



Building a Strong Middle Class Through Career Pathways Programs

Case Studies of Germany, Singapore, and Switzerland

By Laura Jimenez May 2020

Center for American Progress



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Introduction and summary

When the COVID-19 pandemic erupted, it dismantled daily routines, the economy, and the health care system nearly overnight. Tens of thousands of Americans remain hospitalized or have lost their lives, while millions more have lost their jobs.¹ Moreover, a disproportionate rate of people of color—especially Black, Latinx, and Native American individuals—are represented in the numbers of infected, dead, and unemployed.² These statistics lay bare the teetering existence of millions who live on the margins and cannot weather even one financial disruption, who lack access to health care, and who work in a service sector in which jobs have vanished.³ The response to the pandemic shows the dire need for a workforce trained in STEM fields to conduct research, care for the sick, and develop a vaccine for COVID-19 and future diseases. It has also made abundantly clear the need to train more of the entry-level workforce to take jobs in sectors that can sustain inevitable economic downturns.

The time could not be more crucial for a conversation about how to build and sustain career pathways that achieve these aims; such systems connect high-quality K-12 education with career training that leads to good jobs. As such, career pathways build a resilient middle class. While this report does not focus on the impacts of the current pandemic, it is important to acknowledge the significant disruptions that it is causing to the workforce as well as the ways in which it has widened disparities among young workers.

Even prior to the COVID-19 pandemic, today's young workers faced an economic crisis. American workers between the ages of 20 and 24 were unemployed at a rate of 6 percent—nearly twice the 3.3 percent unemployment rate for the total U.S. workforce.⁴ And things were much worse for young Black workers, who were unemployed at a rate of 10 percent. The unemployment rate of young Hispanic or Latinx workers, meanwhile, stood at 6.1 percent—on par with all young workers but still double the national rate. Enter the sudden shuttering of the economy in March 2020: As a result, the national employment rate has increased to 14.7 percent, and for young workers, it has soared from 8.2 percent in January to 27.4 percent in April.⁵ These data also show that unemployment rates for women and people of color are much higher than the national rate.

There are a number of possible causes of these disparities. As highlighted in a recent Center for American Progress report, “A Design for Workforce Equity,” workers of color and women have historically received lower-quality training, had insufficient social connections to the labor market, and experienced lower wages and employment status due to prejudices against these groups.⁶ All of these factors cause workers of color and women to face a lack of mobility in the labor market as well as a lack of equally shared outcomes, compared with their white male peers. Yet data for young workers suggest that academic unpreparedness also carries consequences in the workforce.

The statistics on academic preparedness are concerning, especially for Black and Hispanic students.⁷ These students have less access to STEM courses in high school than white students, and when they do have access, they pass these courses at much lower rates. Black and Hispanic students also drop out of high school at higher rates than white students.⁸ Even if they stay in school and enroll in college, they place into remedial courses at higher rates, where they must learn basic math and reading skills before proceeding to courses that count toward a degree.⁹ Black and Hispanic students experience these poor outcomes in part because they more often attend schools with less funding, have greater rates of inexperienced and out-of-field teachers, and attend schools with low-quality curricula.¹⁰

Such a poor academic foundation leads these students to be underprepared for careers. Furthermore, guidance counselors that serve schools with primarily Black, Hispanic, and low-income students have higher caseloads, meaning that students may not receive the attention they deserve when planning for their futures. All things considered, it is no wonder that these students are often led to aspire to careers that are at greater risk for automation.¹¹ Indeed, adults of color are more often trapped in low-wage, low-quality jobs than white adults.¹²

The Organization for Economic Cooperation and Development (OECD) offers a framework to differentiate between high- and low-quality jobs.¹³ It focuses on earnings quality, or the relationship between wages and living standards; labor market security, which relates to probability of job loss and its impacts; and the quality of the working environment, which includes access to resources for work completion, job safety, and other noneconomic factors. According to OECD, high-quality jobs offer wages that contribute to a good standard of living, promote labor market security, and provide workers with sufficient access to necessary resources.

Yet the plethora of low-wage, low-quality jobs available in the United States carry grave consequences for workers by perpetuating the growing wealth gap. The average income gap between the richest- and lowest-income households is currently at a 50-year high. As a result, for the first time in U.S. history, the current generation of students are not expected to earn more than their parents.¹⁴

Meanwhile, a shortage of workers is pushing wages higher in skilled trades. These jobs do not require a college degree but do require some training after high school. Approximately 30 million American jobs pay an average of \$55,000 a year but do not require a bachelor's degree; yet while a number of career and technical education (CTE) programs train students for these high-skill, high-demand, high-wage jobs, there are not enough of these courses and programs to reach every high school student.¹⁵

