

A nation upside down: a new vision for the future of learning

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Executive Summary

Several billions of dollars have been invested into increasing the number of students who complete high school and pursue a college education in the United States. While high school completion rates have improved, college completion rates have not, and yet the number of jobs requiring a college degree continues to rise. At Innovate+Educate, we have conducted research that indicates the United States is at full capacity for college completion - at least the way higher education is currently delivered. Every American who has the academic ability, financial stability, and time to complete a college degree is doing so. This leaves the 35 million incumbent workers who attempted college, but left without a degree, as the largest – and perhaps only – latent talent reservoir available for vacant bachelor’s degree-level jobs. Employers hold the key: about seventy percent (24.5 million) of these 35 million workers found college-level coursework completely doable, but had to abandon their degree in order to hold down their current jobs. The only way to expand our employability pipeline will be to access this cohort, which means rethinking the utility of a college degree as a hiring and advancement filter. Inevitably, the degree-before-work paradigm will need to give way. Skills-based hiring, competency-based credentialing, earn and learn pathways, formal apprenticeships, and other innovations that rely on demonstrated performance rather than degree proxy signaling for advancement, will become integral to national economic expansion. A work+learn economy will result.

The Challenge

*A Nation at Risk*¹ was released 34 years ago, and our nation remains at risk. Published in 1983, *A Nation at Risk* brought attention to the need for assuring that students would have rigor in the classroom, that teachers were prepared, and that the U.S. would remain competitive. *A Nation at Risk* put forth a vision for what the future could be:

All, regardless of race or class or economic status, are entitled to a fair chance and to the tools for developing their individual powers of mind and spirit to the utmost. This promise means that all children by virtue of their own efforts, competently guided, can hope to attain the mature and informed judgement needed to secure gainful employment, and to manage their own lives, thereby serving not only their own interests but also the progress of society itself.

The call to action from *A Nation at Risk* drove decades of philanthropic and government investment, pouring billions of dollars into reforming education. Some progress was indeed made, but the vision that all would receive a high-quality education from kindergarten through a 4-year college degree never has become a reality. In *The Class of 2016*², the Economic Policy Institute pointed out only 34% of people age 24–29 have a college degree; 66% do not. Our own analysis shows that expanding the age range to include all Americans of working age (25-64), leads to a higher degree completion rate, but still less than half. Approximately 42% of all Americans aged 25-64 have an associate’s or bachelor’s degree. More importantly, 21% of working-age Americans have attempted college but left without a degree. This equates to 35 million Americans who have enrolled in college but who left without a degree, the one credential

required on many job postings in the U.S.

For this cohort of 35 million Americans, education reform via the traditional delivery method will not help. The system just doesn't work for them. Interviews of students who leave without degrees show 54- 71% are leaving in order keep their existing jobs.³ For this cohort, job opportunity is upside down. Meanwhile, encouraging those who have not yet attempted college, to begin doing so, seems fruitless. Our calculations show this slice of working age adults – those that did not attempt college – are too deeply under-resourced to even make the attempt. These individuals will reach age 48 before they can afford to live at the poverty line, work at a full time job, and go to a 4 year institution. In an ideal scenario, all who choose to pursue a college degree, would have enough money and time, but this is not the reality for most Americans.

Americans are now faced with a dilemma. Most need to have a high-paying job in order to be able to afford a college degree, yet they need to have a college degree before they can obtain a high-paying job. Employers are faced with a similar dilemma: the demand for bachelor's degrees in particular is rising^{4,5}, yet everyone who can attempt college on their own, has already done so. Unless a massive economic improvement lifts the fortunes of the 37% who have not yet attempted college, no new college-degreed workers are forthcoming. Higher education, as it stands today, cannot fulfil employers' needs.

New strategies surrounding hiring and credentialing need to be less expensive and far more compatible with working lives. The existing working population is where all the potential growth in U.S. high-skilled labor lies. One option is to adopt performance-based measures for credentialing, hiring and promotion. These tend to be far less expensive to satisfy than conventional degrees and are well-suited to individuals who have learned through work, the military, or other experiences outside of formal education. Another option is to develop integrated work and learn career ladders. In these, employers give promotions based on certificates/courses they help design and which their employees can complete online in their own time, or with dedicated workday time set aside for study. Yet another option is formal apprenticeship, a system of paid and mentored learning that has enjoyed much success in Germany but is encouraged by only a dozen or so states in the U.S. The options are abundant, but adoption during recession was slow.

