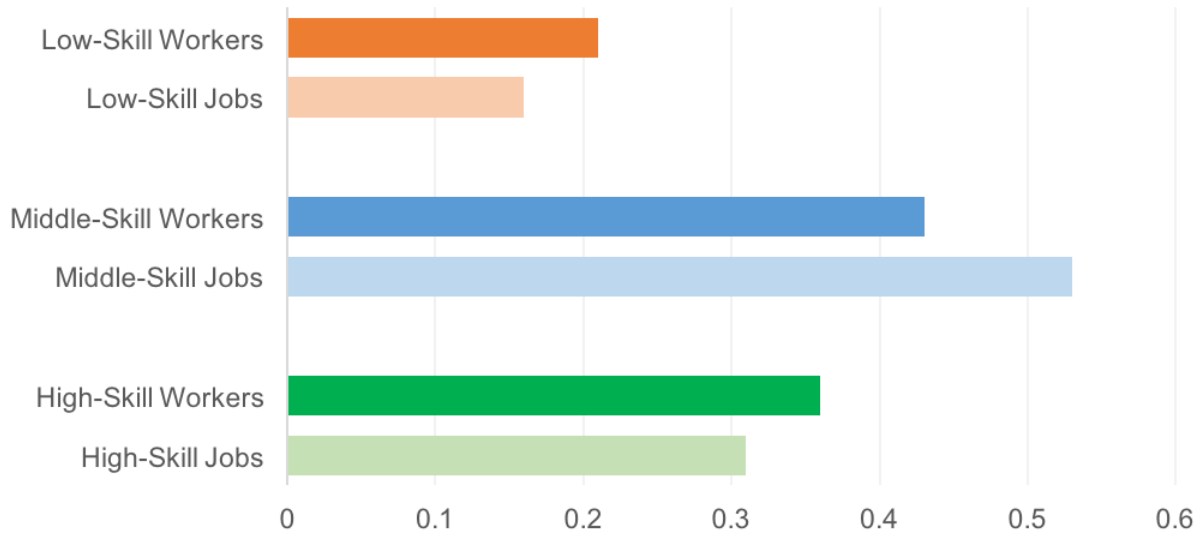
Some states are feeling the consequences of this shortage more than others. For example, California has more than 30,000 heavy and tractor-trailer truck driver jobs, which it's having trouble filling.<sup>29</sup> Colorado, meanwhile, is short on utility technicians and installers.<sup>30</sup> Even in places where these shortages aren't causing major problems yet, shortages in several of these occupations will get worse as their workforces age into retirement. In most regions, there is not yet a strong pipeline guiding workers to these jobs. This means that, if nothing changes, we'll be facing national shortages in occupations that are critical to the functioning of our economy and our daily lives.

## Conclusions

Our analysis of national-level and state-level data makes clear that all parts of the country are dealing with skills challenges. In some industries, these challenges are being experienced across the country, while some are concentrated in certain regions more than others. This means there aren't just a few states or a few industries that need to be thinking about how to recruit and train workers or build talent pipelines. This is a national issue that requires attention on the national level to support state and local innovation.

Looking at the data presented here, one thing stands out: Most of these occupations do not necessarily require four-year college degrees, but do require specialized training and some sort of credential. These "middle skill" jobs are in high and growing demand, but for a number of reasons face serious shortages: In 2015, 53% of jobs were middle-skill, but only 43% of workers were trained at that level. This gap is reported by many states as well, and is continuing to grow. For example, nearly 70% of Mississippians have either a high school diploma or some college but no degree. These people are primed to take advantage of middle-skill opportunities, which make up 66% of the state's jobs, if only they could get the right training.<sup>31</sup>

## U.S. Jobs and Workers by Skill Level



Source: U.S. Bureau of Labor Statistics Occupational Employment Survey 2015, U.S. Census Bureau American Community Survey 2015

If this gap persists, the growth of entire industries, and of our economy, will stall due to a lack of “right-skilled” workers—but we can fix this.

