THIRD WAY

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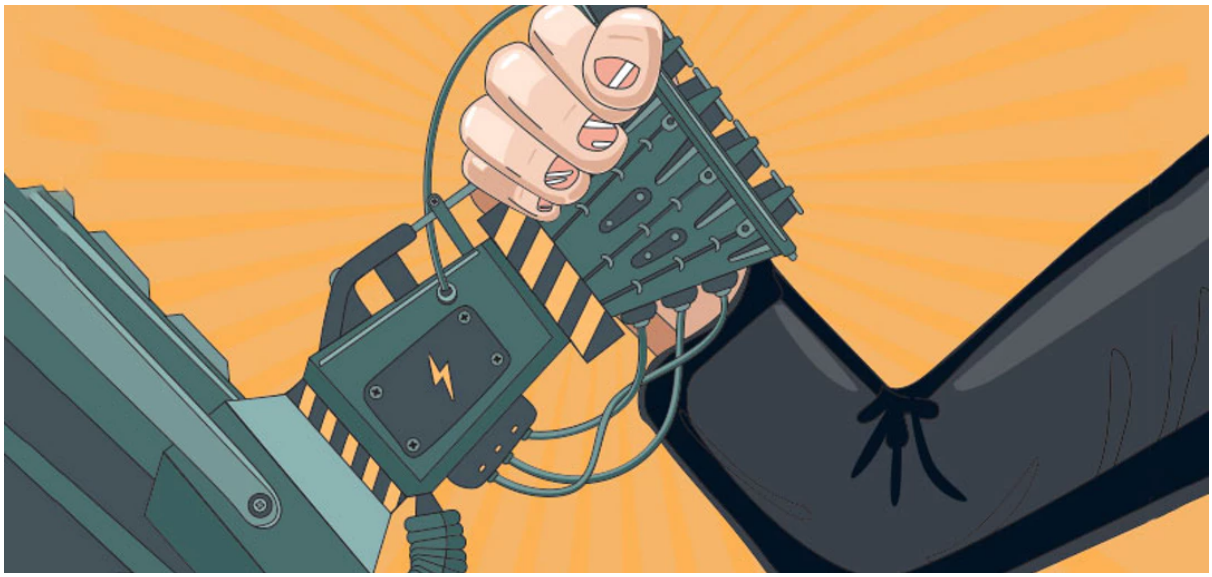
Automate This: Building the Perfect 21st-Century Worker



Rachael Stephens
Fellow for the Economic Program

Takeaways

- Based on our review of skill shortages, growth trends, and labor market demands, Third Way has identified the four skillsets that will make people successful and resilient in the new economy. They are the personal skills and thinking skills that automation can't easily replicate, the digital skills to work with new technology, and job-specific skills for sectors facing major labor shortages.
- These essential skills are learned in formal and informal education and training systems, ranging from K-12 schools and workforce development programs, to homes, neighborhood organizations, higher education, and summer jobs.

- Policymakers need to be more responsive to changing skill requirements, and to look both within and outside the formal education system for policy levers to ensure these skills are being cultivated throughout our labor force.
- The coming wave of automation may be disconcerting, but it does not mean we need to do away with the concept of working for a living. It means we need to upskill our workforce so people can compete and succeed in the new economy.

Automating away vs. automating up: What's really happening to skills and work

When ATMs were deployed in the late 1990s, it seemed clear that bank tellers would soon become obsolete. But instead, bank teller employment has grown an average of 2% per year since 2000—faster than overall employment growth. How did this happen? New technologies reduced operating costs, allowing banks to open more branches, and bank tellers remained in high demand—but for different tasks, like providing advice and selling other services. [1] Where the bank tellers of the 1990s needed little more than basic math and communication skills, they now need to market services to customers and use more advanced workplace technologies. [2] In short, the same job in title now requires more social skills, critical thinking skills, and tech skills than it did before automation accelerated.

