

THE CHRONICLE
of Higher Education®

Career-Ready Education

Beyond the skills gap,
tools and tactics for an
evolving economy





Completion With a Purpose®

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Together we address critical postsecondary education and workforce challenges through a combination of strategic philanthropy, research and insights, and mission-aligned businesses – all focused on advancing the universal right to realized potential we call Completion With a Purpose®.

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**ROADTRIP
NATION**



**EDUCATION
WORK**



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A large, bold, gold-colored letter 'W' that serves as a decorative element for the first paragraph of the introduction.

WANT TO start a little fight? Gather a few college leaders, employers, and economists, and ask them whether there is a “skills gap.” If so, who’s responsible, and how can we fix it?

The rhetoric is everywhere, but the talking points differ. Employers complain that they can’t find qualified candidates for certain jobs, or that recent college graduates lack writing or problem-solving skills. Educators defend and periodically update their curricula while arguing that employers have stopped investing in training to help new hires break in, or mid

career workers stay current.

Meanwhile, economists examine the glut of unfilled jobs — as many as seven million, depending on how you calculate — and debate what those vacancies represent. Fault lines in the social and educational structures that support the American work force? Perhaps, relative to the 150 million currently filled jobs, the open ones are simply part of the normal churn of a recovering economy. Or maybe they’re a sign that many employers just aren’t paying people enough.

All of that is grounded in fact. But the talk doesn’t necessarily help the 20 million people who enroll in college every year aspiring to rewarding careers, nor the millions more already in the work force who worry that a lack of skills or education will hold them back. Neither does it generate many solutions for colleges trying to keep up with the future of work.

So whether there's a skills gap, labor-market friction, or some other term du jour, one thing is evident: For too many people, the pathways, or, as one expert puts it, the "grooves toward careers," aren't as clear or as accessible as they could be — or once were. The education and training developed over the past two centuries may not suit today's labor market or be ready for the digital wave.

"Equipping citizens with the tools they need pays fidelity to the mission of higher ed."

This report moves beyond definitions of the skills gap and the accompanying blame game to the shifts that will push colleges to rethink their role. People now face "longer, more turbulent work lives," notes Michelle R. Weise, chief innovation officer at the Strada Institute for the Future of Work, and at more points along that journey they'll need additional education and training. Hiring is becoming more skills-based, and the explosion and acceptance of new credentials from a plethora of providers demand fresh approaches to academic programs. Employers and policy makers, too, will need to up their game.

The goal isn't to turn every institution of higher education into a job-training center. But there's no shame in adding relevance. With ca-

reer outcomes top of mind for families and public officials calculating their return on investment, colleges have to prove their value to traditional-age students as well as to learners of any age looking for a change or a leg up.

A college degree may still be the coin of the realm for job searches, yet many other "signals" — certificates, badges, industry certifications, apprenticeships, even online games and challenges that employers design to scout candidates — are gaining currency. At the 2019 World Economic Forum, the CEO of IBM, Ginni Rometty, called on her tech-industry colleagues to hire employees based on their skills, "not just their degrees or their diplomas." It's an argument for practicality and fairness.

The message for college leaders is that their programs must develop both hard skills, like digital proficiency, and soft skills, like critical thinking, to help students compete and succeed.

That's the reality of the times — and no hard break with the past, says Brian Fitzgerald, chief executive of the Business-Higher Education Forum, an organization that helps colleges and employers collaborate on curricula. "Equipping citizens with the tools they need," he says, "pays fidelity to the mission of higher ed."

Even for those who contend that the skills gap is a myth or an exaggeration, there's no denying the need to prepare students for a transforming labor market.

Two generations ago, in 1956, General Electric created the first "corporate university." That model hardly exists anymore. Today the rise of the gig economy and the erosion of job security, as global forces often dictate where industries hire and invest, have left employees to navigate their careers more or less on their own.

At the same time, technology and automation threaten to wipe out millions of low-skill jobs

in the United States over the next few decades, leaving young people and minority groups particularly vulnerable, with possible intergenerational impact. International organizations, think tanks, and regional education boards issue analyses, warnings, and calls for, as the World Economic Forum recently put it, a “reskilling revolution.” In early 2019, the Brookings Institution urged government, business, and civic leaders to “promote a constant learning mind-set.”

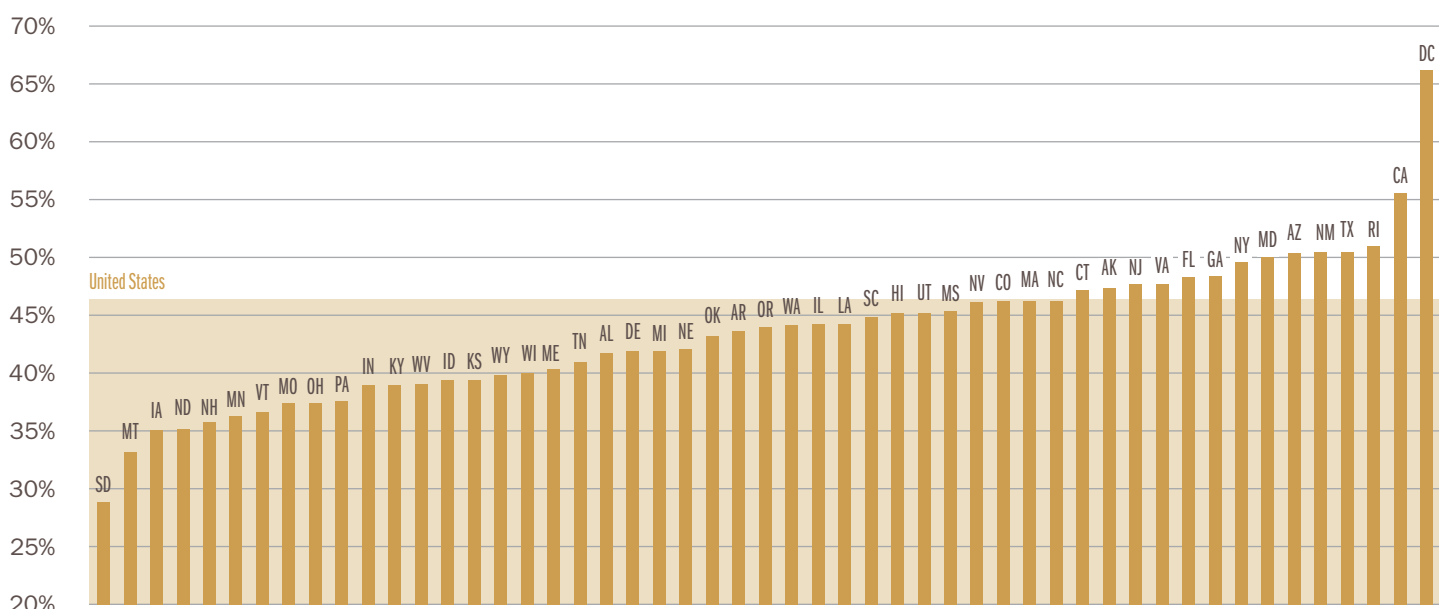
Already there’s demand for this change. One recent survey found that across generations, even

among aging baby boomers, significant shares of American workers are concerned that a lack of skills or education will hurt their careers in the next five years. According to another survey, a Strada-Gallup poll of more than 200,000 adults in the work force or looking for work, 42 percent of those with bachelor’s degrees and 52 percent of those with associate degrees feel they need additional education to advance.

As low-skill jobs disappear, the projected growth of middle-skill jobs — those in fields like health care, cloud computing, and advanced

FIG. 1: DESIRE FOR MORE EDUCATION

Almost half of workers nationally feel they need additional education to advance in their careers.



Note: These figures come from a survey of more than 80,000 adults ages 18 to 65 currently in the workforce.
Source: Strada-Gallup Education Consumer Insights

manufacturing that require some postsecondary education but not a bachelor's degree — has drawn more attention to that sector. So-called new-collar jobs account for more than half of job growth in the current decade and now exceed the available supply of workers to fill them.

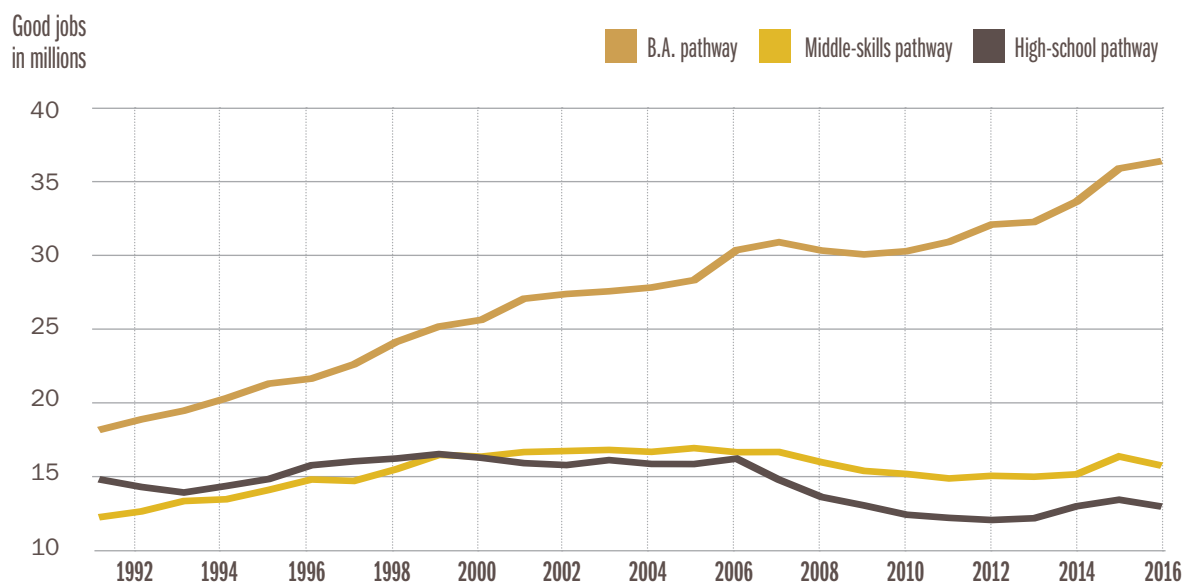
Manufacturing education is one area where employers and colleges, especially two-year institutions, are building partnerships to help meet work-force needs. The Kentucky Federation for Advanced Manufacturing Education, for example, grew out of a relationship between Toyota

and Bluegrass Community and Technical College. Its “work and learn” model has since expanded to 26 other campuses across 11 states. More than 200 participating companies sponsor students, most of whom, after five intensive semesters, get an associate degree and a job.

Given the institutional diversity in higher education, not to mention the pace of technological and economic change, no single report could list the many specific skills that colleges need to teach their students. But facility in certain areas could prove valuable. A recent study

FIG. 2: ‘GOOD JOBS’ FOR CREDENTIALIAED WORKERS

Some postsecondary education helps workers fare better, but over all, the share of jobs paying at least \$35,000 to \$45,000 has shifted to people with at least a bachelor's degree.



Note: The researchers define “good jobs” as those paying at least \$35,000 for workers ages 25 to 44 and at least \$45,000 for workers ages 45 to 64.

Source: Georgetown University Center on Education and the Workforce analysis of data from the U.S. Census Bureau and Bureau of Labor Statistics, Current Population Survey

from Burning Glass Technologies identifies four clusters of skills suited to the kinds of jobs that will be least vulnerable to automation, and better-paying over the long haul: the ability to use digital tools and technology; interpret, visualize, and communicate with data and analytics; understand business and management; and design. Such skills will equip people for the world ahead, where “almost every job is becoming digital in some way,” as Weise has said.

That is, unless the world keeps changing, which of course it will. Already some experts argue that the idea of college as a two- or four-year experience is outdated. “You can’t prepare anybody for life anymore,” says Arthur Levine, a former college president and foundation head who is writing a book on the future of higher education. Instead, colleges need to treat learning as a continuous process.

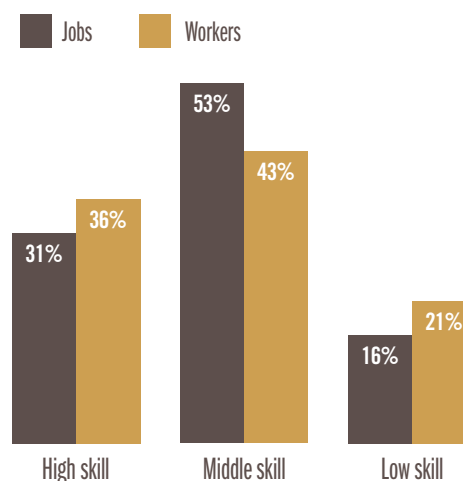
The rise of stackable credentials — which enable, say, a certificate holder to more easily go back for an associate degree and maybe later a B.A. — is one step in that direction. Recently “upskilling” has become a buzzword, referring to various forms of additional training for incumbent workers. In fact, there are many paths for colleges to build long-term relationships with students and to better serve working adults.

Several institutions are already headed in those directions. The University of Washington, for example, is designing a 60-year curriculum to develop a continuing connection with its students. Southern New Hampshire University has built out its online capabilities with plans to offer microcredentials and other programs to more than 100,000 non-degree students within five years.