Defining career and technical education

Career and technical education, or CTE, refers to federally supported courses and programs taught at high schools or community colleges to help students develop the skills and knowledge for specific occupational fields—such as agriculture, business, finance, communications, computer science, engineering, health, and others.¹⁶ The federal Carl D. Perkins Career and Technical Education Act, which provided important funding for this form of education starting in 1984, requires that local CTE programs adhere to the “programs of study” requirements. These include alignment of K-12 and higher education elements; coordination and nonduplication of academic and career-related coursework; opportunities for high school students to receive college credit, where appropriate; and opportunities for attainment of industry-recognized credentials or college degrees.¹⁷

Simply expanding career and technical education is not enough. Deservedly, CTE has a poor reputation, as Black and Latinx students as well as students from low-income families have disproportionately been assigned to programs that lead to low-wage jobs with limited opportunities for advancement. What is more, participation in CTE declined from 1990 to 2009.¹⁸

One key solution is to ensure that there are meaningful pathways from high school to further training that leads to a high-quality job, as well as a supply of workers who have mastered the skills necessary to succeed in—and who have access to lifelong learning opportunities to stay current in—their trades. This will require a rethinking of how education is funded and governed in America, one that coincides with labor market trends and addresses not only the skills of incoming workers but also the quality of jobs that they enter.

Fortunately, there are lessons to be learned from the vocational education training (VET) systems in Germany, Singapore, and Switzerland. These countries enjoy strong academic outcomes, low youth unemployment rates, and high worker productivity and standards of living. While not without flaws, the vocational education programs in these countries are strong because they are aligned with local economic needs and are the pathway of choice for the majority of students.

This report:

- Provides a brief history of career and technical education in the United States
- Presents a vision for a revamped CTE system according to a five-part framework that is based on components of high-quality systems
- Culls lessons learned from the high-quality VET programs of Germany, Singapore, and Switzerland
- Makes recommendations for federal and state governments, labor unions, and employers to implement high-quality CTE programs

Brief history of career and technical education in America

The first federal investment in career and technical education began in 1917 with the passage of the Smith-Hughes National Vocational Education Act. Since then, federal investments have continued and grown, diverging into two main components: career and technical education—previously known as “vocational education”—and workforce development.¹⁹ CTE is administered by the U.S. Department of Education and focuses primarily on secondary school-aged students, while workforce development programs are administered by the U.S. Department of Labor and primarily focus on younger and older adults.

In the early 20th century, the United States began to place the influx of immigrants arriving to the country into schools according to perceived ability. Students were prepared for one of three tracks: college, the general workforce, or specific vocational training trades such as plumbing and secretarial work. The tracks for the general workforce and specific trades were less academically demanding than the college track.²⁰ Yet despite this tracking, by the 1970s, the United States led the world in college degree attainment. It has since fallen to the middle of the pack among OECD countries.²¹ CAP has previously argued that simply halving the attainment gap between white students, who currently rank fourth globally, and Black and Latinx students—28th and 35th, respectively—would make the United States the fifth most educated country in the world.²²

Researchers point out that placing students in tracks creates and maintains harmful social stratification, which worsens income inequality and discrimination.²³ Current career education and workforce development programs aim to end this stratification by providing more students and workers access to the middle class through high-quality jobs.

The Carl D. Perkins Career and Technical Education program is the main national funding mechanism for high school and college career training programs. Today, this program provides technical and work-based learning opportunities across 16 career clusters, including health care, manufacturing, finance, business, and more.²⁴ Meanwhile, the Workforce Innovation and Opportunity Act (WIOA) provides workforce training and employment services to adults and youth through its six core programs: WIOA Adult,

WIOA Dislocated Worker, WIOA Youth, Adult Education and Literacy, the Wagner-Peyser Employment Service, and Vocational Rehabilitation.²⁵ Taken together, these programs emphasize students' and workers' attainment of academic, lifelong, and technical skills in order to prepare them to fill high-demand, high-wage, and high-skill jobs.

However, despite the efforts of modern-day CTE and workforce programs to eliminate the low-quality vocational programs of the past and propel students and workers into high-quality jobs, career education still exists on the margins: It is not yet a widely known or highly sought-after pathway to jobs and career advancement.²⁶ And while the quality of today's CTE programs has markedly improved over programs of the past, overall participation in CTE has declined for the past several decades due to the increased number of academic courses required for high school graduation, declining CTE funding overall, and the push to attend college.²⁷

To increase participation in CTE programs and make them celebrated pathways to high-quality employment, the United States should consider the following five components of strong career education systems.

Five critical components of a strong career education system

The VET systems studied in this report have five components in common. According to CAP analysis, they (1) are aligned with local and national workforce needs; (2) require mastery of academics, lifelong learning, and technical skills through integrated learning; (3) use authentic assessments to evaluate student learning and mastery; (4) offer paid apprenticeships; and (5) lead to employer-valued certifications that also allow for on-ramps to further training within or outside of the occupation.

These five components are not the only recommended characteristics of a high-quality career education system; but because they are part of many high-performing systems, they are the focus of this report.²⁸ Importantly, without meaningful and articulated roles and responsibilities that allow the United States' K-12, higher education, and workforce systems to jointly administer and expand the country's CTE system, achieving the ideal program will be impossible.