This story isn't just about bank tellers—it's about the changing nature of work and skills in the new economy. Employment growth has been fastest in jobs requiring more critical thinking and computer skills and slowest for jobs requiring the physical skills that many middle-class jobs

relied on 50 years ago. [3] Computers and robots have already started filling jobs centered on routine tasks. A prime example: of the 5.6 million manufacturing jobs lost from 2000 to 2010, 4.76 million—nearly 88%—were lost to productivity increases caused by new technologies. [4] Now, artificial intelligence is allowing computers and robots to "think" and take on nonroutine tasks like driving cars. [5] While some pure job substitution will happen as these technologies continue to become better and cheaper, we shouldn't necessarily be alarmed by automation replacing old jobs. Instead, we need to be alarmed by the fact that millions of workers won't have the right skills to fill the new jobs that will be created.

> *Up to 60% of jobs could have one-third of their tasks automated—meaning those jobs will require different skills—but only 5% of jobs could be automated entirely.*

For many jobs, new technology will continue to automate away some of their tasks without automating away the jobs altogether. A 2015 McKinsey study estimates that up to 60% of jobs could have one-third of their tasks automated using existing technologies, but only 5% of jobs could be automated entirely. [6] A 2016 OECD study suggests that only 9% of U.S. workers face a high risk of having their jobs automated away, since tasks vary widely across workers in the same job, and some of those tasks simply have to be done by humans. [7] Plus, we can still expect new jobs to continue being created, and there is a lot of near-term demand for more workers in existing jobs, too.

American workers don't have to be rendered obsolete at the hands of technological advancement. It is making workers more productive and demanding new things of them but not making them useless. The future of automation does not mean we need to completely do away with the concept of

working for a living; it means we need to upskill our workforce so they are ready to compete and succeed in the 21st century.

Ready to compete: Dynamic skills for a dynamic economy

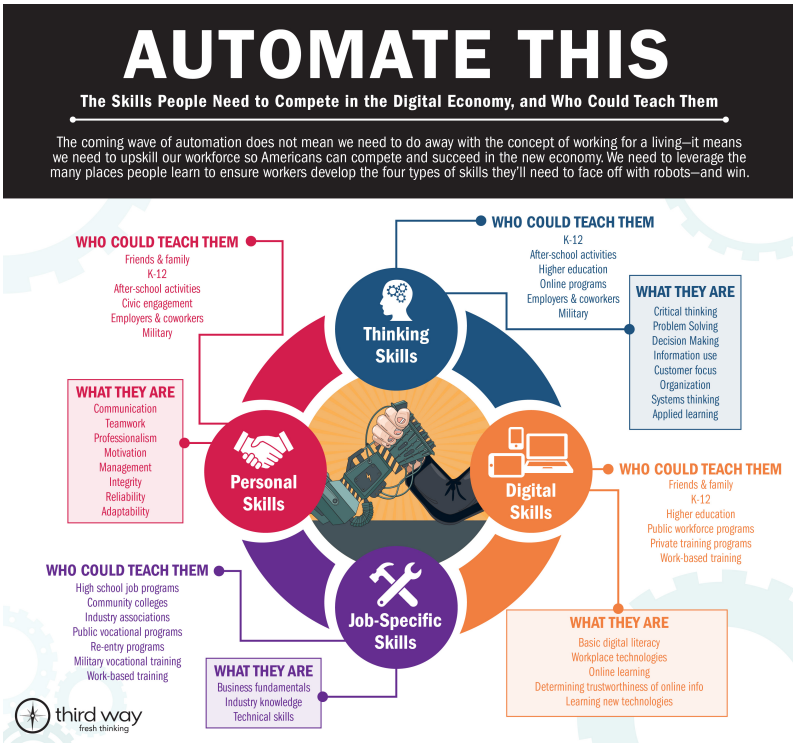
The 21st-century worker must be prepared for a career in a new economy defined by a "radical dynamism" that flows from increasing global competition and rapid technological change. [8] The ability to learn and adapt to changing demands within and between jobs will be crucial to remaining competitive, relevant, and employed. [9] That means all workers need to be equipped with a foundational set of skills that will allow them to successfully learn, adapt, and enter new workplaces *throughout* their careers, as existing jobs change and as new jobs are created. They'll also need to learn the skills needed for specialized tasks at certain in-demand jobs, particularly in health care, education, and technology occupations as well as, in the near-term, jobs in construction and manufacturing.