Bold innovations take time and resources, while more-modest responses can still be effec-

FIG. 3: MIDDLE-SKILL GAP

Middle-skill jobs, which require some post-secondary education but not a bachelor’s degree, now represent more than half of all employment. But the supply of workers falls short.



Source: National Skills Coalition analysis of Bureau of Labor Statistics Occupational Employment Statistics and American Community Survey data

tive. College leaders might consider less convulsive moves like curricula informed by more employer input, tweaks in general-education programs to better incorporate experiential learning, or course schedules better suited to working adults.

This report highlights how colleges can meet the changing demands of the economy without being overreactive or reductive. The only approach that is not an option is inaction.

The following sections focus not on the what — subjects to teach or credentials to offer — but

Is There a Skills Gap?

What do we mean when we talk about the “skills gap”? To most people, it refers to a shortage of available people with the requisite skills to fill open jobs.

When looking at specific regions, populations, sectors, and even industries, the gaps are real. The Manufacturing Institute, for example, predicts that fewer than half of an estimated 4.6 million open jobs over the next decade will be filled. The industry suffers from an image problem and schools’ emphasis on college prep. In computing, women make up only about a quarter of the work force, black women 3 percent, and Hispanic women 1 percent. That probably reflects problems with the pipeline.

Still, it’s not hard to find academics eager to challenge the broader concept. Perhaps the most visible is Peter Cappelli, a professor of management at the University of Pennsylvania’s Wharton School, who derides the

“skills gap” as a go-to excuse when jobs are hard to fill for reasons other than a lack of qualified candidates.

Some jobs, he says, don’t pay well enough. Or they’re located where people don’t want to or can’t afford to live.

If there really were a skills gap, economists argue, employers would be raising wages in response.

In some cases, open jobs are actually unskilled. Or maybe they demand years of experience, and most good candidates are already working for competitors.

“Should we describe that as a skills problem?” Cappelli asks. “Is there anything that schools can do? I don’t see that.” If there really were a skills gap, economists argue,

employers would be raising wages in response. But that hasn’t been the case, not even as the unemployment rate hovers at a two-decade low.

Employers compound their hiring problems, some economists say, by requiring a bachelor’s degree when jobs do not really need that level of education. “College has become such an important signal,” says Daniel Shoag, an associate professor of public policy at Harvard University’s Kennedy School.

But a signal of what? Is a degree a true measure of someone’s accounting or engineering skills, or her reasoning? Or have employers used it as a proxy for other qualities, like reliability?

So-called credential creep can breed resentment, says Byron G. Auguste, chief executive of Opportunity@Work, a four-year-old organization that aims to expand access to career opportunities. Even if it wasn’t anybody’s intention, he says, “employers have weaponized the degree.”

on the how: how to understand the forces driving change, how to identify the challenges ahead, how to structure academic programs to foster employability, and how to build effective relationships with employers and other partners.

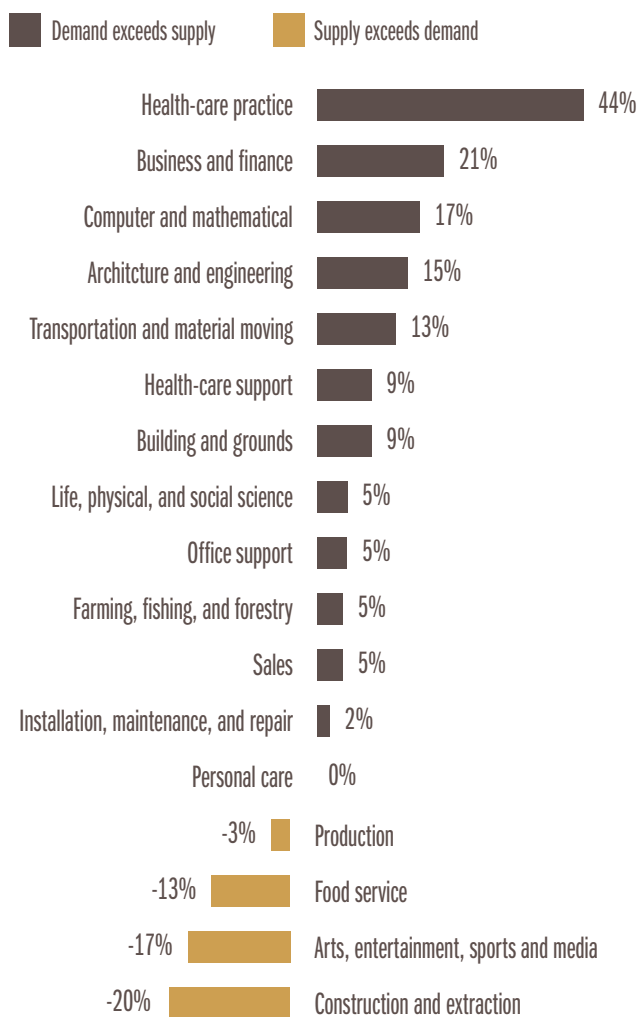
This report explores:

- What college leaders and their partners need to know about the changing hiring landscape and the emerging “credential economy,” to better prepare students for what they’ll encounter, and so that institutions themselves aren’t left behind.
- How colleges can respond to work-force needs while staying true to their missions, drawing on the experiences of both educators and employers.
- Opportunities for collaboration with a range of outside organizations, many of them new on the scene, to extend colleges’ reach.
- Emerging ideas to help students who are beginning their careers or pondering new directions.

The skills gap may be an elusive concept. But the tools and tactics to prepare students for an evolving economy are real and ready.

FIG. 4: MISMATCHES IN SUPPLY AND DEMAND

In several occupations, the number of jobs exceeds the number of available workers by at least 10 percent.



Source: “Different Skills, Different Gaps: Measuring & Closing the Skills Gap,” Burning Glass Technologies, 2018

SECTION 1



TAKEAWAYS

An information gap keeps millions of new and transitioning workers from finding better jobs.

New resources lay out career paths and list open positions, required skills and credentials, and options for education and training.

Major national companies are investing in the education of their employees, but the overall share of employers providing tuition benefits has dropped.

Hiring managers report growing interest in skills-based hiring assessments that could de-emphasize degrees.

In today's education marketplace, the degree versus some other credential isn't necessarily a hard-and-fast choice.

'Signaling' and Hiring in Flux

ACROSS THE country, several million employers need workers, and more than 150 million people are navigating their careers. Any imbalance in supply and demand is arguably evidence of a skills gap. Meanwhile, a paradox of information is surely in play.

Never before have we known so much about labor-market needs. Sophisticated software can now scrape and parse all job ads posted online and spit out exactly how many times employers have sought a particular skill in a given year. Contrast that with another way analysts once studied the job market: by measuring the column inches of job ads in local newspapers.

Yet for anyone charting or creating an educational pathway to a career today — job seekers, college leaders, employers — so much information can be overwhelming. It's hard to identify a solid plan or trend amid all the noise.

Which skills matter most? Which colleges or other education providers offer the best or fastest preparation? Who will cover the cost? And in a world where hiring is increasingly driven by automated tools and tests, how much longer will a degree send the right signal to land a recent grad or ambitious employee an aspirational new job?

Against this dynamic, sometimes chaotic backdrop, colleges, employers, and policy makers are trying to help people along. This section examines information asymmetries and other challenges in career development, as well as external forces affecting colleges, like new options for training and education — including credentials that could rival the degree. It highlights what college leaders and their partners need to know about trends in professional development and tuition reimbursement, and explains how fast the practice of hiring is changing.

INFORMATION GAPS

Beginning, advancing, or changing a career has never been a linear exercise, especially in fields of study, like history or English, that don't map directly to jobs. Now all of that can be even more fraught, as jobs evolve, more work becomes digital, employers often raise qualifications, and managers hardly expect new hires to stay until they retire. Rising tuition makes college a significant investment, and anyone looking to "skill up" can choose from an expanding array of options, including MOOCs, boot camps, and the like.

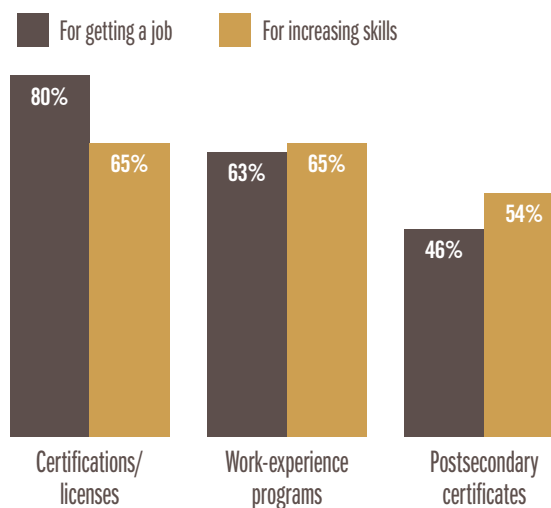
Colleges, for their part, are trying to demonstrate value, attract students at various life stages, and set them up for success. Many community colleges — and now four-year institutions — are developing guided pathways, or course sequences that lead to a particular credential and career. Academic programs now commonly set learning outcomes and convey them to students, and many colleges have integrated career development into the curriculum, in addition to what is traditionally offered through the career center.

Still, that guidance — if students get it — doesn't always clue them in to which fields are growing, what skills those fields require, or even what the jobs they are likely to get will pay.

According to many experts, that information gap keeps millions of new and transitioning workers from finding better jobs, even in an

FIG. 5 : ARGUABLY USEFUL CERTIFICATES

American adults with postsecondary certificates find them less useful than their peers find other credentials that they hold.



Note: The figures reflect the share of adults ages 25 to 64 with individual income and at most an associate degree who report having each nondegree credential and consider it very useful.

Source: "Nondegree Credentials, Work-Based Learning, and the American Working Class," Rooney Columbus, AEI, 2019; analysis of Adult Training and Education Survey, National Household Education Surveys Program, 2016

economic boom.

Career navigation has "become a black box for far too many people," says Jennie Sparandara, executive director of global philanthropy for JPMorgan Chase & Co., where she oversees its \$600-million New Skills at Work project.

The dearth of information is acute for the tens of millions of Americans with only a high-school diploma, a population sometimes called "the untapped work force." Unlike many other developed countries, the United States doesn't have a comprehensive work-force-training system, and low-income groups tend to enroll in higher education at lower rates. Add to that the decline of unions and employer-provided training for entry-level jobs, and the so-called on-ramps to careers have become harder to find.

"That's where the real gap is," says Maria Flynn, chief executive of the nonprofit Jobs for the Future. And that's where colleges, employers, and policy makers have an opportunity to coordinate to better serve this population.

For now, the hodgepodge of state and federal labor, education, and social-welfare programs meant to help workers get a leg up can ex-

clude people who would most benefit, or discourage the very activities the programs are meant to encourage. Some U.S. Department of Labor training for new careers, for example, isn't open to people who are employed, which keeps the working poor from taking advantage. And in some social-welfare programs, parents who become employed lose their child-care support. In too many cases, says Flynn, "the incentives are screwed up."

In 2014, Congress reauthorized the Workforce Innovation and Opportunity Act, with some changes that could make it easier for people to use its grants for college certificates and degrees. But many institutions and employers are still stymied by the fine print and decentralized administration of those programs, with 550 regional work-force boards whose policies and goals can vary widely.

Developing better information tools — like job maps and websites designed for career launchers or switchers — is one way employers and philanthropies believe they can erase some of the labor-market friction. JPMorgan's New Skills project, for example, has put millions toward experiments to promote new employer-driven training models and to develop better community-college expertise in working with employers.

Sites like Petrochem-works.com, developed in 2016 with help from the Council for Adult and Experiential Learning, serve as models. The site lays out eight broad career paths into the petrochemical industry, complete with listings of open jobs and descriptions of the required skills and credentials. Educational resources are included, too.

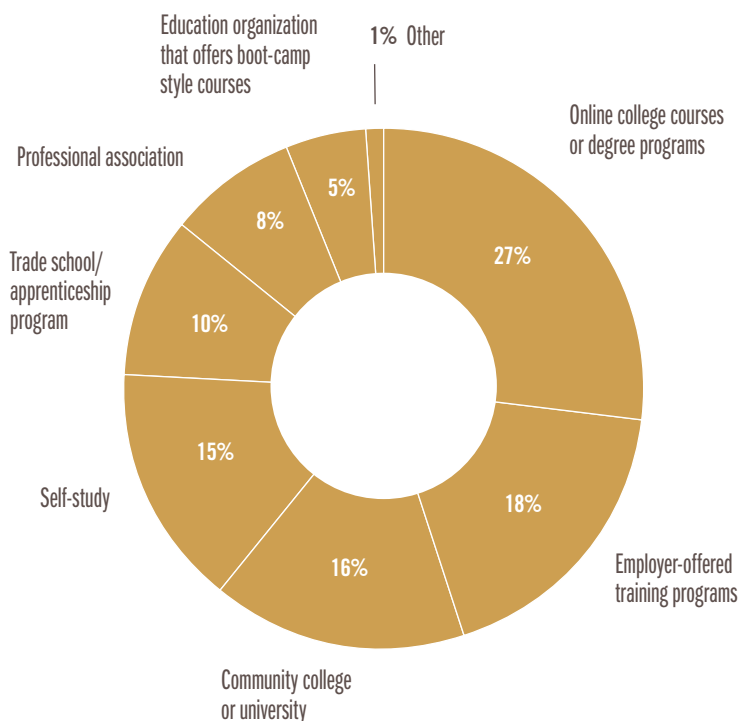
Such sites are becoming more common. Banking On My Career, for finan-

cial services in New York City, features a "day in the life" video, a career-match quiz, and a search tool for "amazing schools to get you prepared." ACT, the organization known primarily for its college admissions test, recently unveiled Stack, a platform that will offer not only career advice but also a host of educational resources and assessments for job seekers to acquire necessary skills, including soft skills, and demonstrate them to potential employers. ACT's chief commercial officer says it could be "a path for people who don't want to go to a four-year university."