1. Align student learning with local and national workforce needs

The John J. Heldrich Center for Workforce Development at Rutgers University defines aligning student training with local and national workforce needs as “activities and related outcomes with the goal of ensuring that higher education institutions graduate the correct numbers of graduates with the necessary skills for the job market in a way that supports students’ career goals and is consistent with institutional mission and economic conditions.”²⁹ In other words, alignment refers to a close match between what students study, the competencies and skills they build, and the work that they perform at a job.

Research finds that one barrier to achieving alignment is a lack of consensus on which general competencies and specific skills match job requirements.³⁰ However, a number of skilled industrial, construction, and service trades have defined the specialized and general skills, knowledge, and abilities that prepare workers for entry-level jobs.³¹

Skilled industrial trades include jobs such as mechanics, machinists, and programmers, while skilled construction trades include jobs such as electricians, plumbers, and carpenters. Skilled service trades, meanwhile, include jobs such as nurses, therapists, and service technicians. What sets these skilled service trades apart is that specific certification and licensure by a government agency is often required to enter the profession.

The question for U.S. policymakers and CTE program administrators, then, is the extent to which specialized skills and competencies matter in jobs outside the skilled trades and how much this specialization matters in addition to generalized skills.

2. Require mastery of academics, lifelong learning, and technical skills through integrated learning

While there are many defined and clearly articulated specialized trades, many jobs lack the same kind of specification. As a result, the bachelor's degree has become the default certification for most jobs that require a higher education.³² Such training emphasizes academic learning in lieu of training for a particular career or general workplace skills that apply to all occupations and levels of seniority in employment. While academic mastery is critical for providing a solid foundation, with the rate at which skill requirements are changing, adaptability and lifelong learning skills may matter most for workers. Many employers agree with this sentiment: Surveys of U.S. employers show that they rank written communication, problem-solving, teamwork, initiative, and analytical abilities as the most desired skills in prospective employees.³³

Notably, these are the types of abilities, skills, and competencies that cross sectors and job types. They are also equally valuable to entry-level workers and to those looking to advance in their careers. Moreover, these skills can all be taught and developed in the classroom and through work-based learning experiences. Such practice is referred to as integrated learning.

Workers recognize the importance of honing their skills. A 2016 Pew Research Center poll of U.S. adults in the workforce found that the majority of workers believe that they must continue to update their skills through training in order to keep up with changes on the job throughout their careers.³⁵

These findings emphasize America's need for a coordinated system of ongoing training that speaks to the needs of both entry-level workers and workers more advanced in their careers.

Defining "integrated learning"

Integrated learning refers to the practice of combining text-based learning with applied learning that occurs inside and outside of the classroom, such as through projects or work-based learning experiences. Integrated learning helps students make connections across subjects, from the classroom to real life.³⁴

3. Use authentic assessments to evaluate student learning and mastery

Authentic assessments of student learning and mastery would closely mimic on-the-job tasks and be of high quality. Experts define high-quality, authentic assessments in career and technical education by six criteria:³⁶

1. Assessments should be appropriately scaled for rigor and relevance, matching the academic and technical intensity expected for entry-level workers.
2. Assessments should measure what students know and can do as well as their behaviors and dispositions toward the work environment. While technical and general skills are important, how students approach the work environment must also be understood.
3. Given the different formats that assessments will take, assessments' scoring rubrics should effectively capture a range of student mastery and should rarely be exclusively paper- and pencil-based.
4. Assessments should be graded in ways that promote skill improvement over time. Rather than pass/no pass grading schemes, grading should provide feedback that allows students to grow in their skills and abilities.
5. Assessments should be conducted throughout students' learning experiences, rather than administered at a single point in time.

Authentic, performance-based assessments would allow students an opportunity to demonstrate their skills in dynamic, interactive ways.

4. Offer paid apprenticeships

Paid apprenticeships offer on-the-job training alongside classroom instruction. These programs significantly benefit workers; participants in paid apprenticeships in the United States earn on average \$60,000 annually, just above the U.S. national median household income.³⁷ However, research shows representation gaps for women and people of color in paid apprenticeships.³⁸ These workers also earn lower wages in apprenticeships.

Women and people of color face barriers to entry into apprenticeships that white male workers do not. For example, they often lack reliable transportation and child care.³⁹ To support the participation of these groups, high-quality, paid apprenticeships could offer child care and transportation benefits. Paid apprenticeships must be made more accessible for people across the country.

5. Lead students to employer-valued certifications that also allow for further training and certification

The term “certificate” is sometimes used synonymously with “degree,” “diploma,” or “license.” However, these things are not the same, and they each carry different opportunities within the workplace. Degrees usually refer to an academic education and include associate, bachelor’s, master’s, and doctorate levels. Diplomas and certificates, meanwhile, usually relate to specific occupations or careers and take about two years to earn; in addition, certificates—and even degrees—can be required in skilled trades such as nursing. Licenses do not usually refer to a specific course of study but are more likely to be required for authorization to practice in certain industries, such as teaching. Employers do not value all of these certification types equally, especially certificates.