> *All workers need to be equipped with a foundational set of skills that will allow them to learn and adapt throughout their careers, as jobs change and new jobs are created.*

In *Ready for the New Economy*, we call for a "skills revolution" that makes adjustments to how we approach education and training through the entire learning lifecycle to ensure more Americans possess the skills to succeed in 21st-century middle-class jobs. [10] But before we can change the way we teach and learn, we need to ask exactly what skills we need to be teaching and learning—and those skills need to encourage flexible, adaptive learning and career-long skill development.

Here, we answer that question with an original skills framework that identifies the types of skills consistently

found to be both critical and lacking in today's workforce, and that encourage flexible, adaptive learning and career-long skill development. We also identify the learning environments in which Americans are—or in some cases, are not, but could be—developing these skills.



The *personal*, *thinking*, and *digital* skill categories can be thought of as the portable foundational skills that not only transfer between most jobs, but that also equip a person to engage in ongoing learning throughout a career. The *job-specific skills* category describes specialized, task-oriented skills that workers need for certain occupations, including the types of jobs that require licenses or certifications. A vast number of in-demand occupations require such credentials but not necessarily a college degree, providing an untapped opportunity for many Americans to enter the middle class and experience real economic mobility.

1. Personal Skills

PERSONAL SKILLS

- Communication – writing and speaking clearly
- Teamwork – working effectively with others
- Professionalism – maintaining a professional demeanor at work
- Management – motivvating and guiding others
- Motivation – demonstrating a willingness to work and seek out new challenges or tasks
- Integrity – treating others with honesty, fairness, and respect
- Reliability – displaying responsible behaviors
- Adaptability – displaying ability to adapt to new, different, or changing requirements

Definition: Personal skills facilitate the technical aspects of work, helping individuals and the organizations they work for function smoothly and productively. These skills form the foundation of a person's ability to learn, motivate themselves, and dynamically adapt to new kinds of work.

Why they matter: The 21st-century labor market increasingly rewards personal skills in job and wage growth, particularly since robots can't replicate many of these abilities. These rewards show up throughout the income distribution. People who possess these skills earned 5% more in 2010 than they would have in the same exact position in 1980—simply because the job demands these skills more now, thanks to new technologies automating routine tasks at work. Plus, the fastest-growing jobs have all been those that require more

frequent use of personal skills. [11] The bank teller story is one example of this evolution.

> *People with good personal skills earned 5% more in 2010 than they did in the same job in 1980 when the job required less of these skills.*

It is because of this increasing importance that employers are starting to weigh personal skills more heavily during the hiring process. The 2014 Economist Intelligence Unit survey found that employers place a high premium on soft skills like collaboration and teamwork (62%), communication (54%), adaptability (48%), and professionalism (32%), making them even more important than academic or job-specific skills. [12]