As such resources proliferate, colleges will need to make sure they are well represented in students' educational choices, and that academic programs stay up to date with changing work-force needs. People who want to advance in their careers are now most likely to think of online

FIG. 6: WHERE TO SKILL UP

To advance in their careers, people would be most likely to look to distance education or to an employer's training program.



Note: These figures are based on a survey of more than 1,900 employed adults conducted in November 2018.
Source: American Workers Survey, Prudential Financial, 2018

college courses (See Fig. 6). But new information tools could raise awareness of other options — and paths that don't require a four-year degree from the get-go.

Even if college leaders make it a priority to keep curricula current, the changing demands of jobs call for constant adjustment. A fledgling effort led by the U.S. Chamber of Commerce Foundation could facilitate that. The project, called the [Jobs Data Exchange](#), or JDX, aims to develop a uniform, machine-readable data format for job descriptions and listings, and potentially integrate that with employers' applicant-tracking systems. Such coordination could clarify how employers and even industries define their talent needs — and communicate them to education providers and job candidates in real time.

JDX is still in its early phases, and it's unclear how many employers will buy into the effort. Chamber officials hope it will be a “Rosetta stone” for communicating in-demand skills.

Half of all spending on education for people over the age of 25 comes from a select group of large companies.

That mutual understanding and regular syncing could improve existing relationships between colleges and employers, and pave the way for new ones.

INVESTING IN EDUCATION

Developing programs that raise people's economic prospects and promoting those opportunities are vital undertakings, but they aren't enough. Students looking for education to start or advance their careers often can't afford it — not just the tuition, but the transportation, child care, or lost wages.

Many rely on state and federal financial aid, but access to those funds can be a challenge for working students, as with the hodgepodge of government programs mentioned above. Earning income may mean losing out on some need-based aid. And only full-time students are eligible for certain state aid.

Programs in some states designed for working students are often small and limited. Indiana's Workforce Ready Grant, for example, covers tuition and fees at several two-year colleges, but only in programs that award what the state designates as “high-value” certificates.

Washington state is notable for an unusually cohesive strategy to serve its neediest residents. Through statewide contracts, it delegates responsibility and funding to its Community and Technical Colleges system to provide job training to people who have lost their jobs, are on welfare, receive food assistance, or are incarcerated. Some 35,000 students, most of them pursuing degrees, are taking part.

In recent years, several employers have drawn attention for investing in the education of their lower-wage employees. Major national companies, including FedEx, McDonald's, Walmart, and the Walt Disney Company, have expanded tuition-reimbursement options, even providing the benefit upfront, which makes it easier for people to use.

McDonald's, which calls itself “America's best first job,” has also developed advising services and plans to roll out a mobile app in 2019 with guidance on educational and career options. Several other big-name employers have aligned with universities to offer educational benefits, including Starbucks and Uber at Arizona State University, and Anthem at Southern New Hampshire University. Others have signed deals with new companies like Guild Education, which provides coaching and tutoring to employees in exchange for a cut of their tuition revenue at partner institutions and other education providers.

For many of these companies, tuition benefits aren't linked to particular personnel needs, but rather are part of a broader strategy to improve employee retention in a period of low unemployment nationally. Employee turnover represents a huge cost to employers (Walmart would reportedly save itself \$20 million a year by increasing average retention by just one month). That kind of commitment by employers is becoming a boon for colleges.

In fact, half of all spending on education for people over the age of 25 comes from a select group of large companies. That leaves those who aren't fortunate enough to work for such employers to fend for themselves, says Ryan Craig, an author and managing director of the University Ventures investment fund.

And high-profile efforts belie a larger, less favorable trend: The proportion of employers providing tuition reimbursement has actually dipped in recent years, according to surveys by the Society for Human Resource Management. Today just 51 percent of employers offer the benefit for undergraduate study, 49 percent at the graduate level. As recently as 2015, those figures were 56 percent and 52 percent, respectively.

New tuition benefits from big-name companies may be "socially impactful anecdotes," but they don't represent the bigger reality, says Sean Gallagher, executive director of Northeastern University's Center for the Future of Higher Education and Talent Strategy. Plus, if and when the economy slows and unemployment rises, current employer support for tuition benefits may wane.

Meanwhile, staffing companies are also increasingly getting into the education and training game. In 2018 the world's largest temporary-staffing agency, Adecco, paid \$413-million to acquire General Assembly, a leading player in digital-skills training, and expand its stable of offerings to employers. General Assembly, which aimed to offer a shorter alternative to an M.B.A., began with students paying for their education. With the acquisition, Adecco is looking to shift the model so employers that work with Adecco pick up more of the cost.

A company called Revature, which specializes in staffing for software jobs, finds many of its trainees through relationships with more than a dozen colleges, and pays the beginning developers while they undergo two years of training. The economics work when it costs more to hire an experienced software developer than to train one. Investors like Craig see the model extending to other high-demand fields, as employers and job seekers recognize the value of these newer "friction-free pathways to employment."

Work-force demand has also led to income-share-agreements, in which students borrow money from a lender or a philanthropic source to cover their educational costs, then

pay back a share of their income over time. The ISAs, as they are called, got their start at coding boot camps and are slowly spreading to traditional colleges. Purdue University was among the first to experiment with the idea; now a few other institutions and a half-dozen states are

An approach gaining attention for its potential to be worker-friendly and portable is an education savings account for students of any age.

considering it.

Another approach gaining attention for its potential to be worker-friendly and portable is an education savings account for students of any age. The Aspen Institute's Future of Work Initiative has proposed the creation of "lifelong learning and training accounts" to which low- and middle-income workers could contribute up to \$2,000 a year on a pretax basis. Employers could also pitch in and get a tax break. Account holders would control the money and could use it for college or other training.

The concept isn't new. Other countries have done it. In the early 2000s, the Council for Adult and Experiential Learning tested the idea in the United States, and it's now before Congress.

THE HIRING LANDSCAPE

People go to college to get an education and a job. But even as the emphasis has shifted toward the latter, the disconnect between higher education and the methods that employers use in hiring is growing.

"College administrators are very confident that a degree and a transcript are the keys to getting a new job," with perhaps a little assist from the career center, says Martin Kurzweil, who directs the Educational Transformation Program at Ithaka S+R, a nonprofit research-and-consult-

HOW DO COMPANIES VALUE EDUCATIONAL CREDENTIALS RELATIVE TO OTHER JOB QUALIFICATIONS?

48%

of HR leaders say **more now** than five years ago

29%

of HR leaders say **the same now** as five years ago

23%

of HR leaders say **less now** than five years ago

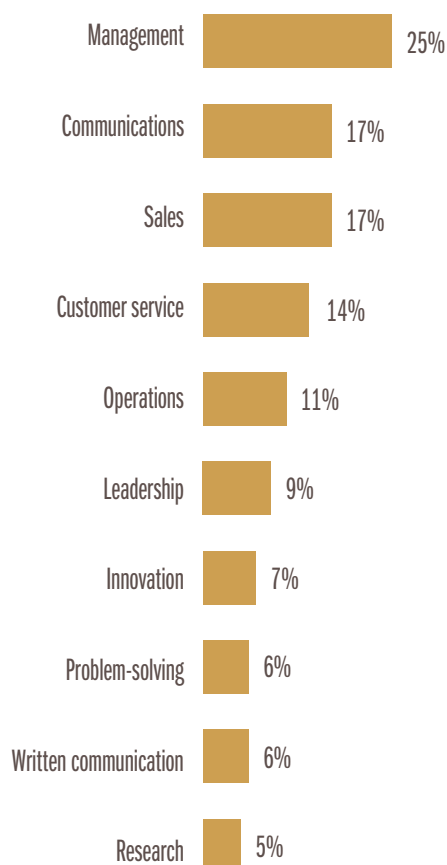
WHAT EMPLOYERS REPORT

54%

agree that degrees are fairly **reliable representations** of candidates' skills and knowledge.

FIG. 7: WHICH SKILLS ARE IN DEMAND

In five years of job postings nationally, here are the most frequently mentioned skills.



Note: The ranking is based on more than 110 million unique job postings from September 2016 to January 2019 and excludes hard skills such as nursing and accounting.

Source: Emsi

HOW CAN COLLEGES COLLABORATE WITH EMPLOYERS AND BETTER



Michael Bokina

vice president,
head of human resources
Siemens USA

Colleges should focus on conceptual thinking to help graduates thrive in fields that are continuously changing due to rapid advancements in technology. Coursework that strengthens logical and reasoning ability will teach students how to work through abstract ideas, innovate, and solve problems — all skills technology companies are looking for.



Scot McLemore

manager of talent
acquisition and
deployment
Honda North America

It is important that colleges work to align course outcomes with the skills employers are seeking in their open position profiles. This can be accomplished through industry advisory groups and graduate feedback. Basing college projects on real-world challenges can also be extremely beneficial for all parties. This can be developed through collaborative development of an aligned curriculum.



Mohamad Ali

president and
chief executive officer
Carbonite

Colleges and employers should collaborate to ensure curricula are introducing students to the skills needed to succeed in today's work force — especially with regard to STEM education. Instilling the skills necessary to succeed in tech-enabled careers, which now range from sales to manufacturing, is crucial to ensuring graduates are prepared for today's work force.

76%

say degree completion is a **valuable signal** of perseverance and self direction.

78%

say employment no longer depends solely on degree or academic major, but more on **experience, practical sense, and ability to do the job.**

62%

have adopted or are exploring a **skills-based hiring** strategy that de-emphasizes degrees.

55%

think **microcredentials** are likely to diminish the emphasis on degrees in hiring over the next five to 10 years.

39%

believe **pre-hire assessments** will pose a significant challenge to the value of college degrees in hiring within three years.

Source: "Educational Credentials Come of Age: A Survey on the Use and Value of Educational Credentials in Hiring," Center for the Future of Higher Education and Talent Strategy, Northeastern University; "Recruiting Trends 2018-19," Collegiate Employment Research Institute, Michigan State University

PREPARE STUDENTS FOR CAREERS?



Marie Artim

vice president for talent acquisition
Enterprise Holdings

Developing collaborative programming, such as case studies, seminars, workshops, and other campus events focused on topics like skill-building, communication, and even interview preparedness is a great way for colleges and employers to work collaboratively to prepare students to successfully enter the job market.



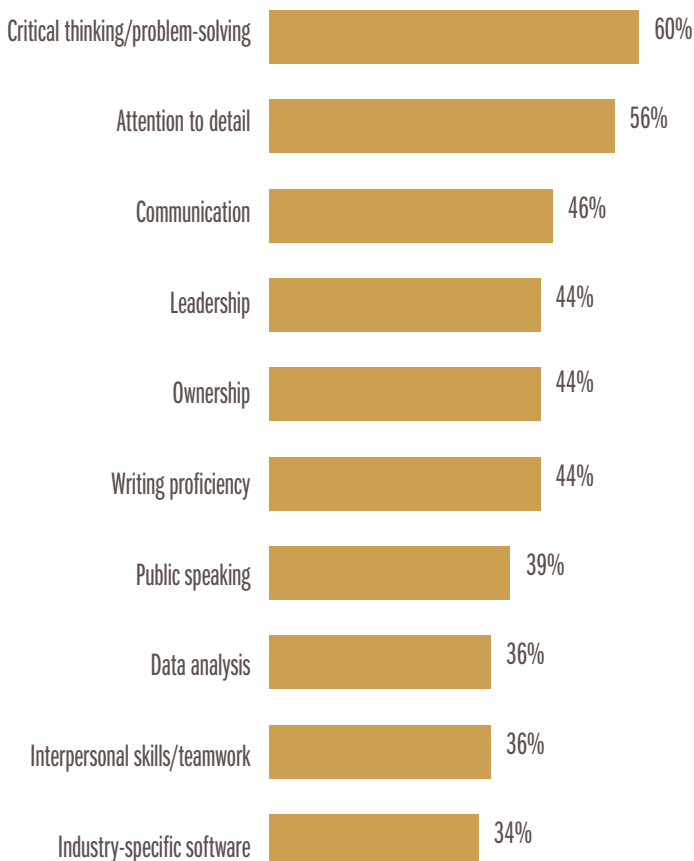
Glenn E. Johnson

head of work-force development
BASF North America

Colleges could integrate team projects into the majority of assignments and include a grading mechanism for those projects that is influenced by each member of the team. Instructors could then provide the peer feedback to each student.

FIG. 8: WHAT MANAGERS FIND LACKING

Considerable shares of managers say recent college grads aren't up to par in the following areas.