Resolving the mismatch between needing to work, and obtaining a better life through education, is a core component of Innovate+Educate's mission. We know this requires partnerships across the U.S. focusing on credential completion, industry recognized certifications, and strategies that meet the learners *where they are*. There are steps both higher education and employers need to take. We believe in higher education. We believe in lifelong learning. We believe in strategies that support individuals working while learning. But, the way the education system is set up right now is just not working. A shift in assessment, training, hiring, and advancement is required.

This report begins our 2018 journey to explore the education-employment mismatch and its implications for our traditional model of degree-before-job. Over the next seven months, we will issue a series of in-depth reports to continue this discussion, with statistics at the state level for all 50 states.

We hope you will join us.

The Data

The main point of entry to a living wage job in the United States is a four-year degree.ⁱ The data will argue that the degree-before-job model is not working, and that we therefore need to create more pathways to both job entry and advancement. In this report, we show the current gap between supply and demand at the bachelor's degree level. We then explain why bachelor's degrees have become a default prerequisite for such a large proportion of jobs. We will demonstrate why reforming the current education system or encouraging more students to go to college will not result in higher numbers of bachelor's degree-holding candidates available to employers. To conclude, we will offer a glimpse of the future system that is likely to replace the current one.

Known: Job Supply and Demand are out of Balance at the Bachelor's Degree Level

Job supply and demand are mismatched at both ends of the education spectrum. As **Figure 1** shows, there are 300% too many individuals with less than high school degrees compared to jobs available, 42% too few bachelors' degreed individuals compared to jobs available, and 45% too many graduate-degreed individuals compared to jobs available.ⁱⁱ Only in the middle of the education spectrum (high school through associate's degree) is the U.S. in balance.

This mismatch persists because higher education has had a near monopoly on routes to a job. Why did this come to be? Why is a bachelor's degree the default requirement for so many jobs?

Though college degrees are required, they do not predict job performance.

The skills needed for many jobs may be getting more complex, but whether one has appropriate skills is not captured well by the presence or absence of a degree. A major review of different methodologies for predicting job performance showed that *years of education predict just 1% of total job performance.*ⁱⁱⁱ

The reason degrees are a poor proxy for job performance originates from the extremely large variation in ability between people with nominally similar degrees. Additionally, increasing one's skill level through education is a very slow process. It takes 12+ years of education to obtain an employment-worthy credential. Consequently, an additional 1-4 years' increment in skill is actually a small change, completely overwhelmed by the large intrinsic variation in people's skills. For example, as shown in **Figure 2**, the scores of people aged 16- 24 on a workplace literacy test increase with level of education at the rate of about 0.7 scale points a year. Meanwhile, the range of such scores between individuals at nominally the same level of education is as much as 25 points.

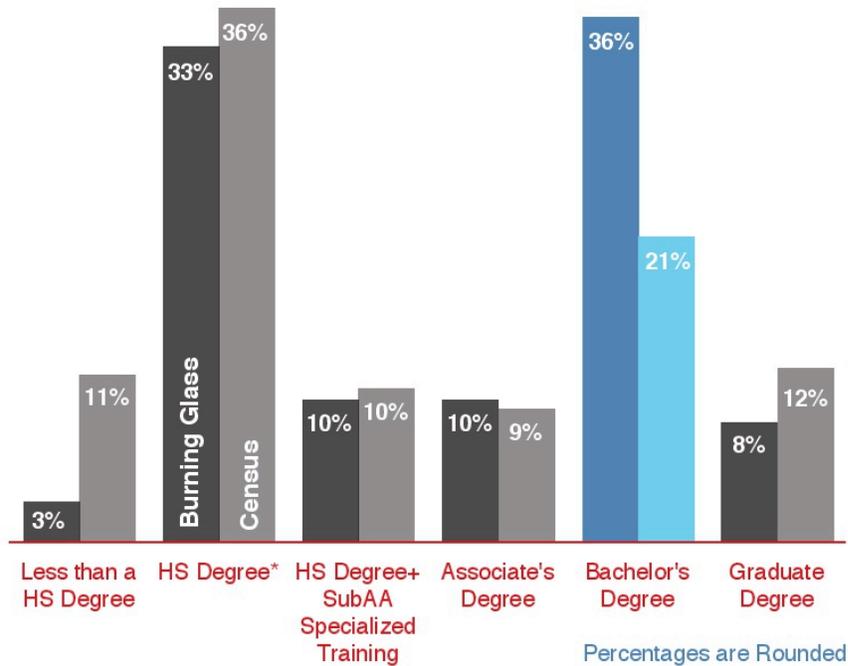


Figure 1: Percent of advertised jobs available at each level of education, versus percent of individuals with the corresponding degree or credential. Job posting data from the first 11 months of 2017 online job advertisements as analyzed by Burning Glass. Census data are from Census' American Community Survey, 2016, using its Dataferrent tool to query the degrees attained by individuals aged 25-65. The high school degree category includes individuals who attempted college but left without receiving a degree or certificate.