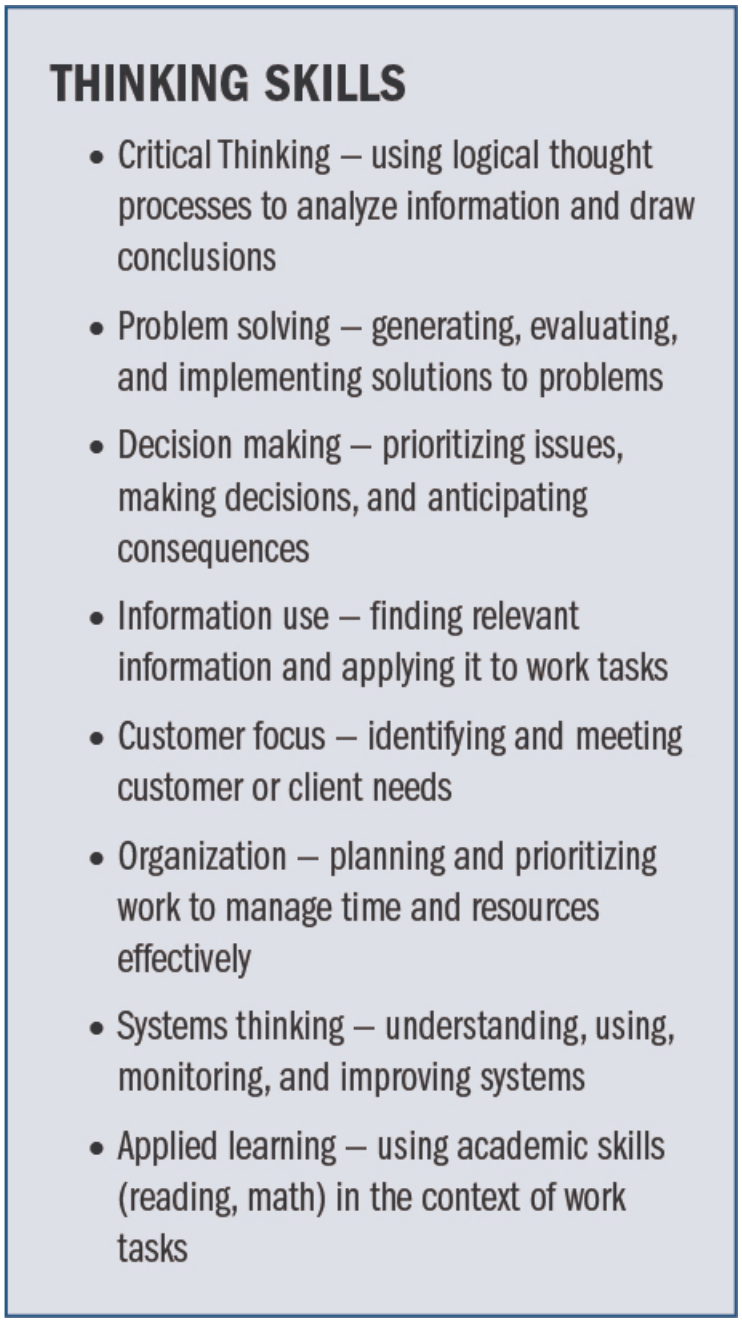
This trend is likely to continue: according to Pew, jobs requiring high levels of "social and interpersonal skills" like those listed above will continue to grow faster than other jobs. [13] These skills are harder for technology or artificial intelligence to replicate than routine tasks like assembling an engine or entering data. [14] Plus, jobs that rely heavily on skills like those above are likely to entail fewer routine tasks —meaning they are the *least* susceptible to future automation. [15]

The gap: Employers often have a hard time finding these skills in candidates: in one survey, 44% said a lack of skills like communication was making it more difficult to fill job vacancies. Thirty-three percent said the absence of workplace personal skills was the most significant barrier to fulfilling their needs. [16]

It's important to remember that many first-time workers, whether they're fresh out of high school or a master's degree, will likely lack some of the skills above that typically come with experience. But some workers and students are put at an early disadvantage, particularly if schools do not focus on instilling these attributes, or if children lack parents or other

adult role models who demonstrate these skills and behaviors in day-to-day life.

2. Thinking Skills



Definition: Jobs of the future will require dynamic thinking skills that allow a person to solve unstructured problems, work with new information, and carry out nonroutine tasks. [17] In this framework, "thinking skills" encompasses cognitive skills that describe a person's ability to reason, learn, and apply academic knowledge to succeed at these

types of work.