Note: Figures are based on a survey of approximately 64,000 managers.
Source: "2016 Workforce-Skills Preparedness Report," PayScale

ing organization. But that's not the only way it works anymore. Employers are starting to ask what applicants can do, not what their degrees are in.

It's as if colleges and employers are speaking different languages, says Kurzweil. "There's this translation barrier."

And the field is changing fast. Consider this: Until a few years ago, prospective IT employees could typically land jobs on the basis of their degrees or many alternative credentials, like the certificates offered by several companies or the industry group known as CompTIA. Today even the alternative credential is being displaced, as companies are just as likely to find software developers from among the thousands of college students and other coders flocking to HackerRank, a website that runs coding challenges.

The hiring market is awash with signals — degrees and certificates, credentials authorized by industry associations, even badges that colleges, employers, and other parties develop together and issue on commercial websites like Degreed, Credly, and Portfolium. Degreed says its mission is to "jailbreak the degree" by creating alternative ways for people to accrue and display their skills. On top of that, a number of colleges are offering so-called micro-master's degrees and specializations in partnership with MOOC providers like edX and Coursera.

What all of the signals are supposed to convey, of course, is what job seekers are capable of. But employers are increasingly devising their own ways to assess that.

Today hiring managers recruit and filter job candidates using gamified tests and online simulations, as Ithaka S+R describes in a recent report on the "Wild West" of pre-hire assessment. Digital interview tools with built-in artificial intelligence can assess facial reactions down to the micro-expression. So-called talent analytics promises to compare applicants' attributes with data on the traits of employers' own best-performing employees. And as more employers use automated tools to screen out candidates without the right skills or keywords on their résumés, some companies offer assistance crafting materials that can out-robot the robots.

Skills-based hiring is supposed to be efficient and fair. If degrees signal proficiency, the thinking goes, why not let people demonstrate that

directly? But pre-hire assessments come with some controversy. The tools can be less reliable predictors than their marketing suggests. They run on algorithms that offer little transparency to applicants, and their use can run afoul of anti-discrimination laws if there is a disparate impact on the basis of gender, race, age, or other protected classes.

And to be sure, these approaches have not yet dealt the death knell to the degree. Indeed, a recent survey of hiring managers found that nearly half reported an increased reliance on educational credentials compared with five years ago. Less than a quarter reported declining reliance.

But that same hiring survey, sponsored by Northeastern's talent-strategy center, also found brewing interest in a more formal method of skills-based hiring that would de-emphasize degrees. Only 13 percent of respondents said they weren't interested or weren't likely to consider it in the future.

So while the degree remains a reliable signal now — whether as proof of a specific proficiency or as a sorting mechanism — colleges

"College administrators are very confident that a degree and a transcript are the keys to getting a new job."

should recognize that pressures are building against it. Those arguments come both from employers finding more reliability in skills-based hiring and from equity advocates making the case that an overreliance on degrees leaves too many talented and qualified people behind. While the cutting-edge hiring practices described above are not yet ubiquitous, they're not going away.

For colleges, that calls for rethinking what their degrees mean. Some institutions have opt-

ed to reform general education, overhaul academic programs, or emphasize certain skills in particular courses or across departments. Other have doubled down by incorporating badges that denote particular skills. A move could be as simple as helping students better understand and represent their skills in today's hiring process. A bolder suggestion, from the Ithaka S+R report, is to integrate some employer assessments into the curriculum.

How the degree stacks up in the contemporary credential economy could become clearer thanks to a new organization called Credential Engine, whose mission is to “empower everyone to make more informed decisions about credentials and their value.”

As the Jobs Data Exchange (JDX) urges employers to publish job postings in a common format, Credential Engine is encouraging colleges and other education providers to use its nomenclature to post their credentials in the [Credential Registry](#). So far it lists about 6,500 degrees, certificates, licenses, and other credentials, although some items offer minimal information. The plan is that eventually all 650,000 known credentials will be “countable, searchable, and seeable,” says Scott Cheney, executive director of the organization, which has received about \$10 million in funding.

The project's backers, including the Lumina Foundation, see the registry as a foundational source of information for educators and employers as well as students and job seekers. That's information like which degree at which college is preferred by a particular employer, a claim the college could make and the employer could verify. Backers of the registry also hope that app developers and human-resources-software companies will take advantage of its open-source language and technology to connect their tools to it.

Such a clearinghouse may still seem like a curiosity, and not pan out as planned. But if the credential commons takes off, it could bring much greater transparency to education pathways and work-force demands.

That, in turn, could lead fewer people to pursue bachelor's degrees, says Chauncy Lennon, Lumina's vice president for the future of learn-

ing and work. “Their stand-alone value in the labor market is also going to shrink,” he says. While he's no enemy of degrees, he believes institutions should compete on the real value of what they offer, not on people's unfamiliarity with other options. The goal of Credential Engine, he says, is to eliminate this “information asymmetry.”

Yet in today's education marketplace, this isn't necessarily a hard-and-fast choice: the degree versus some other credential. Many colleges have adopted competency-based education programs and award academic credit for

While the degree remains a reliable signal now, colleges should recognize that pressures are building against it.

prior learning or industry-recognized certificates. Northeastern University is one institution taking that to the next level. In cooperation with IBM, which awards badges to recognize particular competencies of its employees and its customers, the university in 2017 began granting the equivalent of up to 10 credits in three of its graduate programs. A year later, Northeastern began accepting Google's IT Support Professional Certificate for credit toward a bachelor's degree.

As the landscape shifts, college leaders have to determine what deserves legitimacy in their own curricula. In the next section, we will examine other ways colleges can uphold their missions — and their integrity — while adapting their policies and procedures to ensure that students are well prepared for the working world that awaits them.

SECTION 2



Students at Bluegrass Community and Technical College rotate through jobs at a Toyota plant as part of the Kentucky Federation for Advanced Manufacturing Education.

The Nimble Institution

AS MUCH as some might flinch at the idea, career relevance has been a powerful strand of American higher education's DNA ever since a band of forward-thinking Puritan ministers founded Harvard in 1636 to train clergy for their new colony. It was fundamental to the land-grant-university movement 150 years ago, and to the development of community colleges in the mid-20th century. And, of course, preparation for jobs has always been the main selling point for both for-profit and nonprofit career colleges.

Over the years, public demand for relevance has ebbed and flowed, as have counterarguments that college should be about getting an education, not a job. In an era of rising tuition and economic change, expectations for the utility of a degree are “on steroids,” in the words of Louis Soares, chief learning and innovation officer at the American Council on Education. Each sector, each institution, has to grapple in its own way with how to lift students' prospects — and contribute to the greater social and economic good.

TAKEAWAYS

One way to improve students' employability is to combine liberal-arts fundamentals with hard skills.

Extending coursework beyond the classroom, say in interdisciplinary projects, can accelerate students' career preparation and development.

Curricular reforms — more-relevant courses, certificates, even entire degrees — may be needed to boost students' prospects.

Effective partnerships with employers can generate valuable input to align academic programs with work-force needs.

Such collaborations require time, money, broad buy-in, and a focus on students to move from one phase to the next.

Those efforts increasingly go to the core: the curriculum. Yet while the pressure to produce “career-ready” graduates is strong and growing, college leaders should be able to fulfill that aspect of their mission — in both liberal-arts and more-specialized programs — without dismantling their educational models or compromising their principles.

Effective moves need not take semesters or years. “Higher ed gets the rap that it can’t move fast enough,” says Brian Fitzgerald, chief executive of the Business-Higher Education Forum. In recent years, the group has worked with more than three dozen colleges to help develop or modify degree programs to better reflect employers’ interests. In some cases, its process quickly shows where the two sides are aligned and can move forward. The work of the forum, other intermediaries like the Council for Adult and Experiential Learning, and many institutions themselves provides useful examples of how to prepare students for successful careers.

“Employers really value soft skills that are the bedrock of a liberal-arts education.”

This section explores ways that colleges can innovate from within. It highlights how to identify internal barriers to change, improve collaboration with employers, and plan to sustain any new programs that result.

BOOSTING ‘EMPLOYABILITY’

The philosophy major working as a barista is a favorite punchline for pundits who think it embodies the foolishness of the liberal arts. But the joke may be on them. A growing body of evidence, including recent reports from Burning Glass Technologies and the Strada Institute for the Future of Work, shows that liberal-arts majors like philosophy and communications instill many of the skills that are most in demand by employers.

“Employers really value soft skills that are the bedrock of a liberal-arts education,” Matthew Sigelman, Burning Glass’s chief executive, has told *The Chronicle*. In fact, the company’s analyses have found that liberal-arts graduates may be more employable — or at least earning more — than peers who chose certain business majors that appear to be more career-focused.

One way to improve students’ employability is an approach that could be called liberal arts plus: the fundamentals of a traditional program combined with specific courses, or even mini-courses, that teach hard skills like coding, design, or data analytics. Yale University, for example, will experiment in the summer of 2019 with a course in software coding offered by an outside organization, the Flatiron School, and count it toward an undergraduate degree.

It’s the inverse of — in career and technical education — integrating the liberal arts into certificate and associate-degree programs in the trades. The underlying idea is the same: to cultivate the versatility and ingenuity that will help graduates navigate the world of work in a more automated future. With skills in communications, for example, someone might work in behavioral health as a grief counselor or in marketing as a social-media manager, the kinds of jobs unlikely to be taken over by robots. And as work-force demands change, the well-equipped graduate will be ready to adapt.

Graduates not only need to develop so-called hard and soft skills, but also get the guidance to communicate and apply them. Students should understand future career opportunities and have the precise language to translate their skills to the job market. Without ensuring that, the Future of Work institute argues, institutions will “fumble the handoff from college to career.”

These days, pedagogical techniques like experiential and immersive learning are on the rise. Extending coursework beyond the classroom, often in interdisciplinary projects, both better engages students and accelerates their career development. According to the latest Faculty Survey of Student Engagement, which polled about 13,000 professors in 2018, roughly two-thirds of them design upper-level courses so that students solve “complex real-world problems.”

Other factors can also impart employability. Growing numbers of colleges are requiring

Do Your Academic Programs Actually Develop ‘Employability’? There’s an Assessment for That

Lots of colleges claim that their academic programs prepare students for employment. A new organization known as the QA Commons says: Prove it.

The idea is to evaluate whether individual courses of study develop the skills that employers increasingly say they want, the so-called soft skills like communication, adaptability, and problem solving.

“We don’t think they’re ‘soft’ anymore. We think they’re essential,” says Ralph A. Wolff, who founded the group after more than three decades in accreditation (he led the higher-ed arm of the Western Association of Schools and Colleges).

QA Commons spent two years developing and testing a set of “essential employability qualities” and recently began offering to certify programs that meet its standards. Among the first to sign up is the state of Kentucky, which has put forward 20 programs from six institutions, including two-year colleges and the flagship university.

The group’s assessment focuses on five factors, examining whether a given program:

- develops skills in a work-based context, such as through a capstone project.
- coordinates its activities with the institution’s career services.
- creates meaningful relationships with employers.
- engages with students to make sure they feel they are being prepared well.
- reports how its graduates fare in the labor market.

The organization, backed by more than \$3 million in grants from the Lumina Foundation, doesn’t dictate exactly how programs should meet those criteria. But it suggests that skills like technical agility or comfort with other cultures are best taught



KRISTINA JIANA QUILES

Through a partnership with the nonprofit Per Scholas, students at Guttman Community College pursue an IT certification as part of their coursework.

over time, with continued attention to students’ experiences inside and outside the classroom.

Guttman Community College, the newest institution of the City University of New York, was one of 27 colleges to undergo the assess-

The QA Commons ‘Essential Employability Qualities’

People skills like collaboration, teamwork, and cultural competence

Problem-solving abilities like inquiry, critical thinking, and creativity

Professional strengths like effective communication, work ethic, and technological agility

ment during the group’s experimental phase. For a college that prides itself on career development, the process was “a way to see if we were true to our word,” says Niesha Ziehmke, Guttman’s associate dean for academic programs.

The assessment — of programs in business, IT, and human services — turned up a few areas where certain skills weren’t as

embedded in the curriculum as they could be. Guttman has since added a new business course that revolves around students’ internships and jobs. And the college replaced an IT course with one offered by a nonprofit organization called Per Scholas, which has close ties to industry and a hands-on space in the Bronx. Students who successfully complete that course earn not only academic credit, but a credential in computer-network management.

Whether or not Guttman’s programs get certified by the QA Commons, Ziehmke has found the process worthwhile, and now wants to put other programs through it, too. “We do not do this enough in liberal arts,” she says.

Wolff, meanwhile, hopes the approach will gain traction and perhaps even be adopted by traditional accreditors. “We’re not trying to vocationalize the whole higher-ed world,” he says, but college leaders need to pay more attention to developing students’ prospects.

“What we’d like to do,” Wolff says, “is legitimate that preparation for the workplace is part of the academic enterprise.”

internships as part of the undergraduate experience, often raising money to make sure lower-income students can afford to take advantage. The next section outlines some new approaches, including micro-internships: short-term projects for students who can't necessarily take on the equivalent of a full-time job.