Closing this gap isn’t just about improving the quality of education in public schools and public colleges. We also need to expand access to options outside of four-year degree programs, including career and technical education (CTE), that can fill many of the skill shortages we report on here. To do that, we must create new ways to pay for training, empower students and parents with more information about career pathways, incentivize companies to invest more in training and raise wages, and break down the stigma still associated with many blue collar jobs—especially those that pay middle-class wages or better. Only when all those involved in workforce development—employers, educators, students, workforce agencies, and federal, state, and local policymakers—come together, will we be able to fill the gap.

## Appendix

### Skills gaps, shortages, and mismatches

The term “skills gap” is often used across the board to describe multiple states of skills in labor markets, but these states are actually distinct and can imply different solutions.

Technically, a *skills gap* is present when the training or education for a given occupation does not adequately prepare students for the demands of that occupation. This is most commonly said to be apparent in the basic academic knowledge and skills acquired in K-12 education.<sup>32</sup>

A *skills shortage* is more commonly what we’re really talking about—this is when training for a given occupation is adequate, but there just aren’t enough people getting that training and

then entering that occupation.<sup>33</sup> When, for example, manufacturers say they're facing a multi-million worker "skills gap," they're really facing a shortage under this definition.

A *skills mismatch* is when, on a broader level, the supply and demand of skills—usually measured by education level—are out of sync. This will mean some occupations experience skills shortages, while others experience an oversupply of skilled labor or are able to hire labor with more education or skills than the job actually requires.<sup>34</sup>

## The data we're working with

### Job Fill Rate

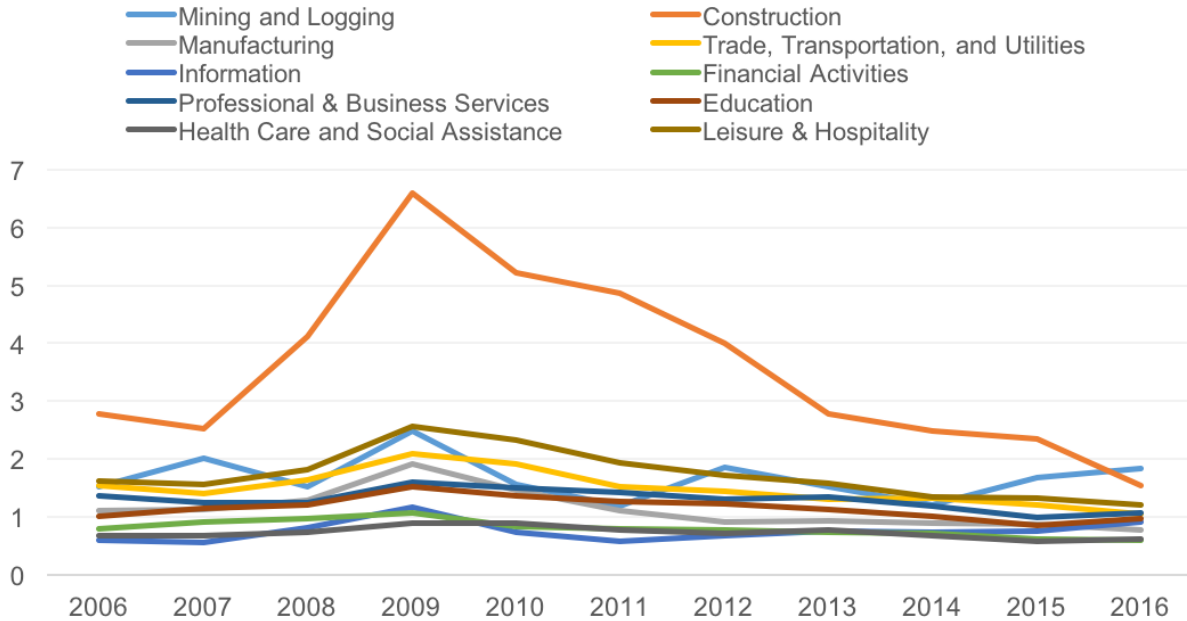
The job fill rate is the ratio of new hires to job openings left unfilled at the end of each month, and it can give us a clue as to whether it's taking employers a long time to fill open positions (implying some sort of issue in finding or attracting skilled labor), or if they're able to rapidly fill them (implying no issue in finding or attracting adequately-skilled labor).