Why they matter: Recent and projected job growth trends are strongest in occupations requiring high levels of analytic skills, alongside the personal skills above. Between 1980 and 2015, for example, jobs requiring high levels of analytical skills grew 77%, compared to just 18% growth in jobs requiring high levels of physical skills. [18] In the 2014 Economist Intelligence Unit survey, 72% of employers listed critical thinking and problem solving as the most important workplace skills for a new hire to have. [19]

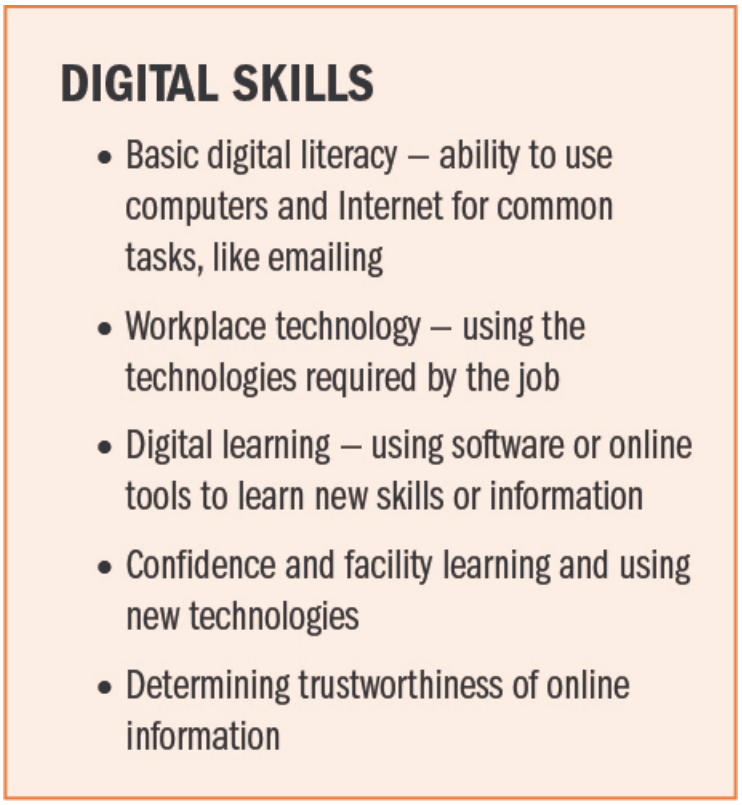
> *Between 1980 and 2015, jobs requiring high levels of analytical skills grew four times faster than jobs requiring physical skills – 77% compared to 18%.*

Like jobs that require more personal skills, jobs that rely on high levels of analytic skills also tend to be the least routine and therefore are in the least danger of being replaced by a robot. [20] A worker who has developed strong analytic skills and personal skills is better prepared for jobs that won't be disappearing anytime soon.

The gap: Despite the importance of these types of thinking skills, they appear to be in short supply. In a LinkedIn survey, 58% of hiring managers say a lack of these skills among employees is limiting their company's productivity, while 89% of executives in a *Wall Street Journal* survey have a "very" or "somewhat" difficult time finding candidates with these skills. [21] Other studies and surveys have found significant skill gaps in critical thinking and applied academic knowledge. [22] For example, the ACT Foundation tested workers who have the educational attainment required for their jobs, and in most industries examined, a majority lacked sufficient skills in applied mathematics, reading for information, and locating information. Even many workers

with higher education levels are not adequately prepared with the skill levels their employers demand. [23]

3. Digital Skills



Definition: Digital skills are critical for succeeding in any workplace that uses technology—which describes nearly every modern workplace. They also contribute to skill dynamism, equipping workers with a solid foundation of tech familiarity upon which they can continually learn new technologies and hone other work-related skills throughout their careers. [24]

Why they matter: Employment has grown faster in jobs that use computers more, including in jobs for which some tasks have already been automated, and this trend is expected to continue. [25] Moreover, workplace technologies are likely to keep evolving at a rapid pace. A 2014 Deloitte survey found that tech skills have an ever-shrinking half-life, becoming obsolete in as little as two and a half years without additional training. [26]