Beyond teaching and work experience, some institutions are looking to rebuild academic structures to bolster students' prospects. One way to do that: Incorporate industry credentials into degree programs. This has been a trend at two-year colleges but is expanding to four-year institutions. The Association of Public and Land-Grant Universities and the University Professional and Continuing Education Association recently announced a partnership with a nonprofit organization called Workcred to explore how more undergraduate programs could align their curricula with the requirements of credentialing bodies such as the National Environmental Health Association and the Project Management Institute.

A new partnership will explore how more undergraduate programs could align their curricula with the requirements of credentialing bodies.

Other curricular adjustments could also have an impact, with little added cost. In recent years, many institutions have employed a “stackable credential” model, which allows students to earn a certificate, whether offered by a college or industry group, that will count toward an associate degree, and perhaps eventually a bachelor's degree.

One devotee of this approach, Brigham Young University's PathwayConnect program,

which is intended to help people start or return to college, takes the idea even further. It has reconfigured its curriculum so that all students' first courses lead to an industry-recognized credential. General education comes later. This “certificate first” model, as Clark Gilbert, president of BYU-Pathway Worldwide, calls it, has contributed to higher retention rates, he says, and been especially effective for adult students. The program now offers more than two dozen 15-credit certificates, including Child and Family Advocacy and Agribusiness.

College leaders sometimes report difficulty persuading faculty members of the responsibility to prepare students for careers. Yet some findings suggest otherwise. The majority of respondents to the Faculty Survey of Student Engagement say they often discuss career plans with upper-division students. Among STEM faculty, about 60 percent do, and in education, health, and social-service fields like public administration and social work, the rate is 80 percent.

Still, engaging faculty in career-development efforts can require some extra attention. Governors State University, for example, has devoted a portion of its career-services budget to training professors to help students compete for micro-internships. The new Liberal Arts Bridge Program at Saint Mary's College of California aims to get professors fully versed on the career-services resources available to students. The high value of faculty mentors in people's career and life outcomes suggests that even small investments toward greater engagement — and nudges from deans or department chairs in that direction — could pay dividends.

Colleges' sharpening focus on career development may be having a positive effect. In a 2015 poll by the Association of American Colleges & Universities, less than a quarter of employers found recent college graduates well prepared “to apply knowledge and skills in real-world settings.” In 2018, about three-quarters of executives and hiring managers were satisfied by graduates' preparation, even if only 15 percent said they were very satisfied.

WORKING WITH EMPLOYERS

Shaping the curriculum is any college's prerogative. Yet reforms conceived and executed by faculty and staff members alone may not ensure that students are graduating with the skills they

A Campus Made for Collaboration

Who:

Arapahoe Community College,
Colorado State University,
Douglas County School District,
Castle Rock Economic
Development Council,
Town of Castle Rock

What:

Sturm Collaboration Campus,
Arapahoe Community College,
Castle Rock, Colo.

Why:

To combine education and work-force training — from high-school diploma to associate degree to bachelor's degree



ACC, JHL CONSTRUCTORS, DLR GROUP

Arapahoe Community College's new Sturm Collaboration Campus plans to integrate work experience into every program by 2024.

Everything about Arapahoe Community College's new \$40-million campus, now under construction, is intended to imbue students' education with meaningful work experiences.

Its degree offerings, concentrated in business, health, and technology, all reflect demand from local employers. Courses scheduled in clusters will allow students with jobs to plan to be on campus just two days and one evening a week. And the college has committed to incorporate some form of job experience — be it a job shadow or a full apprenticeship — into every program by 2024.

The 14-acre campus, about 30 miles from downtown Denver, is itself designed to foster new opportunities. The first phase is an airy, 45,000-square-foot structure of steel columns and glass walls that will have no private offices but plenty of "huddle spaces" for small meetings — and feature 13 classrooms, flex space, and a large plaza that col-

lege leaders hope to use often for community and employer-sponsored events.

Learning from other colleges' mistakes, the campus planners made sure to build in facilities for catering. Without that, says Eric Dunker, Arapahoe's dean of business, technology, and work-force partnerships, employers "are not going to have an event at your space."

A few employers will occupy the building as tenants: a 3-D printing company, a start-up incubator, and the local Arapahoe/Douglas Work-force Development Board. The local school board and Colorado State will also have operations there. The mix is meant to expose high-schoolers to potential careers and local residents to postsecondary options.

Offering stackable certificates and degrees, as in a program for certified nursing assistants, is another core principle. Students may start with a certificate and return later for more. "Our intent is not for you to be a CNA

for life," says Dunker.

In some programs, students will be able to gain hands-on experience on campus by, for example, hacking into systems and debugging malware in a high-tech cybersecurity lab. Other programs being developed with employers, such as one with the local water district, will offer experiential learning at real work sites.

Once the new campus opens in the fall of 2019, Dunker plans to keep working with an advisory committee of business leaders that helped shape the new curriculum. Colleges themselves can't "pull all the strings and push all the buttons," he says: New programs must also align with local needs.

Arapahoe's philosophy of employer-focused education has resonated. In early 2019, the Sturm Family Foundation announced a \$10-million gift to Arapahoe — among the largest ever to a community college — as a sign of support for the direction the institution is taking.

need to start or advance their careers.

As the economy evolves, fields advance, employers aim for more diversity in their ranks, and regions identify emerging or unmet employment needs, college leaders should consider how to develop more-relevant courses, certificates, even entire degrees. Doing so with employer input — or collaborations that run deeper — can better align efforts with current and projected workforce trends.

It can also add layers of complications to an already complex process. But some challenges and pitfalls can be minimized or avoided. Here's how, in lessons distilled from several examples of partnerships between higher education and industry.

Assess need. Rather than assuming what employers' needs are, college leaders should ask. Even when programs are up and running, that information-gathering must continue.

Structural barriers can keep students out of programs that interest and could benefit them.

A hot new field may be apparent, but how it translates into careers might not be so clear. Take data science. Case Western Reserve University began offering its first courses toward a minor in applied data science in 2014. Before that, officials there worked with the Business-Higher Education Forum to consult representatives from a range of employers, including biomedical companies, banks, and engineering firms. To the university's surprise, different industries were seeking the same core set of data skills. And they wanted generalists.

"Companies are not necessarily looking for students who are computer scientists," says Roger French, a professor of materials science and engineering who oversees the minor. The goal is not "a few experts in the corner who know how to use data," he says. That context helped Case

Western shape its first data-science sequence as an interdisciplinary minor open to all undergraduates (the university eventually created a major in data science, but that came later).

For 20 years, Pace University and the National Alliance for Communication Technology Education and Learning, or Nactel, a consortium of telecommunications companies and unions, have worked together to prepare people (1,700 graduates and counting) for careers in that field. The program began — pre-internet and mobile devices — with an associate degree oriented toward landline and copper-wire technology. Today telecom employees need to understand internet and mobile technology, plus cloud computing, cybersecurity, and 5G networks. Accordingly, the Nactel offerings now include a master's, two bachelor's, and five associate degrees, plus a host of certificates and mini-courses.

Officials from Pace, the consortium, and the Council for Adult and Experiential Learning have met at least four times a year since 1999 to review developments in the industry and determine how best to reflect them in courses and degrees. The curriculum changes constantly, says Nancy Hale, a professor of technology systems and co-director of the program. "It's like a living entity."

Nactel may be an extreme example of consultation, but it is a reminder that even in fields that don't evolve as fast, it takes effort from colleges and employers to stay current. As institutions develop their own methods to assess workforce needs, a new tool called [Calibrate](#) could support a more methodical approach. Developed by the Center for Employability Outcomes at Texas State Technical College, the tool gives deans and department chairs an efficient way to solicit input from employers on the specific skills required for various jobs. That information can help them decide which courses to add, drop, or tweak.

Identify internal barriers. Knowledge of a campus's policies and procedures will help advocates conduct even the most informal feasibility study for a new offering. The goal is to determine what they can do quickly to get it going — and students benefiting — versus waiting for numerous rounds of discussion and sign-off.

Decisions about how academic programs are designed, where in an institution they reside, and how they are branded can change the speed at

which something gets off the ground, and how accessible it is to students. Some structural factors can needlessly delay approval of new programs. The faster an institution can move, says Fitzgerald, of the Business-Higher Education Forum, the more credible its commitment will seem to eager employers. “Businesses don’t need talent in four years,” he says.

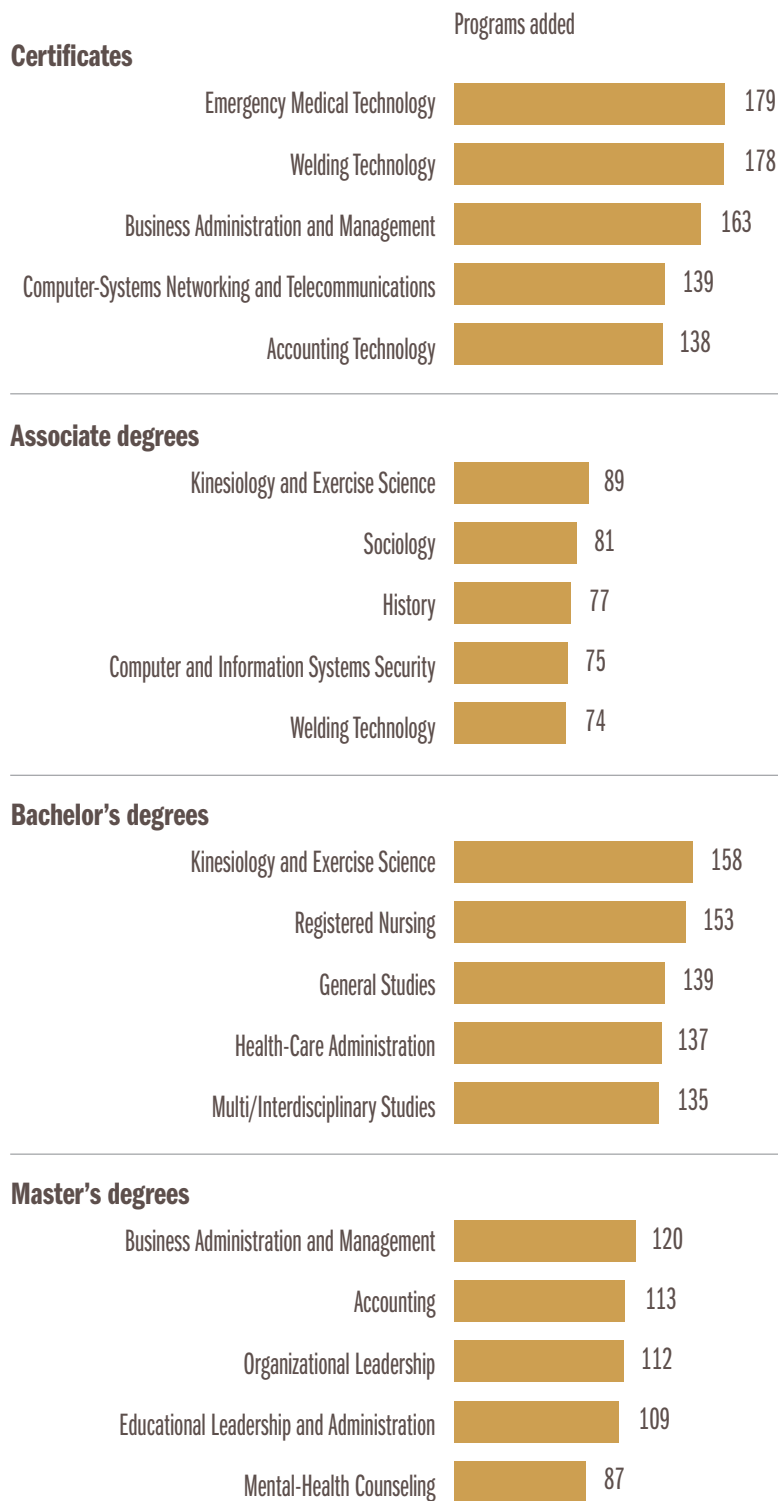
Case Western’s first move in data science was calculated. French and others there realized early on that establishing a minor didn’t require as many approvals from the university, or an OK from the Ohio Board of Regents, as a full degree program would. For similar reasons, the Advanced Cybersecurity Experience for Students at the University of Maryland at College Park is a minor in the honors college, not the engineering school.

Structural barriers can also keep students out of programs that interest and could benefit them. Before Case Western set up its minor, only engineering students could take data-science courses. Elsewhere, prerequisites may exclude qualified students from certain courses or concentrations. Periodic reviews of such requirements can identify which still make sense and which no longer do. STEM fields deserve particular attention, says Fitzgerald, as that is where some colleges have “walled off a lot of very marketable majors.”

Reach across cultures. When faculty and staff members sit down with executives and managers, they can avoid

FIG. 9: WHAT COLLEGES ARE ADDING

These are the fastest-growing programs since 2010-11.



Note: The figures represent numbers of institutions (for certificate and associate-degree programs, two-year colleges; for bachelor's- and master's-degree programs, four-year colleges) that did not report the given CIP code in academic year 2010 or 2011 but did in either 2016 or 2017.

Source: Chronicle analysis of National Center for Education Statistics data



NORTHWESTERN MUTUAL

Two universities and a major corporation have joined forces on a Data Science Institute to be housed in the company's sleek new facility.