- Job fill rate = hires/job openings unfilled
- A job fill rate <1 suggests there are more job openings than new hires each month, meaning employers are experiencing some sort of hiring difficulty. This difficulty could relate to the skills of applicants, or to a non-skills issue.
- A job fill rate > 1 suggests that at least some of their job openings open and close in under one month, meaning they aren't experiencing any major hiring difficulty and are likely attracting adequately-skilled labor.

We calculate the job fill rate using the Bureau of Labor Statistics (BLS) Job Openings and Labor Turnover Survey (JOLTS) data, which is released monthly. Job fill rates in U.S. Industry Supersectors, as defined by BLS, are charted below.

## Annual Average Job Fill Rates in U.S. Industry Supersectors

2006-2016



Source: U.S. Bureau of Labor Statistics, Job Openings and Labor Turnover Survey

## Wages

Traditional economic theory suggests that when an employer is having trouble attracting the right number of workers with the right skills, they will do things like raise wages and other benefits to attract higher-skilled labor. Skills gap skeptics argue that the stagnation of wages proves employers don't really have any issue in finding skilled labor. They say instead that employers simply say they're having a problem, so that others will help pay to train their workers.

When we look at industry wage changes over the last 10 years, they've generally remained pretty flat. In a few industries, however, they've started to increase in the last few years.

<b>Industry Sector</b>	<b>2006</b>	<b>2015</b>	<b>% Change</b>
Mining	\$45,267.34	\$49,570.00	10%
Utilities	\$62,598.26	\$70,020.00	12%
Construction	\$42,210.32	\$43,340.00	3%
Manufacturing	\$38,259.72	\$38,710.00	1%
Wholesale Trade	\$40,540.72	\$40,980.00	1%
Retail Trade	\$24,691.28	\$23,670.00	-4%
Transportation and Warehousing	\$42,904.03	\$40,160.00	-6%
Information	\$51,569.49	\$57,860.00	12%
Finance and Insurance	\$44,750.00	\$49,090.00	10%
Real Estate and Rental and Leasing	\$32,616.00	\$34,810.00	7%
Professional, Scientific, and Technical Services	\$57,319.03	\$62,640.00	9%
Management of Companies and Enterprises	\$55,790.52	\$63,630.00	14%
Administrative and Support and Waste Management and Remediation Services	\$27,442.59	\$27,930.00	2%
Educational Services	\$44,973.39	\$45,530.00	1%
Health Care and Social Assistance	\$36,002.23	\$36,850.00	2%
Arts, Entertainment, and Recreation	\$24,996.98	\$24,940.00	0%
Accommodation and Food Service	\$19,553.14	\$19,740.00	1%
Other Services (except Public Administration)	\$29,276.80	\$29,730.00	2%
Government	\$47,630.65	\$49,560.00	4%
Agriculture, Forestry, Fishing, and Hunting	\$20,999.34	\$21,890.00	4%