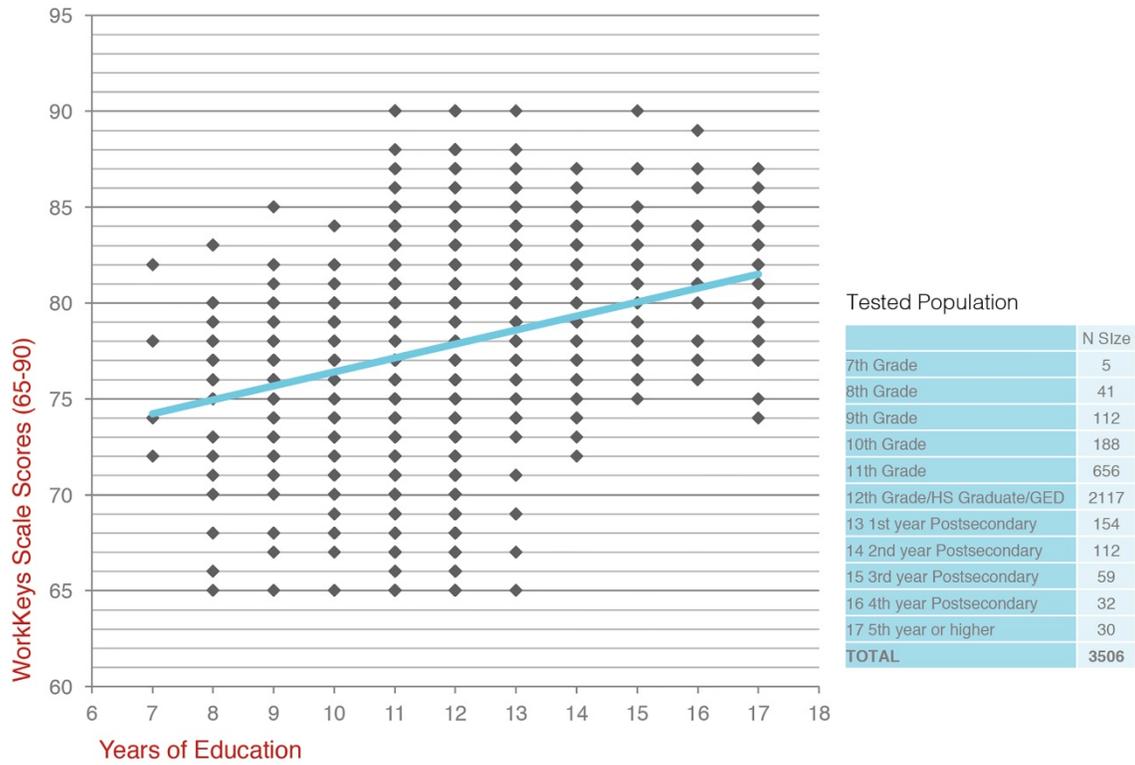


Figure 2: ACT[®] WorkKeys[®] Reading for Information scores, by completed years of education. The tested population was New Mexicans aged 16-24. The increase in students' average score is very slow, for each year of education achieved (see line). Meanwhile, the variation in student scores within a given year of education is enormous. Note that many data points that appear to be single, are actually multiple data points stacked on top of each other.