Students and Employees, Elbow-to-Elbow

Who:

Northwestern Mutual, Marquette University, the University of Wisconsin at Milwaukee

What:

Data Science Institute at Northwestern Mutual's Cream City Labs, Milwaukee

Why:

To promote research and experiential learning and develop a talent pipeline

“Students crave applied experiences,” says Keri McConnell, senior director of a new Data Science Institute poised to provide them. The \$40-million collaboration of Northwestern Mutual, Marquette University, and the University of Wisconsin at Milwaukee will expand education and research in the field, including through courses, internships, mentorships, and other programs.

“Our mission is to expose everyone to data science in their field of choice,” says McConnell, a veteran of the company.

The sleek, high-tech Cream City Labs, a 17,000-square-foot space connected by a skyway to the rest of Northwestern Mutual's headquarters complex, will be the institute's home base. There students will be able to sit elbow-to-elbow with employees of the insurance company while doing coursework based on real business problems — and then potentially head over to a meetup or mixer. The facility, which opened in the fall of 2018, also houses event space, the company's venture-capital arm, and several start-ups.

The design of Cream City Labs, which pays homage to Milwaukee's nickname and its iconic beige bricks, is unusual not only for Northwestern Mutual, a 160-year-old corporate presence in the Midwest. At Marquette, for example, most nonclassroom open spaces are designed for quiet study, says Thomas Kaczmarek, a professor at the university and its interim co-director of the institute. “This is much livelier.”

The two universities take different approaches to data science: Marquette has a minor, major, and master's degree; UW-Milwaukee teaches the subject in several courses and in majors like engineering and marketing. The new institute means campus leaders are discussing the possibility of creating common courses, perhaps involving Northwestern Mutual, too. Already students can work on their assignments at Cream City Labs, and classes may soon meet there.

The shared space makes it possible for students to bump into a potential mentor or internship sponsor. “People typically don't come,” McConnell says, “for heads-down time.”

some frustration if each side understands where the other is coming from. The more they find common ground, the more likely their collaboration is to succeed.

Higher-education institutions and employers, whether corporate or nonprofit, have different norms. Jenny Thornton sees that in her work running a consortium of 12 colleges and 11 companies collaborating to create a common technology credential that would be recognized throughout the national capital region, from Baltimore to Richmond. Her meetings with employers are short and efficient. With colleges, she says, the dynamic is different: “If I get through half of an agenda, I’m happy.”

As much as that experience plays to stereotype, colleges and employers may be used to different levels of deliberation. Leaders at Bluegrass Community and Technical College learned that while developing courses with Toyota and other manufacturers as part of the Kentucky Federation for Advanced Manufacturing Education. Some companies were growing impatient at the slow pace until they understood that that accreditors needed to weigh in on curricular changes. “They’re not used to that,” says Pam Hatcher, the college’s dean of academics and work-force development.

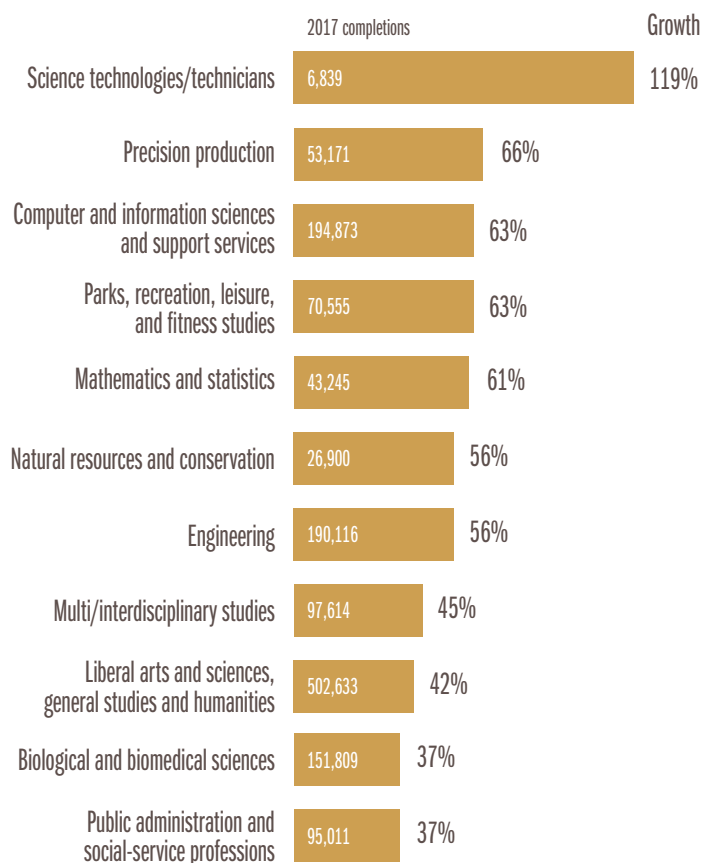
Going deeper, employers’ interest in protecting their competitive advantages and colleges’ in preserving academic integrity can also create speed bumps. Thornton encountered the former when she prompted employers in her consortium, the Collaborative of Leaders in Academia and Business, known as CoLAB, to get specific about the skills they wanted students to develop. Some were reluctant to say,

for fear of revealing proprietary information. She encouraged them by emphasizing the value of their input to creating a useful new credential. And when people on the college side raised concerns about quality, she made the case for keeping their programs on the cutting edge of a fast-moving field.

The first courses for the new credential will be offered online in the fall of 2019. A useful motivator, says Thornton, is “keeping the end goal in mind.” Another point of advice: “Don’t get hung up on uniformity.” CoLAB is moving forward even though not all employers are offering the same incentives, and not all institutions are classifying the new “generalist digital credential” the same way. Some will make it a certificate,

FIG. 10: WHERE STUDENTS ARE FLOCKING

These programs saw the greatest growth in completions from 2010 to 2017.



Note: The figures represent all completions at any degree level for all institutions in the U.S. that report federal data.
Source: Emsi analysis of National Center for Education Statistics data

SPACES THAT WORK

Who:

Altierus Career College,
Norcross, Ga.

What:

Simulated professional
environments on the campus
outside Atlanta

Why:

To prepare students for jobs,
down to the sensory details

All the Trappings of the Job

In career education, the more real, the better.

Even before her students arrive, Kimberlee Norton, the chair of surgical technology at Altierus Career College, in Norcross, Ga., washes her hands in the classroom lab with the same surgical soap her students will use when they learn to scrub in.

The idea, she says, is to “get the smell of the soap in the air,” even on days they’ll be spending more time on general-education assignments than on hemostat clamping or, in two simulated operating rooms, taking turns with arthroscopic tools to remove a rubber organ from a surgical dummy.

Exposing students to authentic work environments is increasingly important for all sectors of higher education, but programs focused on preparing students for specific careers have devoted particular attention to the details of professional settings. Norton, for example, lobbied for the campus to upgrade the lights over the operating tables, to mimic the lighting that’s standard in real hospital ORs.

The authenticity extends to other programs in the red-brick suburban office park 20 miles from Atlanta, where Altierus occupies 35,000 square feet. The medical-assistant students giving shots to one another practice their technique in a lab outfitted with curtained exam bays that look like those in emergency rooms. Pharmacy-tech students fill mock prescription orders in spaces like the ones where they might work, behind the counter at a typical CVS.

Accrediting bodies set minimum standards for the facilities and equipment at many career colleges. But the nonprofit Altierus, which has been refurbishing this campus and its two others, in Houston and Tampa, as part of a broader retrenchment and re-launch (the campuses were once run by the for-profit Corinthian Colleges), is aiming to go beyond the basics.

Those efforts are especially apparent in a spacious new lab the college just opened to train technicians in HVAC and refrigeration. The

warehouse-like room features new residential and commercial-grade equipment from a variety of manufacturers, and one workstation resembles a rooftop, so students can get a feel for working on air compressors where they’re likely to be in real life.

With a giant garage door at one end of the lab and the capacity to put compressors on wheels, instructors can roll the equipment outside. Students need to know, says the campus director, Moses Delaney, “how to work on these units in the cold and in the heat.”



ZENITH EDUCATION

Students in an HVAC Tech program train on commercial-grade equipment, sometimes outside in the elements



MELISSA TREVIZO, SAN JACINTO COLLEGE

At San Jacinto College, students can practice working in a confined space, thanks to equipment donated by an employer.

some a minor, and others are still deciding how to treat it. That flexibility can be key.

So can a common vocabulary. The Business-Higher Education Forum notices that the two sides' jargon isn't always self-explanatory. When representatives of employers would talk, for example, about "understanding the business case" for including a particular skill in a data-science degree, the concept didn't readily resonate with their counterparts across the table.

A trusted third party like one of the aforementioned groups can be useful, not least to help translate different perspectives.

Build effective systems. Whether colleges and employers will collaborate is an easier question than how they'll pull it off. Solid structures like

advisory boards and timelines can help projects run smoothly.

Effective collaboration comes down to the people involved, says Jennie Sparandara, who directs the \$600-million New Skills at Work project for JPMorgan Chase & Co. "It's a highly relational process. You can't necessarily shortcut that." But the more routinized and formalized a partnership becomes, she says, the less dependent it will be on personal ties.

Structures like a board, a defined mission, and training helped guide Nactel at a time when telecom technology was hardly the only thing changing. Through corporate partners' mergers, acquisitions, and divestitures, as well several divisive labor strikes, the consortium stayed on track because it was led by a board that took its

mission seriously. Two years in, the group incorporated as a nonprofit. New members would receive formal training, and even during some ugly labor disputes, they put education above all, says Susan Kannel, who oversaw the program until retiring from the Council for Adult and Experiential Learning a few years ago. Also important, she says, is “commitment all the way up the food chain.”

A good partnership doesn’t need a formal board, but it should have the right people in the room, in terms of their roles and their demeanor. Kannel says a few “faculty know-it-alls” nearly poisoned the well early on for Nactel. Michael Bettersworth, who runs the Calibrate project, has seen many employer-college advisory groups go nowhere because the employers sent “the vice president of meetings” rather than an informed manager.

A “playbook” that outlines who does what in an employer-college partnership is one tactic Glenn Johnson, head of work-force development for BASF, has developed. He tries to describe how the two parties should divide responsibilities for things like program audits (colleges run them, employers offer input) and evaluating graduates (colleges should routinely request evaluations of recent hires, employers should provide the feedback).

Johnson is also a big believer in making every meeting a productive one, circulating an agenda and leaving time for a visit to campus or company facilities when appropriate. He also suggests closing out each meeting by sharing wish-list items. Thanks to one such session, process-technology students at San Jacinto College, in Texas, can now practice in a “confined-space entry tank” donated by Sun Products Corporation when learning to operate energy plants.

Leaders of a partnership may want to define specific ways employers can step up. They can develop and promote wage and salary surveys, for example, and sponsor activities like career fairs to raise awareness among underrepresented groups. And they can offer students an edge, in the form of an internship, mentor, or incentive like guaranteed résumé review or preferential hiring.

Sustain the programs. Collaborations don’t run themselves. They take time and money to move from one phase to the next.

The costs of coordination need to come from

somewhere. Nactel leaders realized that early on and decided to devote a share of students’ tuition to administering the program. In an energy-industry consortium that CAEL oversees, member companies pay a fee to help cover costs.

Grants or other outside funding can help. “Money greases the skids,” says Fitzgerald, of BHEF. Support from companies like JPMorgan, which backs CoLAB; the National Science Foundation, which has funded five other con-

The potential to reach prospective students via their employers is tantalizing to many colleges.

sortia run by BHEF; or other sources, including foundations and government programs, can provide for administrative assistance, faculty release time for course planning, or other resources to keep partnerships from falling apart.

Employers incur costs, too, of money and time. In Kentucky’s five-semester advanced-manufacturing program, for example, companies provide mentors and plan students’ rotations through a range of hands-on jobs. “That normally is not budgeted for, particularly at a plant,” says Kim Allen Menke, a regional director for government affairs at Toyota. The program’s chapters around the country are now considering whether to institute a formal fee structure or other funding mechanism.

Of course recruiting students is always a priority. Much of that work often falls to employers — and labor unions, if they’re involved. In the Nactel program, for example, Pace University counts on the participating companies and unions to promote courses to workers, and it uses their logos in its marketing. Especially now, as more competitors are putting courses online, Kannel says, that branding is invaluable.

Keep students front and center. From recruitment through graduation and employment, partnerships should anticipate students’ questions

and understand their needs.

Good, precise information is central to attracting students and supporting their successful completion. Nactel, for example, updates course descriptions and schedules online.

And the consortium stays on top of its curriculum with regular student input. Three times during each course — at four, eight, and 12 weeks — it solicits anonymous feedback from students and delivers the responses in real time to faculty members and administrators.

The surveys don't stop when the students finish the program. Each year Nactel surveys alumni 18 months out to get their perspectives on their education. Measures of satisfaction are high: 92 percent say they've used what they learned, and 93 percent say they're more aware and prepared for jobs in the industry.

BUILDING STUDENT PIPELINES

As many colleges are adapting curricula to promote students' career development, and others are developing more-intentional partnerships with employers, some are rediscovering the value of an internal resource: schools or divisions of continuing and professional education. They often have longstanding partnerships with employers and are now being tapped to build on that expertise.