Plus, many jobs we may not associate with technology actually require fairly advanced technological skills. For

example, occupations in health care—one of the fastest-growing employment sectors—have seen computer and tech skill requirements increase and change rapidly over the past two decades. [27] A user of workplace technology will need to be not only comfortable with the machines and software of today, but also able to quickly learn how to use the ones created tomorrow. These skills will be about operating and repairing new technologies like robots, as well as interacting with and working alongside them.

The gap: According to Pew, only 17% of Americans are "digitally ready" to confidently use computers at work or to use Internet-based learning tools to advance their skills—which means this skill deficiency could be holding them back from a new job or promotion. The less-educated and lower-paid tend to have lower technological proficiency, suggesting that if the gap in digital readiness is not addressed, technological change will only continue to exacerbate income and skill polarization. [28]

> *Only 17% of Americans are "digitally ready" to use computers at work or to use Internet-based learning tools to advance their skills.*

4. Job-Specific Skills

JOB-SPECIFIC SKILLS

- Business fundamentals – understanding of company functions and one's own role within those functions
- Industry knowledge – up-to-date knowledge of the industry and of the company's position within it
- Technical skills – ability to complete tasks sepcific to the job and/or the employer

Definition: Job-specific skills are the "hard skills" required to enter a particular occupation. These skills are often referred to as "career and technical" skills, which can include both task-specific skills and technical skills needed for math, engineering, scientific, or computer-related work. A worker usually develops these through a training or education program that awards a credential like a certificate, license, or degree.

Why they matter: Career and technical skills are becoming more important across a range of jobs and education levels, and they are not only for the college-educated. The Georgetown University Center on Education and the Workforce estimates that by 2020, 65% of all jobs will require some sort of credential beyond a high school diploma (compared to just 28% in 1973). [29]

In particular, "middle skill" occupations—jobs that require training or education beyond a high school diploma, like a license or certification, but don't necessarily require a four-year college degree—are going to be in high demand. [30] Credentialed skills are required for a wide range of jobs, from the classic trade occupations like plumbing and electrical repair, to jobs in energy and manufacturing, to health care and security services. These and other jobs are also going to keep requiring higher levels of digital skills, as technological advancement continues to demand workers

have skills that complement technology and artificial intelligence. [31]

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The gap: In a small town just outside of Concord, New Hampshire, General Electric Aviation is the largest employer in town, employing about 800 manufacturing workers. But one-third of those workers will retire in the next five to 10 years—and so far, GE is having a hard time finding the skilled workers to replace them. [32] Nationally, The Manufacturing Institute estimates that 2 million of 3.5 million manufacturing job openings will go unfilled over the next decade due to a shortage of adequately skilled labor. [33]

Existing shortages in job-specific skills will become more pronounced as more than 76 million baby boomers in America retire, cutting their labor force participation rate from 80% in the early 2000s to less than 40% by 2022. [34] This will be true across sectors, including several that offer middle-class wages and a large number of job openings. In general, middle-skill jobs are facing serious shortages: the National Skills Coalition estimates 53% of all job openings in the U.S. are in middle-skill jobs, but only 43% of the country's workers are trained to the middle-skill level. [35]

Gaps between skill supply and demand for specific industries, however, can be difficult to estimate at the national level, since they tend to vary based on demands of regional economies. While several types of data that can reflect skills shortages or mismatches may be unreliable or unconvincing on their own, patterns emerge when we examine trends across data sources. In particular, patterns across job fill rates, recent wage changes, education and credential attainment, employer surveys and state supply-and-demand

analyses are consistent with some type of skills shortages or mismatches in the following industries:

- Health care and health care support
- Tech-related occupations
- Education
- Manufacturing
- Finance and financial services
- Information services
- Construction

Many occupations within these industries are ones that are growing rapidly *and* are unlikely to be automated away in the near future, making them good career prospects for at least a generation of jobseekers. But we may not be preparing enough workers to fill in-demand jobs, particularly when we look at data at the regional level.