Nearly 1 million certificates are conferred to students in the United States every year, but research shows that very few jobs actually require a certificate.⁴⁰ Research also shows poor outcomes for students—especially low-income students—who obtain certificates.⁴¹ Slightly more than half of students studying for a certificate ever receive it, and when they do, only slightly more than one-third of students receive wages above those of the average high school graduate.⁴²

Therefore, certificates may not lead to enhanced wages in good jobs. Understanding what employers value will require meaningful, ongoing engagement with them to design certificate programs that are validated in the labor market and associated with good jobs. Such jobs would allow workers to earn enough in wages to live and pay back any student loans used to acquire the certificates.

Surveys of long-standing vocational education programs in Europe reveal eight characteristics of high-quality certificates:⁴³

1. Standardization of final exams across all certificate programs
2. Verification and approval of final exam assignments by a group of assessors
3. Variation in examination methods
4. Authenticity of assessments
5. Verification of grading by independent committees
6. Use of grading scales
7. Grading by multiple assessors
8. Substantiated rationale for grading

Moreover, those getting a certificate in a particular occupation should also receive credit that can be applied toward additional certificates, diplomas, or degrees. Certificates should not preclude learners from continuing on their desired career pathways.

Examples from Germany, Singapore, and Switzerland

A high-quality career education program that confers valued certificates that carry weight in the labor market will take coordinated and sustained effort from the K-12 system, the higher education system, and the labor market. Germany, Singapore, and Switzerland provide useful examples of career education programs that do just that. Their strong career education—or vocational education training—programs offer lessons that the United States should consider.

Overview of the German, Singaporean, and Swiss VET systems

The German postsecondary training system, which includes VET, is comprised of three types of training programs. The first is full-time vocational schools, which are required for certain vocations, such as those in health care. The second is dual VET programs, where participants can choose from more than 300 programs and act as both students and employees, or apprentices. Vocational schools and VET programs train about two-thirds of all students and typically last about two to three years. Finally, the third type of training program is traditional colleges, which last anywhere from three to five years.⁴⁴

Singapore's entire education system, including its VET system, is highly meritocratic. Student scores on exams determine what type of training they receive—academic or vocational—and what types of programs they are eligible to pursue. After taking a general exam at age 16 or 17, approximately 25 percent of Singaporean students enroll in junior college, which is the primary route to the university system. About 40 percent enroll at one of five polytechnic schools, and another 25 percent enroll at the Institute of Technical Education (ITE). Therefore, in total, about 65 percent of all students enroll in some form of vocational education training. ITE students can return for further training at one of the country's polytechnic schools, and students in polytechnics can also pursue an academic degree.⁴⁵

In Switzerland, compulsory education ends at ninth grade, so by the age of 14, students must know what postsecondary training and occupational path they want to pursue. Students, then, have three options: a federal VET certificate program that takes two years to complete; a federal VET diploma that takes three to four years to complete; or an academic school. These three programs are what is called the “upper secondary level,” after which students can pursue further training in what is called the “tertiary level.” There are also two options for vocational training and two for academic training. Approximately 70 percent of students pursue the vocational route while only about 25 percent of students pursue the academic route.⁴⁶

How these countries fulfill the five characteristics needed for strong VET

1. Align student learning with local and national workforce needs

Germany, Singapore, and Switzerland all provide formal and sustained roles for employers in the design and implementation of national career education programs. In all three countries, the availability of paid apprenticeships reflects labor market needs, and companies recruit new hires from their pool of apprentices.

Each country employs different strategies to further the pathway from training to the labor market. Germany, for example, researches various topics, including the connection between training and employment; modernization and quality assurance of the training system; the availability of lifelong learning; training diversity; and ways to scale the German model elsewhere in the world.⁴⁷

Singapore, meanwhile, requires its career program faculty to take a teaching sabbatical in order to engage in externships in corporate firms, thus ensuring that teacher skills are constantly upgraded as technology and workplace practices change.⁴⁸ Employers help design students’ vocational training programs, assessments, and set certification standards, as well as provide training programs with up-to-date equipment. Switzerland also tasks employers with determining training content and with identifying which new occupational programs must be developed, revised, or closed.⁴⁹

2. Require mastery of academics, lifelong learning, and technical skills through integrated learning

All three countries place a strong emphasis on academics and lifelong learning skills. Germany’s training system applies the concepts of lifelong learning to every aspect of its system, from the curricula to the assessments and apprenticeships. It does so through the development and application of its German Qualification Framework for lifelong learning.⁵⁰