The potential to reach prospective students via their employers is tantalizing to many colleges, given that 36 million adults in the work force have some college experience but no degree, and millions more have no higher education at all. Finding students through professional channels reduces colleges' recruitment costs, and employers may pay or contribute to tuition. Colleges are attracted to this market


be it for customized work-force offerings or as a general educational partner for programs of students' choice.

Institutions such as Purdue University Global, Southern New Hampshire University, and Western Governors University are pursuing these relationships on a national scale. The University of Maryland University College announced in 2019 plans to change its name to the less-confusing University of Maryland Global Campus and spend \$500 million over the next six years to build its visibility. Other institutions, including the University of Florida Online and Brandman University, rely on companies like Guild Education to help negotiate partnerships with employers and provide coaching to students. Arizona State University recently disclosed plans to create a for-profit education-services company to manage corporate partnerships.

In pursuing these arrangements, some institutions are making a concerted effort to promote not only degrees, but also shorter courses and programs, like the University of Utah's Degree-Plus Certificate Series. That's one of the main growth strategies for Southern New Hampshire, whose president, Paul LeBlanc, sees these offerings as a way to compete in a future where higher education "will surrender its monopoly on credentials, transcripts, and delivery of education."

Options for students of any age are expanding. With growing national attention to employability, new organizations have emerged to help bridge the connection between college and career. The section that follows will highlight some of the ways colleges are revamping longstanding approaches and forging new relationships to create more opportunities.

SECTION 3



A nonprofit called Braven partners with colleges and employers to help low-income and first-generation students (at San José State University here) build the social capital that will boost their careers.

MIKAELA RAPHAEL

TAKEAWAYS

Work-and-learn

models like internships are demanding renewed attention and fresh approaches, as new entities link colleges and employers.

Companies in the health-care, insurance, and technology industries have developed apprenticeships to build talent pipelines.

Colleges can choose from an array of new models to integrate practical experience into coursework.

Tech giants are pursuing close collaborations with higher education to train more people in digital technology.

Some students may need extra support to gain the social capital and professional savvy to navigate the job market.

New Models for Work-Based Learning

PRACTICAL EXPERIENCE has long been part of higher education. Work-and-learn models integrated into the curriculum — like co-ops, internships, and hands-on projects — are a natural way for colleges to help prepare students for careers. That goal demands renewed attention and fresh approaches, and some colleges are updating or creating programs, often with new partners.

The old standard work-study, a form of financial aid, could be better deployed to promote students' career development. Most student-affairs officers consider the programs important tools to build professional competencies, according to a recent survey by Naspa-Student Affairs Professionals in Higher Education, which has recommended several ways to make work-study more meaningful and useful.

Two of its ideas: Require students to apply for jobs as they would others, with résumés and interviews, and better train supervisors in giving feedback. Beyond work-study, Clemson University and the University of Iowa are two institutions that have devoted time and resources to try to make all campus jobs more relevant and worthwhile.

The work-college model, in which students perform many of the jobs required to run a campus, or work in local nonprofit groups in return for free or low-cost tuition, is also evolving. Paul Quinn College, in Dallas, has reinvented itself by placing students into jobs with local employers, in effect using itself as a staffing agency to help students pay tuition while studying and learning new skills. Paul Quinn is expanding to nearby Plano, Tex., and hopes to build a national network of urban work colleges.

To attract working students, colleges have long partnered with the military and some employers to offer courses on site. UPS, for example, has for 21 years run Metropolitan College, which serves night-shift workers at the compa-

ny's giant Worldport facility, in Louisville, Ky., with a computer lab, instructors from the University of Louisville and Jefferson Community and Technical College, and bonuses for academic progress. To date, more than 17,000 employees have taken part, and more than 6,000 have graduated.

Amazon aims to work closely with many colleges through its Career Choice program. In 40 of the rapidly growing company's biggest fulfillment centers across the country, it has built prominently located classrooms with glass walls, "so employees can see their peers pursuing their education," says Steven Johnson, Amazon's director of associate career development. Career Choice, which pays tuition upfront, is designed as a benefit for entry-level employees. About 16,000 have used it since its inception, in 2014, and Johnson says those taking courses in the on-site classrooms complete them at a higher rate.

Partnerships between colleges and employers typically have been negotiated bilaterally or through consortia. But an array of new approaches is emerging, many facilitated by private

Amazon's Career Choice program for entry-level employees features classrooms with glass walls, "so employees can see their peers pursuing their education," says Steven Johnson, the company's director of associate career development.



companies and nonprofit organizations focused on bridging the gap between college and career. Guild Education works with several major employers, including Walmart and Lyft, and more than 80 colleges and other education providers to register employees for classes and coach them on balancing their work and studies.

Another venture, a nonprofit group called Education at Work, coordinates directly with colleges (six as of early 2019), hiring students to work on or near campuses in call centers for commercial clients, and providing scholarships and career coaching.

Colleges are also forging new relationships with organizations like coding bootcamps and job-training programs to help develop students' hard skills.

Advocates argue that this realm is ripe for reinvention. Among them is Maria Flynn, president of the nonprofit group Jobs for the Future, who urges colleges to usher in the "next generation of innovation" in partnership with outside organizations that can lend expertise or contacts that colleges may lack. Colleges may understand curricula, for example, but not have as many direct ties to employers' hiring managers as some of the new organizations and companies. "Part of the problem is folks don't play to their strengths," Flynn says, and "don't have incentives to collaborate."

This section explores how some traditional approaches are evolving, and how colleges are teaming up with other entities to further develop students' career skills.

APPRENTICESHIPS ACROSS INDUSTRIES

Say the word "apprenticeship," and most people think of manufacturing or trades: jobs that entail physical labor. The image is probably also of men. While it's true that apprenticeships in the United States have historically been dominated by those industries and that population, several companies and organizations are now working with colleges to broaden the scope of the model and participation along with it.

In Minnesota, for example, Fairview Health Services developed an apprenticeship program to encourage registered nurses with associate degrees to continue their studies and earn a B.S. in nursing. Participants gain practical experience in a hospital or clinical setting and take courses from any of several colleges. The program, which currently enrolls about 120 nurses, could

be a model for expanding apprenticeships in the profession.

In 2016, a Colorado-based company called Tectonic became the first software developer to offer an apprenticeship registered by the U.S. Department of Labor. Now, in addition to providing software to its clients, Tectonic is also delivering talent, in the form of job candidates, says Heather Terenzio, the company's founder and chief executive.

Several companies and organizations are working with colleges to broaden the scope of the apprenticeship model and participation along with it.

Students in the Tectonic Academy spend about six months in paid training, 40 hours a week, first in a classroom setting and then working with senior developers on client projects. If they finish, they earn a certificate, and many are hired by Tectonic's clients. The program is still relatively small, with about 100 participants so far, but the company expects to at least double that in 2019. It plans to offer the academy at Emily Griffith Technical College, in Denver, for a stand-alone certificate (worth 39 credits) or as part of a four-year IT degree. The company hopes to work with other colleges as well.

On a bigger scale, the Chicago Apprenticeship Network, now a coalition of 19 employers led by the insurer Aon, has developed a citywide program in financial services for community-college students. It began after Aon, analyzing its hiring practices, realized it had gotten into the habit of requiring bachelor's degrees and relying on certain feeder colleges for some positions, says Bridget Gainer, vice president for global public affairs. Several of those positions didn't actually necessitate that level of education, she says, and Aon wanted to diversify its work force.

Aware of the apprenticeship movement in Eu-

rope, Aon and another company, Zurich Insurance, began their program in 2017, each with 25 students from the City Colleges of Chicago system. A year later, the program expanded to 130 apprentices. This year's class is 400.

Every employer covers the cost of its apprentices' wages, benefits, and tuition, a package that Gainer estimates is worth \$50,000 a year. A local nonprofit group called One Million Degrees provides coaching, primarily on how to manage workplace situations. Admission is competitive, and the companies participate because they want to create a sustainable talent pipeline, says Gainer: "This is not a social program, and this is not a charity."

Apprentices work four days a week at their employers and take classes on Fridays at colleges in the system. While most participants are 20 to 25, several older military veterans and returning students have also taken part. The vast majority are black and Hispanic, reflecting the enrollment at City Colleges.

Professors at more than 140 institutions are sourcing real-world projects that can be incorporated into course syllabi through a start-up.

The goal is to extend the use of apprenticeships in fields like finance, insurance, and human resources, Gainer says, in Chicago and beyond. But quickly building the network is less important, she says, than providing participants with a real path to a professional career.

ACCESSIBLE MICRO-INTERNSHIPS

Internships can be a great way for students to explore fields of interest and gain professional experience and responsibility. But the opportunities often aren't suitable for working adults or others whose circumstances don't allow them to

relocate temporarily or take on the equivalent of a part- or full-time job.

So-called micro-internships — shorter-term assignments that students can more easily fit into their schedules and coursework — can be a valuable alternative. And given the burgeoning gig economy, employers have become more comfortable outsourcing small projects to nonemployees.

Micro-internships exist in a variety of forms. Some colleges, including Governors State University, encourage students to independently seek out opportunities through companies like Parker Dewey, a three-year-old venture that maintains an online marketplace where employers post projects and rates, typically \$20 to \$25 per hour, and students bid to win the work. Typical jobs take five to 40 hours to complete and can be done remotely.

Other colleges embed such practical experiences into coursework, as in the Experiential Network at Northeastern University. Students there, primarily in online master's- and professional-degree programs, take on six-to-eight-week projects for employers. The remote work is unpaid but typically counts toward a class requirement or for direct credit. Northeastern finds the projects itself, tapping into its network of 3,000 co-op employers.

Professors at more than 140 institutions are now sourcing real-world projects that can be incorporated into course syllabi through a Canadian start-up called Riipen that is growing in the United States. Companies post gigs, or challenges, like devising a strategic-marketing plan, and educators post descriptions of what students can take on, individually or in groups — 100 hours of sales forecasts, for example, or 25 hours of designing a content-management system.

Many of these models have mechanisms to provide feedback on the quality of students' work. That can get them used to the kinds of tasks they're likely to be given in entry-level posts, which may be especially helpful for those who lack the connections to land such professional opportunities on their own. And broad participation could help democratize hiring, by putting a more diverse pool of potential job candidates in front of employers. It's a low-risk way for the employers to get a feel for students' abilities, and for students to get a sense of the work, without a long-term commitment on either side.

In fact, Riipen executives say more than half of the employers that post projects on its site do

so as a way to spot students whom they might eventually hire.

TECH COMPANY TIE-INS

For decades, thanks largely to many colleges' adoption of prior-learning assessment, students who earn certifications from companies like Microsoft and Cisco have been able to convert those credentials into academic credit. Recently some of the new tech giants have begun to pursue deeper affiliations with higher education.

In 2018, Facebook announced plans for partnerships with more than a dozen community colleges. The nature of the relationships will vary: At Central New Mexico Community College, for example, the company is helping develop a certificate and perhaps eventually a degree in digital marketing. Elsewhere the arrangements involve simply infusing more training in digital marketing — not only as relates to Facebook products — into existing courses.

Amazon Web Services offers a more formal approach through the AWS Academy, which has developed two semester-long courses in cloud computing. To date, more than 100 two-year and four-year colleges have signed up, agreeing to have their own instructors undergo the company's required two to six months of training. Participating institutions can incorporate the academy's two courses or elements of them into their own curricula.

Google, too, has entered this arena. Its eight- to 12-month course toward an IT-professional-support certificate is already offered online via the Coursera platform. But with assistance from Jobs for the Future, the company is also working with more than two dozen community colleges in seven states to offer the certificate or to integrate material directly into existing programs.

BUILDING SOCIAL CAPITAL

For many students, particularly those from low-income households, or who are the first in their families to attend college, ability alone often isn't enough to land a good job. Their life experiences may not have taught them how — or given them the confidence — to ask for an informational interview, prepare a résumé, or even understand the expectations of a professional work environment.

In partnership with a five-year-old nonprof-

it called Braven, several colleges now provide a framework and offer academic credit to help students build such social capital. Under the model, students at Rutgers University at Newark, San José State University, and National Louis University engage in a five-semester program that mixes online learning with weekly in-person labs, where they get coaching from a mentor drawn from one of the organization's employer partners. Over the course of the program, the students practice skills like professional networking, project planning, and problem-solving with data.

Students typically start in their sophomore or junior year, and according to Braven, by the time they graduate and get a job, about half out-earn their parents' total income (typically, Americans have a 50-50 chance of outearning their parents by age 30). The organization also says that Braven fellows, many of whom belong to minority groups, are also more likely than all black and Hispanic public-college graduates to land "strong" jobs, which the program defines as those with benefits and opportunities for advancement, within six months of graduation.

Other organizations have offered similar training to college students. A company called Fullbridge is one; another, Koru, was recently sold and is now revamping its model. Braven's services are designed for colleges looking to help low-income students develop the connections and skills that typically accrue organically to their wealthier peers. Begun in 2014 with just 14 students, Braven now counts about 1,200, and it plans to expand on existing partner campuses and to larger college systems.

While the program was founded to support students, it has also become a talent-development tool for employers, says its founder, Aimée Eubanks Davis. Prudential Financial, one of the biggest employers in Newark, is a major sponsor of the Braven program at Rutgers. As with other employers that provide coaches, the company values its relationship with the organization for helping employees learn how to lead a diverse team, Davis says, and providing early access to a pool of potential hires.