When and where: How Americans learn 21st-century skills

The conversation about skill development and gaps tends to focus on deficiencies in our public K-12 systems and in higher education. It's common to say that schools should be doing a better job of teaching all kinds of skills, from personal skills to thinking skills to digital skills and even job-specific skills to students so that they're ready by day one on the job. But if it sounds too simple a solution to address a complex problem, that's because it is. The best workforce solutions should take into account all the ways and places a person is—or could be—learning skills to get them ready for work.

In K-12 and Higher Education

It's true that our K-12 system is teaching too many of our children too little, and that's part of why we're falling behind

other countries in skill development. In student aptitude testing, the U.S. ranks 20th out of 35 highly advanced economies in reading, 19th in science, and a stunning 31st in math as of 2015. We come in 13th of 28 countries that tested students in problem solving. [36] Our higher education system doesn't fare any better. For example, of the 60% of college entrants who wind up earning a degree within six years, 36% will demonstrate no meaningful gains in critical thinking skills. [37]

> *Thirty-six percent of college graduates will demonstrate no meaningful gains in critical thinking skills from their college education.*

Soft-skill development is also lacking in our formal education system, especially for students from poorer families. These students are twice as likely as their wealthier peers to rarely experience any soft-skill-building classroom activities, like working in small groups—a critical activity for building teamwork and communication skills. [38]

At Home and in Our Communities

Foundational soft-skill development is influenced outside the classroom as well. Research has shown that our communities provide a natural context for learning, and linking classroom learning to community-based activities requires students to engage and develop soft skills like distilling information and adapting to new situations. These skills can be developed in a range of activities through a variety of community institutions, including local nonprofits, libraries, sports groups, other clubs, and places of worship. Community-based learning also has the added benefit of keeping children more engaged in their formal education—volunteer or work experience that is coordinated with a students' academic curriculum is a particularly effective way to capitalize on this benefit.

Building community-based learning into a child's life can help reduce disparities in soft skill development between rich and poor children. Barring any additional effort by educators, poorer children are less likely to learn these skills through parental influence, social networks and extracurricular activities than their wealthier peers. This contributes to the disadvantage they often experience when they enter the job market as adults. [39]

At Work

On-the-job training is also a way for many workers to learn personal skills, job-specific skills, and even the thinking skills often associated only with academic settings. In fact, according to one Pew survey, 46% of workers think they've learned critical thinking skills mainly through work experience—compared to just 19% who say they've learned it primarily through formal education and 18% through other life experience. [40]

Employer-provided training, however, has been on the decline, as employers have increasingly relied on schools and public programs to provide skilled employees. Between 1996 and 2008, the percentage of workers receiving employer-sponsored training was cut in half, from 33% to 20%. [41] By 2011, only 21% of employees had received any employer-provided formal training in the previous five years. Apprenticeships are an incredibly effective type of on-the-job training, but the number of apprentices decreased by almost half in less than 10 years, from 500,000 in 2003 to 280,000 in 2012. [42] Many employers fear investing in human capital that can walk out the door, but workers are about twice as likely to stay with employers that offer them training. [43] Despite this decline, employers still make up the largest share of the $1.1 trillion spent each year on postsecondary education and training, spending $413 billion. [44]

These trends have, however, shown recent signs of a potential reversal. Federal and state-supported apprenticeship programs have expanded in the last couple of

years, and a 2016 survey of employers found that 69% had a training budget during the previous year—up from 57% in 2012. [45] Without much publicly available data on this, it's hard to know whether this really reflects a prolonged increase in employer-provided training. In any case, it is clear that both workers and employers benefit from having employers more involved in training.