Singapore, meanwhile, emphasizes lifelong learning skills for students and teachers alike.⁵¹ In 1997, the Ministry of Education reviewed the country’s compulsory education curriculum and identified ways to reduce required coursework in order to make room for both student projects and student choice in course selection. Teachers have reflection time for professional development built into their schedules, and there is a direct feedback loop from the ministry to the schools so that the systems inform each other. Singapore is consistently a top performer on international academic tests such as the Program for International Student Assessment (PISA). Contributing to these outstanding results is the country’s practice of identifying students who are struggling at critical benchmarks, including in third grade—the final year for students to master reading—and high school. In Singapore, even the bottom 25 percent of performers outrank most country’s overall averages.⁵²

Switzerland’s students, like Singapore’s, perform well above average on the PISA.⁵³ In addition to academic excellence, Switzerland’s VET program also focuses on lifelong learning skills. For example, students must develop formal presentation skills both in the classroom and in workplace settings. In fact, the Swiss system holds itself accountable for ensuring that students learn all of the desired skills and abilities through its skills maps, which articulate where in the system students learn the skills and abilities—be it the classroom, a technical training site, or the workplace.⁵⁴

3. Use authentic assessments to evaluate student learning and mastery

Assessing students’ skills and mastery of academic and technical topics is a complex endeavor. Germany invests in assessment research and uses simulation in school-based settings to understand a student’s approach to real-life situations.⁵⁵ It uses the results of such assessments to improve training curricula and facilities and to improve the measurement instruments themselves.

Singapore’s strategy for authentic assessments is based on its “authentic learning” approach.⁵⁶ Unlike with the dual models of Germany and Switzerland, students in Singapore receive integrated academic and career training at real work sites rather than off-site training programs. This ensures tight integration of academics and work-based learning.

Switzerland’s assessments of training programs are based on projects that students complete during their time in the program. These projects are based on objectives negotiated by the student and assessor at the beginning of the program.⁵⁷ Students receive a learning report at the end of each semester that documents their progress, vocational interests, and motivations.

4. Offer paid apprenticeships

All three countries pay student apprentices a wage while they are learning.⁵⁸ This type of support is possible due to the employer-government partnerships in overseeing and operating the national vocational programs. Employers pay apprentices a wage, which often increases if those apprentices become employees. These models work because employers pay to maintain their vocational programs—not only through apprentice wages but also equipment, the provision of training sites and materials, and mentorship by their employees.

5. Lead to employer-valued certifications that allow on-ramps to further training

In all three countries, the standards and certificates associated with the VET programs are standardized across the country. This means that certificates are nationally recognized and accepted. In Germany and Switzerland, for example, certificates are conferred by third parties, including chambers of industry, chambers of commerce, and unions.⁵⁹ In Singapore, technical institutes confer certificates.⁶⁰ And in all three countries, students are required to have certificates to enter nationally recognized occupations.

There are no comparable data comparing pay for certificate holders with average annual or minimum wages in each country. However, with average annual salaries of approximately \$54,516 and \$122,935 (U.S. dollars), respectively, Germany and Switzerland eclipsed U.S. workers' average salary of \$48,672 in 2019. Singapore, meanwhile, is on par with the United States in terms of the average salary, at \$48,048.⁶¹

Germany's system allows students to enter one of three training programs following compulsory education: a full-time occupational program, a dual training program that combines academic and technical education, and higher education—the more academic route.⁶²

Students in Singapore and Switzerland have a wide array of options, not only in occupations but also in the types of training they pursue and how far they go.⁶³ Students can stop at two-year certificates or pursue advanced certification requiring additional years of study. They can also return to receive more training after spending time in the workforce. These options are merit-based, so students must achieve minimum scores on assessments to qualify for training programs. However, students who do not meet minimum scores receive additional counseling, and both countries have second-chance programs where students receive additional training before being assessed again.

Challenges in the German, Singaporean, and Swiss VET systems

Though strong, these VET systems are not without their challenges. Germany, for example, has major problems for which it must find solutions. The first is ensuring that all students have high-quality training options. In 2015, less than half of Germany's students with the lowest possible qualifications received a spot in a dual training program; the remainder did not receive anything.⁶⁴ And 8 percent of training positions went unfilled because there were no suitable candidates.⁶⁵ These gaps can be partially explained by the large influx of immigrants into Germany, whose primary barrier to entering VET programs is a lack of fluency in the German language. States are therefore offering language courses; however, this has not completely closed the gap.

Germany also has a severe teacher shortage across its compulsory, vocational, and academic training systems.⁶⁶ The country is looking for solutions, such as alternative teacher certification programs to increase the number of teachers available. In addition, more German students are choosing the academic program over the dual training program. In 2016, there were 80,000 fewer apprenticeships than there were in 2017, as well as 155,000 fewer applicants.⁶⁷

Like Germany, Singapore is facing several barriers to ensuring that vulnerable student populations can access its education system. Singapore has seen an influx of immigrants in recent years, and integrating them into the workforce and education system has proven to be challenging.⁶⁸ Singapore has adopted policies requiring employers to pay fees to train foreign workers and making employers responsible for ensuring that these workers follow Singaporean employment rules. The children of immigrants, meanwhile, face the challenge of learning English—Singapore's main language of instruction.