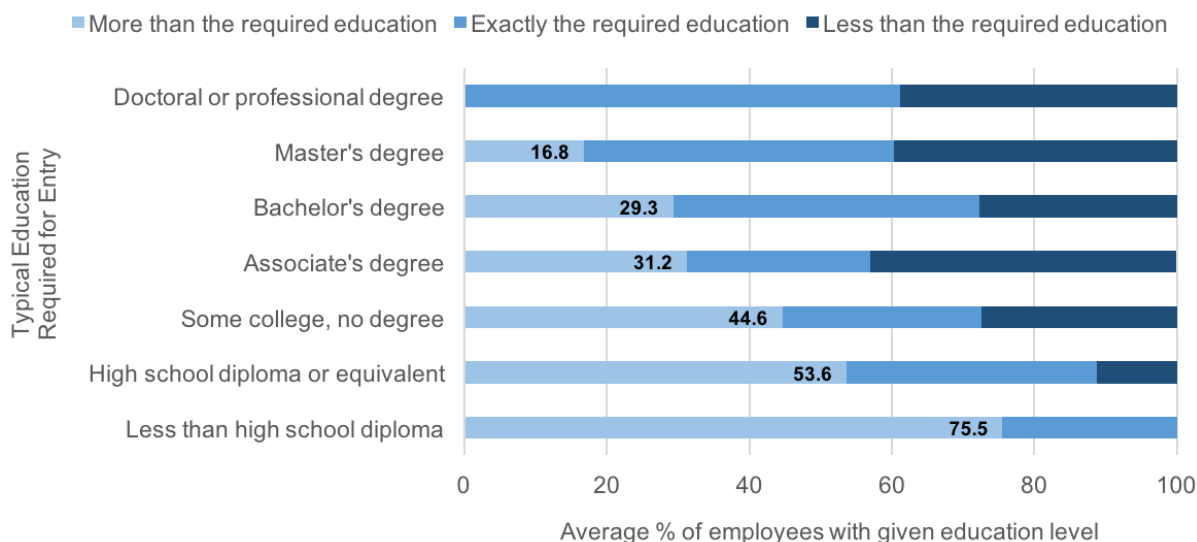
Source: U.S. Bureau of Labor Statistics Occupational Employment Survey 2015  
Wages listed in 2015 constant dollars

## **Education and Credentials**

Broadly speaking, demand for highly-educated labor has been falling when it comes to job requirements.<sup>35</sup> But employers—particularly after the 2009 recession flooded their applicant pools with highly-educated applicants vying for a limited number of jobs—still seem reluctant to let go of expectations that even a low-skilled job can and should be filled by someone with a bachelor’s degree. The “hollowing out” of the middle-skill portion of the job market has been well documented, even as a new set of middle-skill jobs is growing.<sup>36</sup> This, combined with expanded access to higher education (certainly a positive thing) has led to lower-skilled labor being “crowded out” of low-skill jobs by higher-skilled labor—leaving lower-skilled workers with fewer options, and more likely to be unemployed or pushed out of the labor force altogether.

## Required vs Actual Education Levels

How Employees' Education Compares with their Job's Typical Requirements

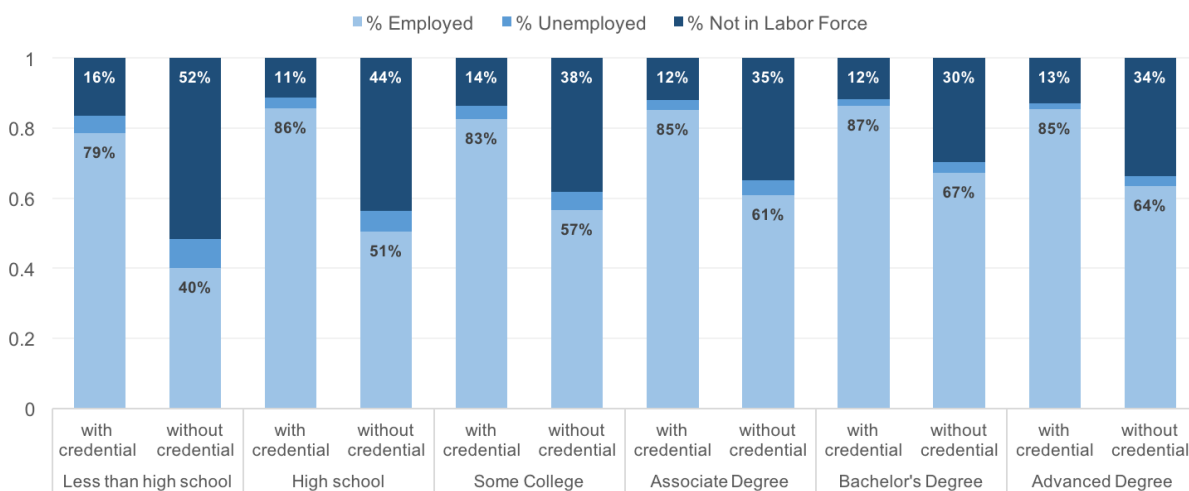


Source: Bureau of Labor Statistics Occupational Outlook, 2015

Non-degree credentials—occupational certifications and licenses—open doors and boost employment and wages for those with less education, or those who simply prefer not to follow a college-oriented path toward a successful career. Right now, non-degree credential attainment is actually higher among those with more formal education—but it doesn't have to be that way. Many credentials don't require college degrees, and others are earned alongside degree programs. Plus, credential attainment produces the largest gains in employment and wages for those with the least formal education.<sup>37</sup>