In Workforce Programs

Vast and complex networks of federal, state, local, and nonprofit workforce programs train out-of-work or underemployed workers across age groups and help connect them to employment. There are dozens of federal programs alone, so navigating the system can be challenging for job seekers and for employers.

Despite these complexities, many programs report positive outcomes for participants. Participants in adult programs, for example, out-earn peers who didn't get training by $1,600 to $2,800 per year. [46] The return on investment (ROI) for federal workforce spending can be remarkably high as well. In Idaho, for example, the ROI of adult programs is $4 per federal dollar spent; for dislocated worker programs, it's nearly $5. [47] For especially at-risk populations, the returns are astronomical: YouthBuild's program for youthful offenders yields a stunning $10 return per dollar invested by reducing recidivism, improving community safety, and improving education and employment outcomes. [48]

These figures demonstrate what is possible when a program is run well and targets the right people, but program quality and effectiveness vary across regions and programs. Many of the most effective programs have been developed at the local level, and we're able to identify how and why they work. [49] This is why the 2014 Workforce Innovation and Opportunity Act (WIOA) emphasizes the importance of locally tailored programs that engage regional employers. [50] What remains less clear is how to scale and replicate effective program models in new regions, industries, and populations while maintaining high program quality.

In the Military

The U.S. Armed Forces trains service members in technical skills they can use in at least 962 civilian occupations, like health care and electrical repair. Veterans are also considered to have an edge on certain personal skills like teamwork, integrity, and dependability, as well as thinking skills like problem solving. [51] Yet despite being highly skilled, many veterans struggle to find work once they get home, due in part to poor integration between their military training and job certification programs. [52]

In Prison and Re-Entry Programs

More than 500,000 Americans will be released from prisons this year, and two-thirds of them will get arrested for a new offense within three years of release. But a person who can get and keep a job is at least 20% less likely to commit another crime. [53] The best re-entry programs provide comprehensive services while teaching job skills *and* soft skills and connecting individuals to jobs. [54] Some particularly innovative programs, like the EDWINS Leadership & Restaurant Institute in Cleveland, have recidivism rates close to zero. [55]

> *It costs $30,000 a year to incarcerate someone, but costs one-sixth of that ($5,000) to retrain a former inmate and help them find a job.*

Skill training is an incredibly cost-effective way to reduce recidivism and crime. It costs around $30,000 per year to incarcerate someone, but it costs just one-sixth of that ($5,000) to retrain a former inmate and help them find a job. Despite how cheap and effective these programs can be, only 48% of prisons offer limited options and just 7% of inmates actually get vocational training in prison. [56] Most inmates are left without opportunities to develop the foundational

soft skills or job skills that can change their lives after prison and improve safety in our communities. [57]

Conclusion

Ensuring that our workforce develops the skills they'll need to compete in the 21st century is key to our nation's ability to compete in the new economy: America's global competitiveness is hurt when our labor force lacks dynamic in-demand skills, and Americans who don't have opportunities to develop these skills keep falling behind. In particular, the *personal*, *thinking*, and *digital* skills that help a person become an adaptive career-long learner need to be front and center for policymakers and educators. These skills will only become more critical as rapid technological advancement and increasing task automation keep changing the types of work we do and the skills we need to do it.

Making our people more dynamic and adaptive will require that the institutions that teach them become more dynamic and adaptive to changing demands, too. We need to improve and modernize the way we teach skills across all stages of development, including middle-career and retraining programs. We also need to strengthen access to information about career pathways that can increase economic mobility and lead to a middle class life. As a part of this, policymakers and program administrators must continue finding new and creative ways to engage employers in every stage and facet of skill development, from what skills we teach to what experience really makes a person qualified to teach them.

In addition to strengthening existing training systems, we must expand opportunities to learn work-related skills in less traditional environments, like in our prison system, and strengthen connections to work for people already getting skills training, like our armed service members. Finally, we should reimagine how we might leverage the full range of learning environments, like homes and communities, to give more Americans the opportunity to reach their potential.

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