The country also faces the challenge of ensuring that its education system fosters creativity in its students. When the government interviewed business leaders in 2012, they expressed worries that Singaporeans do not invent new technology, but rather perfect technologies and systems invented elsewhere.⁶⁹ Singapore's education system is fiercely meritocratic, often providing advantaged students—those with additional resources outside of school to improve their academic prowess—entry into elite institutions. It also weighs academic achievement more heavily than other skills and abilities, which may limit the ability to be more creative and invent technologies. In short, Singapore's brand of meritocracy can leave behind students from low-income communities, students with disabilities, and students who are new to the country.

Finally, the Swiss VET system is also facing a number of issues. In a 2005 report, the Swiss Coordination Centre for Research in Education highlighted concerns that pertain to gender, nationality, and socioeconomic status, including high student dropout rates among women, less funding for postsecondary VET programs than for academic programs, low workforce participation among women, and early tracking of migrant students, especially into lower-quality educational pathways.⁷⁰ The report raises the question of what these issues mean for equity, suggesting that the Swiss federal government adopt an equity lens through which to view its policies and create strategically guided steps to improve.

Key foundations of strong VET programs

Despite these challenges, there are considerable lessons to learn from the vocational education programs in Germany, Singapore, and Switzerland. Among them are three key foundational components that guide how each country approaches its education system; this context has a direct impact on the countries' economies and standards of living.

First, each country has adopted a long-term outlook for education reform. The public education system is the backbone of their economies and standards of living. As a result, they invest in their VET systems as part of a broader economic strategy that promotes the well-being of their citizens; moreover, each country plans reforms over decades in order to meet the changing needs of their economy. For example, Germany closely regulates its training programs to ensure that they are sensitive to labor market needs. Singapore intentionally aligned the establishment and improvement of its VET system to fit the needs of the economy. And Switzerland has adjusted its policies to reflect increasing enrollment in its VET system.

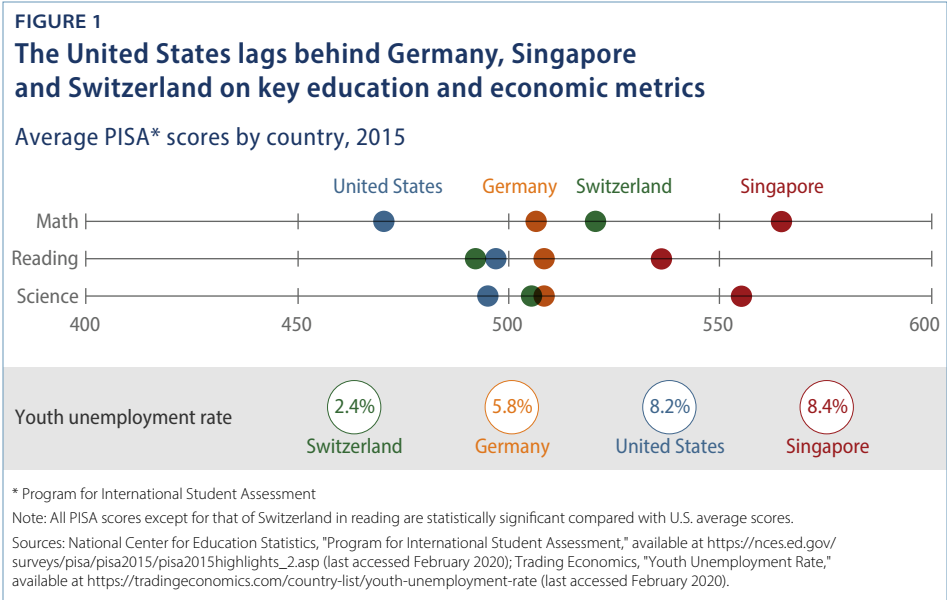
Second, each country addresses the quality of its compulsory education system so that it adequately prepares students for rigorous VET programs. Germany, Singapore, and Switzerland each ensure nationwide use of high-quality curricula, rigorous academic standards, and national tests to ensure the portability of compulsory education and certifications across state and regional lines.⁷¹ The emphasis that these countries place on investing in improving education quality relates to their desire to be competitive in a global market based on the quality of their work. To be competitive, they must have the highest-quality workforce.

Third, each country gives an equal role to employers and labor unions in designing the VET system and providing some aspect of VET education. They believe in a tripartite governance model to bring high-quality vocational education to scale. In all three countries, employers host apprentices and pay them, and labor unions or other employer-related third parties determine training content or certify student skills by administering assessments and conferring certificates. This model allows each aspect—government, employers, and third-party organizations such as unions—to play roles suited to their expertise. It also ensures that labor unions play a role in ensuring that the incoming workforce is thoroughly trained on industry standards.