In these and other examples, variations on longstanding models and new approaches to real-world learning promise to give each group of stakeholders — colleges, employers, and students — what they need.

What's Ahead

HERE'S A SAFE BET: The “skills gap” conversation isn’t going away. The pressure on colleges to offer valuable, relevant programs that better align with work-force needs will probably only increase.

To some, that may seem like a burden, another demand on colleges and a further diminution of their unique and vital role as creators of knowledge and cultivators of an educated populace.

Big picture, however, it’s also an remarkable opportunity — one that doesn’t have to reduce higher education to job training. As the United States, like many advanced economies, now enters what some call the fourth industrial revolution, millions stand to be left behind as jobs disappear to automation and the labor market demands new technical and “human-centered” skills. The people most likely to be out of luck are some of the most financially vulnerable and politically disaffected.

No educator wants to neglect the underserved populations that could benefit most. Or leave graduates indebted and underemployed, or laid off with no viable alternatives. Or to see his or her institution shown up by a coding bootcamp or community-development group with a better track record of promoting socioeconomic mobility.

All sectors of higher education need to consider how better to lift their students’ prospects in the long term. With forethought and mission-appropriate strategy, colleges that embrace this challenge can help blunt the worst effects of disruptions and secure the economic future of millions of people and the nation as a whole.

Institutions that step up will find many allies. Expect government agencies, philanthropies, and employers to continue to focus their

attention on policies and programs that broaden educational opportunities to advance the work force.

At the federal level, many of these discussions will take place in Congress, where lawmakers are weighing proposals to extend financial aid for the neediest students to shorter and nondegree programs. Other ideas are to increase support for apprenticeships and to make it easier to use work-study funds for off-campus jobs. The Higher Education Act is not the only vehicle: The White House’s National Council for the American Worker is a multi-agency effort to ease what it calls the “skills crisis.” States, too, are paying heed, primarily with proposals to expand student-aid programs so that more working adults qualify.

For education foundations, work-force and career-readiness programs are increasingly a top priority, as evidenced by a steady volume of surveys, reports, and events, as well as sustained support like the Lumina Foundation’s for Credential Engine, a project that is building a comprehensive registry to bring transparency to the credential marketplace. And it’s not just the traditional grant makers having an impact. Following on a five-year, \$250-million effort that wound down in 2018, JPMorgan Chase & Co. recently announced a second five-year commitment of \$350 million to extend its global New Skills at Work initiative, with plans in the United States to expand community-based partnerships and job-training programs at community colleges. The goal is to improve career options for low-income populations through education and training informed by local labor-market trends.

Among employers, more are acknowledging that they often fail to articulate and communicate their talent needs. Several local and national

efforts are underway to improve the connection between employers and colleges. Among the most ambitious is the U.S. Chamber of Commerce Foundation's Talent Pipeline Management initiative, which trains employers to identify their skill needs and develop partnerships with local colleges to meet the demand. Across the country, more than 2,000 employers have taken part, and several new degree programs have resulted, with more in the works. Meanwhile, in a period of low unemployment and national attention to inequality, several major companies are rolling out new tuition benefits.

As for colleges, well, there, too, practices are evolving. Work-force education is becoming an important market strategy for many institutions, especially growing mega-universities with big online footprints and national-market ambitions. Meanwhile, all types of colleges are re-examining their offerings (even Yale University plans to offer a coding course with an outside organization). They're creating minors and degrees in emerging areas and developing credentials for students to signal particular skills to potential employers. Five years ago, the non-profit Education Design Lab began championing a variety of such badges, and it now counts more than 500 colleges interested in deploying them. It plans to experiment with several colleges and employers in 2019 to see what effect the badges have in hiring.

Still, there's room for more innovation, and there's a growing need for it. This report describes many promising tactics to prepare career-ready graduates. In interviews with more than 100 college leaders, employers, policy makers, intermediaries, and students for this project, several nascent ideas emerged as potentially powerful ways to get colleges and employers on

the same page. As both sides refine their approaches, here are three that deserve consideration:

Faculty “employability” externships or fellowships would expose more professors to employers' current practices and needs. At Emily Griffith Technical College, in Denver, faculty members teach Monday through Thursday and are expected to spend Fridays at work sites. On the national level, Ralph A. Wolff, a former accreditor who has developed an assessment of how well academic programs prepare students for employment, is looking to test the externship idea “so professors can have more of a work-force orientation,” he says, when they return to the classroom.

“Platform-centric skills” in the curriculum could familiarize students with the major technology platforms they are likely to encounter at work, such as Marketto (in marketing), Salesforce (in business), and Tableau (for data visualization). Graduates lacking those skills are “underqualified for jobs that pay well,” said Entangled Studios, a private consultancy, in a report in 2017. Institutions, employers, and the software vendors themselves, it argued, should do more to close this disconnect.

The new hiring landscape should be reflected in colleges' career services, so that students can experience employer assessments and screenings in a low-risk setting before hitting the job market. If employers are pursuing skills-based hiring and measuring applicants' competencies in new ways, higher education “should review, develop, and implement the very processes employers are actually using,” Ithaka S+R said in recent report.

Higher education doesn't lack for metaphors. For years, the prevailing one was the ivory tower, an image of an institution on high, deliberately set apart from the places students would go on to apply what they'd learned. That was never wholly the reality. But to the extent it was — and still is — that has engendered resentment of colleges and led people to question the value of a degree. The story line is in need of an update. What's more, today's students are swirling in and out of college, working and studying. Most of them will require continual instruction and training over the course of their working lives.

What comes next? Well, the University of Washington is designing a 60-year curriculum

for continuous education. Stanford University's design school has envisioned an elaborate set of loops to represent students' taking six years of college over time. The Education Design Lab proposes a "weave," in which most learning happens outside the classroom, and students themselves find ways "to capture it, assess it, and credential it."

The times call for relevance. The generation of traditional-age students now entering college wants it, and working adults need it. Whether brand-new models, variations on old standards, or some of both prevail, they must reflect the vital role that colleges play in preparing students for work. There's no dismissing that anymore.

Projects to Watch

Expanding Community College Apprenticeships: a project of the American Association of Community Colleges to encourage as many as 80 two-year institutions, in conjunction with local industries, to establish 12,000 apprenticeship programs by January 2022. The \$20-million effort, funded by the U.S. Department of Labor, will also seek to set up 4,000 additional apprenticeships at four corporations and create a Virtual Apprenticeship Network to connect colleges with employers.

Nudge⁴ Solutions Lab's data project to match state residents with education: an effort to tap into state data systems in Indiana, Tennessee, and Virginia to identify residents who, based on their educational history and current job and salary, would appear likely to benefit career-wise from additional education. Led by Benjamin L. Castleman, an associate professor of education and public policy at the University of Virginia, the project will share lists with state education agencies, which will contact people about relevant opportunities and financial aid.

California Online Community College: a new institution designed for older working students. The state's 115th two-year college, it will offer courses leading to credentials and certificates in high-demand fields. The college recently announced Heather Hiles, a tech entrepreneur, as its chief executive, and plans to enroll its first students by late 2019.

Foundry College: a for-profit two-year college being designed to prepare adults for the kinds of middle-skill jobs that won't leave them vulnerable to automation. Founded by Stephen Kosslyn, an academic who worked at Harvard and Stanford Universities, and more recently as chief academic officer of the experimental Minerva Project college, Foundry will feature an unusual curriculum — two 90-minute classes a week, each a mix of lectures, quizzes, and live-action exercises such as role-playing — and will aim to develop students' judgment, emotional maturity, and other soft skills as they earn associate degrees in business management.

RECOMMENDATIONS

Add skills training to the mix

No matter students' chosen field or stage of life, they will be better equipped for careers if they've learned some modern workplace skills. That means exposure through coursework to digital tools, even specific platforms prevalent in major industries, and up-to-date techniques to analyze and visualize data.

Help students convey what they know

Imparting vital skills — communication, critical thinking, teamwork, creativity — isn't enough: Colleges should make sure students understand what they've learned and can express and apply it in the world of work. Badges, portfolios, and other tools can help students develop, document, and signal their abilities. Don't take for granted that a degree represents what's intended; ensure that it does.

Focus earlier in the educational pipeline

Colleges and employers could work more closely with school systems to expose students to a broad array of careers, including in advanced manufacturing and other technical fields that pay well and offer opportunities for advancement. Consider speakers, field trips, and sharing salary data. With college students, especially those who may lack professional connections, create programs that provide career development and job experience.

Brush up on hiring and credentials

Graduates need to be ready for an era in which machines sort job applicants by keywords and performance on pre-hire assessments, and new signals de-emphasize the power of the degree. Develop policies to recognize nonacademic credentials, and familiarize students with skills-based-hiring practices.

Invest in professional development

Professors and administrators don't necessarily know how to evaluate labor-market needs or forge relationships with employers to offer input into the curriculum. "Employability" fellowships for faculty are one approach. And seasoned intermediaries can lend advice on, for example, bridging cultures or competency mapping, a process of showing where education and training align with job requirements.

Tap the expertise of outsiders — and insiders

Colleges may not have the resources to teach cutting-edge coding, find a broad range of internship opportunities, or help disadvantaged students build social capital. Partnerships with companies and nonprofits can help fill these voids, and continuing-education divisions can offer connections to employers. Surveys or focus groups of alumni, students, and employers can also bring to light unrecognized needs and new opportunities.

Resources

[“Apprenticeship and the Future of Nursing: An Equity-Based Strategy to Address the Bachelor’s Degree Gap,”](#) by Ivy Love and Mary Alice McCarthy, New America, 2018

[“Automation and Artificial Intelligence: How Machines Are Affecting People and Places,”](#) by Mark Muro, Robert Maxim, and Jacob Whiton, Metropolitan Policy Program at Brookings, 2019

[Beyond the Skills Gap: Preparing College Students for Life and Work,](#) by Matthew T. Hora with Ross J. Benbow and Amanda K. Oleson, Harvard Education Press, 2016

[“Dismissed by Degrees: How Degree Inflation Is Undermining U.S. Competitiveness and Hurting America’s Middle Class,”](#) by Joseph B. Fuller and Manjari Raman, Accenture, Grads of Life, and Harvard Business School, 2017

[“Educational Credentials Come of Age: A Survey on the Use and Value of Educational Credentials in Hiring,”](#) by Sean R. Gallagher, Center for the Future of Higher Education & Talent Strategy at Northeastern University, 2018

[“Employing Student Success: A Comprehensive Examination of On-Campus Student Employment,”](#) by Omari Burnside, Alexa Wesley, Alexis Wesaw, and Amelia Parnell, Naspa-Student Affairs Administrators in Higher Education, 2019

[“The Hybrid Job Economy: How New Skills Are Rewriting the DNA of the Job Market,”](#) by Matthew Sigelman, Scott Bittle, Will Markow, and Benjamin Francis, Burning Glass Technologies, 2019

[“The Idea That Launched a Thousand Strategic Plans,”](#) by Dan Berrett, *The Chronicle of Higher Education*, 2017

[“Innovation Nation: An American Innovation Agenda for 2020,”](#) Business Roundtable, 2019

[“The Jobs Are Here, but Where Are the People?”](#) by Craig A. Giffi, Paul Wellener, Ben Dollar, Heather Ashton Manolian, Luke Monck, and Chad Moutray, Deloitte Insights, 2018

[“The Learner Revolution: How Colleges Can Thrive in a New Skills and Competencies Marketplace,”](#) by Kathleen deLaski, Education Design Lab, 2019

[“Mapping the Wild West of Pre-Hire Assessment,”](#) by Meagan Wilson, Martin Kurzweil, and Rayane Alamuddin, Ithaka S+R, 2018

[“On-Ramps to Good Jobs: Fueling Innovation for the Learning Ecosystem of the Future,”](#) by Michelle R. Weise, Andrew R. Hanson, Allison Salisbury, and Kathy Qu, Strada Institute for the Future of Work and Entangled Solutions, 2019

[“Platform-Centric Skills: How a Scaled Education Strategy Can Ignite Platform Growth,”](#) by Allison Salisbury, Kathy Qu, and Danielle Landrein, Entangled Studios, 2017

[“Robot-Ready: Human+ Skills for the Future of Work,”](#) by Michelle R. Weise, Andrew R. Hanson, Rob Sentz, and Yustina Saleh, Strada Institute for the Future of Work and Emsi, 2018

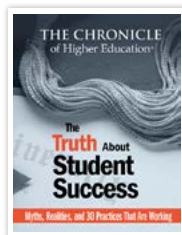
[“Skill Gaps, Skill Shortages, and Skill Mismatches,”](#) by Peter H. Cappelli, *Industrial and Labor Relations Review*, 2015

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The Chronicle produces a series of in-depth reports for campus leaders. Here are a few complementary titles.

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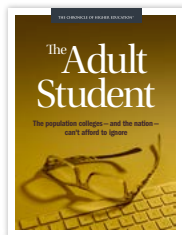


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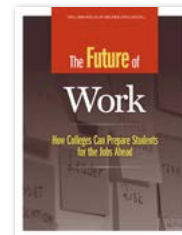


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