## Employment Rates by Education and Credential Attainment Level

2015



Source: U.S. Census Bureau American Community Survey, 2015

These include credentials for many of the same occupations that are already reporting skills shortages above, and that are projected to grow rapidly in the coming decades.<sup>38</sup> Many of these programs do not graduate enough students to fill current and anticipated job openings



in corresponding professions. In a one-year period, roughly 790,000 students graduated from middle-skill certification programs.<sup>39</sup> Given that there are currently 6 million open jobs and a widening gap between middle-skill jobs and middle-skill workers, this will not be sufficient to fill many of the industry gaps identified in this paper.

Thus, the national data on education and credential attainment are most consistent with a broad skills mismatch (as far as skills are indicated by education and credential attainment) rather than a gap or shortage. The skills mismatch appears to be an “oversupply” of highly-educated labor and an “undersupply” of certain degrees and credentials for specific occupations.

It’s important to recognize two things: first, having more people complete a quality college education isn’t necessarily a bad thing, even if the job market doesn’t demand that education at the moment. Second, the undersupply of certain occupational credentials may be due to a number of factors that must be assessed separately for each occupation. These factors may include: asymmetries of information between what employers need and what the workforce thinks they need; a lack of public awareness about the viability of certain career pathways; or the high and strict education requirements for teachers in certain fields that may contribute to an undersupply of teachers, which in turn limits how many people we can train.

## **Employer Surveys**

Surveys of employers are regularly cited by academics, journalists, and educators as evidence of broad skills gaps as well as skill shortages for specific industries. Skeptics, on the other hand, point out that employers have a natural incentive to exaggerate hiring difficulties so that others (namely, the government) will pay to train their workers so that employers won’t have to do it themselves. This could help explain why there’s a red “significant gap or shortage” icon for nearly every industry in our infographic above. While this critique is valid, survey data should not be thrown out entirely—particularly if where employers report skills gaps aligns with what other data show us.

Nearly 20 recent surveys of employers, C-suite executives and HR professionals in a range of regions industry sectors reveal some patterns in the types of skills job applicants tend to lack and what industries or occupations are facing the biggest skills challenges. Health care, education, and finance and financial services reported the most significant and consistent challenges, while industries like manufacturing, construction, transportation and utilities reported existing shortages that will probably get worse with the coming wave of baby boomer retirements.<sup>40</sup>

Employers also reported major gaps in some of the thinking skills and personal skills we talked about in *Automate This: Building the Perfect 21st-Century Worker*.

While we should not consider employer surveys to be 100% reliable on their own, the gaps identified in many surveys are consistent with gaps reported in other national-level data, and in regions across the country.

## State Analyses

State analyses of their own skills shortages or mismatches are incredibly useful for two purposes: first, for identifying local labor market shortcomings or challenges, and second, for helping us identify which industries or occupations are facing challenges in regions across the country, versus which are only facing shortages in particular geographic areas.

Gathering and sharing data is a crippling challenge for many states when it comes to assessing the needs and capacities of their labor forces. The Workforce Innovation and Opportunity Act (WIOA) of 2014 required states to start setting up longitudinal data systems to better understand long-run training and education outcomes, but most states are still in the early stages of this process. A handful of states, however, already have good data and were able to assess supply and demand of skilled labor within the last few years.

In addition to industry-specific shortages, most states are reporting growing “middle skills” gaps—a gap between the number of jobs requiring some credential between a high school diploma and a bachelor’s degree, and the number of people with those credentials. This is consistent with extensive literature suggesting that middle-skill attainment does not meet employer demand.

The ability to estimate regional variations in skills gaps, shortages and mismatches points to one of the major strengths of state or regional-level analysis, particularly since solutions are crafted and executed at the state and local level.

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