How strong vocational education would benefit America

The OECD assesses member countries in its Better Life Index on a host of quality factors, including housing, income, jobs, community, education, environment, civic engagement, health, life satisfaction, safety, and work-life balance.⁷² In a combined ranking of all these indicators, the United States falls in the middle of the pack. This is not where it needs to or should be. Getting back to the top must not be a piecemeal effort, but rather a coordinated, long-term strategy that centers providing high-quality education for every student.

Table 1 compares the United States to Germany, Singapore, and Switzerland on education and employment indicators. Each of the comparison countries have better academic outcomes than the United States. Their students outperform U.S. students on the biannual PISA, an exam that tests 15-year-olds in reading, math, and science. On this assessment, the United States consistently performs in the middle of the pack.



Interestingly, the countries with the longest-standing vocational education programs have drastically lower rates of youth unemployment than the United States, which has a rate of 8.2 percent. For comparison, Germany and Switzerland sit at 5.8 percent and 2.4 percent, respectively.

Recommendations for implementation

Any significant or meaningful reform of career education at the national level in the United States will require a vision, as well as sufficient funding from federal, state, and local government to make that vision come to life. What follows are recommendations for each level of government, labor unions or other third-party employer organizations, and employers to develop a high-quality career education program that comprises the strongest components of the programs highlighted in this report.

Federal and state governments play a key role in five areas: (1) developing a national and state vision for career education, (2) providing funding, (3) ensuring equity, (4) ensuring portability of credentials, and (5) ensuring a match between availability of training programs and labor market needs.

1. Developing a national and state vision for career education

A vision for career education in the United States should ensure that all students participate in meaningful pathways to good jobs that allow them to be productive citizens. The benefits to society are plenty: higher standards of living, higher tax revenues, higher worker productivity, higher-quality goods, and a national identity as a great place to learn and live.

High school graduate profiles

Defining what students should know and be able to do across multiple dimensions is critical in determining what resources and supports students will need to get there. Some states are doing just that through “graduate profiles,” which provide data across dimensions such as content knowledge, universal workplace skills, civic responsibility, and career preparation.⁷³ The advantage of graduate profiles is that they help states define high school graduation requirements that expand beyond just course completion, the main metric for most state requirements.⁷⁴ Virginia is an example of a state with a graduate profile in place, and Kansas, Michigan, and South Carolina are looking to follow suit.⁷⁵

2. Providing funding

Currently, the federal government spends about \$4 billion annually on high school and postsecondary career education and adult workforce programs.⁷⁶ States contribute funding for these programs, but national data on how much they spend are not available. The high-quality systems documented in this report are expensive, which is why the tripartite governance and funding models work to bring these systems to scale. High-quality apprenticeships must be paid for, in significant part, by employers, who must see the value of allocating resources to the young workforce in order to continue investing.

Funding can also come from the private sector. For example, Siemens, a global manufacturing company, runs apprenticeships in Brazil, Canada, Europe, India, and South Africa. In 2014, the company expanded its apprenticeship to Charlotte, North Carolina.⁷⁷ It covers three trades: machinists, mechatronics electricians, and mechatronics technicians. Apprentices are paid; they spend 1,600 hours in the classroom and 6,400 hours in the factory over the course of a four-year program that results in a state journeyman's certificate, an associate degree in machining or mechatronics from a local community college, and placement in full-time positions as available. Siemens estimates that it spends \$131,000 on each apprentice but finds that the rate of return on that investment is 8 percent compared with hiring an entry-level worker who did not graduate from the apprenticeship program.

3. Ensuring equity

Federal and state governments have a responsibility to ensure that career education policies benefit all students and do not disadvantage those who have fewer resources. To do so, federal and state governments need to develop career education policies with equity at the center. Current data on CTE programs in the United States suggest that not all students have access to high-quality programs and that some programs, such as skilled trades, lack gender and racial/ethnic equity.⁷⁸

CTE program quality, access, and achievement are three areas in which the United States should expand what data are tracked and reported. Data on the quality of CTE programs should include, but are not limited to, the relevance to local labor economy needs; the resources schools have for their programs, such as computers and other equipment; and the extent to which programs lead to attainment of certificates valued by employers. Data on access to programs and student achievement must be more extensive than what is currently mandated. They must include,

for example, participation and performance rates by specific CTE programs, courses, and concentration statuses—students who take two or more CTE programs in the same field are considered “CTE concentrators.” These data must also track postsecondary participation and performance for students who pursue further training, as well as their employment and wage outcomes. CAP’s recent report on workforce equity recommends tracking and reporting holistic data on employment quality in order to interrupt inequitable outcomes in the workforce.⁷⁹ These data should be disaggregated by race/ethnicity, gender, socioeconomic status, ability status, and English learner status.

Kentucky produces an annual Career and Technical Education Feedback Report to track important data, detailing a series of outcomes for CTE students in each region of the state, including college enrollment, college GPA, college credit attainment, and full-time study status.⁸⁰ In addition, the report includes regional employment rates and employment rates by occupational sector. While these data are not disaggregated by student groups, they represent a start toward more meaningful outcome data for CTE students.

4. Ensuring portability of credentials

Credentials have the most currency when employers use them to make personnel decisions and certifications are accepted nationwide. To get there, certificates must meet standards of quality agreed upon by employers. Federal and state governments, in partnership with employers and labor unions or third-party employer organizations, should audit credentials to identify those that carry value and establish a process to phase out those that do not.

Alabama is one state taking the quality of credentials issue head-on. The state’s adult labor market participation rate is among the lowest in the country.⁸¹ To address this, the Governor’s Office of Education and Workforce Transformation aims to produce 500,000 credentialed workers by 2025.⁸² In order for these credentials to be recognized by employers in the state—and thus have value for workers—the governor established the Alabama Committee on Credentialing and Career Pathways, a public-private entity devoted to credential quality and transparency, using labor market information to align education and training programs with economic demand. To pay for this effort, the state braided funding from the federal Every Student Succeeds Act, the Carl D. Perkins Career and Technical Education Act, and the Workforce Innovation and Opportunity Act, all of which are intentionally designed to create better alignment between education and the workforce by training students for in-demand careers.

5. Matching availability of training programs and labor market needs

Ensuring that available training matches labor market needs will require the number and type of career education training programs to reflect current and future labor market needs. This is not a separate question from credentials of value, but rather should be considered simultaneously. Alabama's approach exemplifies this.

Labor unions and other third-party employer organizations have a critical role to play in training and certifying student skills and abilities. A persistent problem facing career education in the United States is determining where students should receive occupation-specific training, given the lack of employer-led apprenticeships. Currently, many students receive this training in classrooms and through some work-based learning experiences. The United States needs to rethink its delivery of occupational training if it is to be scalable. While labor unions in the United States have long participated in the training of the adult workforce by administering apprenticeship programs in skilled trades, the problem of scale quickly arises, as these are not available in every city or county.⁸³ The U.S. Department of Labor sets standards of quality for apprenticeships through its Registered Apprenticeship Program, and this framework could be used to determine the quality of apprenticeship programs nationwide.⁸⁴

One example comes from a partnership that arose between the culinary and bartenders unions in Las Vegas and major hotels and casinos on the Las Vegas strip, arising from a need to create a "reliable, trained" workforce.⁸⁵ The academy trains approximately 1,600 people annually, a majority of whom are Latinx or Black. The training is free, and the training institute is now a recognized postsecondary institution in the state. Trainees are first in line for job openings.

Employers should also host, mentor, and pay apprentices. In Germany, Singapore, and Switzerland, this practice is required. Employers in these countries say that the investment is worthwhile and see improvement in their bottom lines. Studies in the United States support this sentiment, as apprenticeships show a 50 percent return on investment and lower employee turnover rates.⁸⁶

U.S. employers interested in developing internships can apply to the federal Department of Labor to create a registered apprenticeship. These apprenticeships must offer wages, work-based and classroom learning, mentorship, and an industry-recognized credential. In exchange, employers receive from the department technical assistance, the potential for tax credits, national recognition of certificates and quality standards, and incentives for veterans who can receive an additional monthly stipend to supplement wages.⁸⁷

Conclusion

The United States' future economic growth and the stability of its middle class require high-quality pathways from high school to further training and a good job, as well as a supply of workers who have mastered academic and lifelong learning skills. Achieving this goal will require a rethinking of how education is funded and governed in America. This must coincide with labor market trends and address not only the skills of incoming workers but also the quality of jobs that they enter.

Fortunately, there are lessons to be learned from the examples provided by the vocational education training systems in Germany, Singapore, and Switzerland. While not without their flaws, these systems are high quality because they are aligned with local economic needs and are the pathway of choice for the majority of students in these countries.

If the United States applies lessons learned from Germany, Singapore, and Switzerland, it can regain its reputation as the educational and economic leader of the world.

About the author

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Our Mission

The Center for American Progress is an independent, nonpartisan policy institute that is dedicated to improving the lives of all Americans, through bold, progressive ideas, as well as strong leadership and concerted action. Our aim is not just to change the conversation, but to change the country.

Our Values

As progressives, we believe America should be a land of boundless opportunity, where people can climb the ladder of economic mobility. We believe we owe it to future generations to protect the planet and promote peace and shared global prosperity.

And we believe an effective government can earn the trust of the American people, champion the common good over narrow self-interest, and harness the strength of our diversity.

Our Approach

We develop new policy ideas, challenge the media to cover the issues that truly matter, and shape the national debate. With policy teams in major issue areas, American Progress can think creatively at the cross-section of traditional boundaries to develop ideas for policymakers that lead to real change. By employing an extensive communications and outreach effort that we adapt to a rapidly changing media landscape, we move our ideas aggressively in the national policy debate.