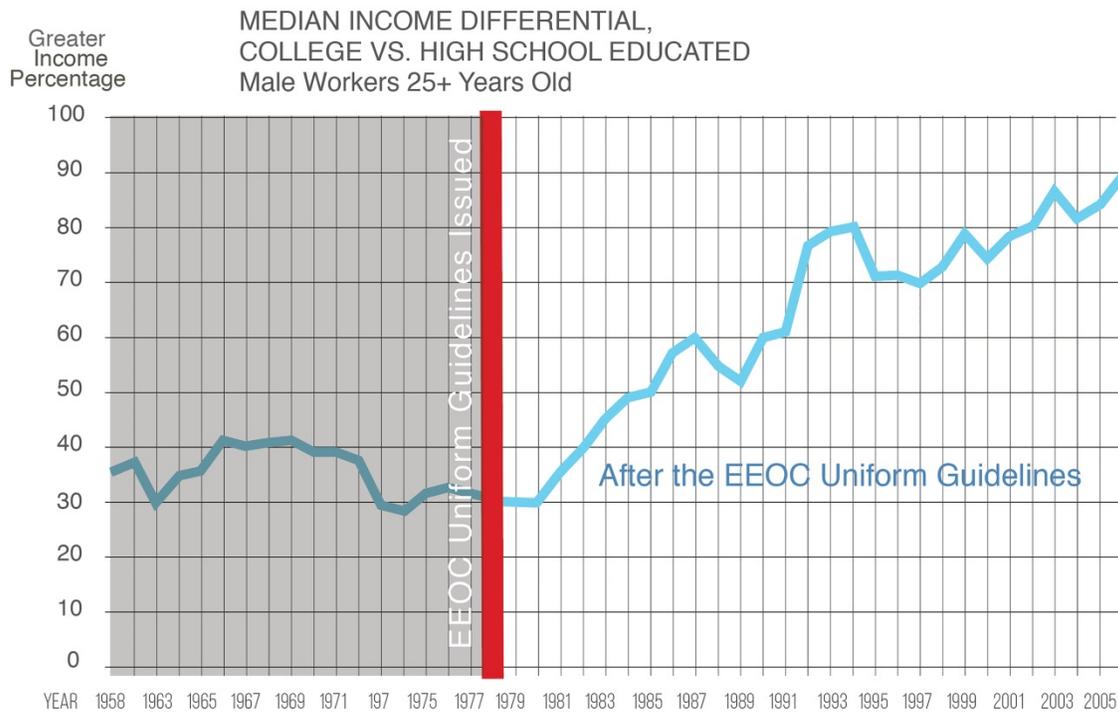


Figure 3: The Uniform Guidelines on Employee Selection were published in 1978 as a result of several Supreme Court decisions on prehire testing, including *Griggs v. Duke Power* seven years earlier. The value of a college degree also started to rise after 1978. Figure adapted from Bryan O’Keefe and Richard Vedder, “*Griggs v Duke Power: Implications for College Credentialing.*” John William Pope Center for Higher Education Policy (now the James G Martin Center for Academic Renewal), 2008.

Within **Figure 2**, the careful reader will note that the population with college degrees seems to be missing the lower scores. Because scores at the high end seem unaffected, the absence of low scores most likely represents the use of a filter (e.g., not accepting students with low scores) rather than a sudden improvement of students’ skill levels.

College degrees appear to be required mostly because they provide an easy way to sort resumes.

Bryan Caplan, in his book *The Case Against Education*⁶, makes this point in several ways. Perhaps his most compelling point is that those who have a degree earn vastly more than those who almost have a degree. In other words, it’s the degree label itself and not the learning underneath that is being used to make a hiring decision.

The John William Pope Center for Higher Education Policy (now the James G. Martin Center for Academic Renewal) also pointed out that the very year the government enacted regulations to limit the use of test scores as an easy pre-hire sorting tool, the value of the degree took off.⁷ In 1978, the Uniform Guidelines on Employee Selection were enacted by the Equal Employment Opportunity Commission (EEOC), in response to a 1971 Supreme Court case, *Griggs v Duke Power*. The now well-known wage separation between 4 year college graduates and high school

graduates began at the same time (**Figure 3**). Thus, it seems that the college degree became valuable primarily because it replaced test scores as a resume sorting tool.

Employers require degrees for jobs that appear not to need them

As two recent studies have demonstrated^{8,9}, job advertisements appear to be demanding degrees even for jobs that don't need them. To determine the extent of this practice, Innovate+Educate partnered with Burning Glass Technologies to match online job advertisements' stated educational requirements^{iv} against the Department of Labor's O*Net "Zone" classification for those same jobs. The O*Net Zone levels are organized by the amount of education that should be required for that job, based on 1) an analysis of job responsibilities and 2) the proportion of degree holders at each level already working in that occupation, see **Table 1**.

In total, about 14% of all job advertisements are asking for education beyond what one would imply from the job title. Across the US, this represents about 10 million jobs.^v Looking just at jobs where employers specified a bachelor's degree as a requirement, about 70% appear to legitimately require education at that level and 30% do not. The greatest mismatch occurs at what should nominally be associate's degree level occupations where employers were asking for degrees both higher and lower. The fact that employers do not feel comfortable requesting an associate's degree, relative to other degrees they are more familiar with, considerably devalues the associate's degree. It also inflates the apparent demand for bachelor's degrees.

		<High School Degree	High School Degree	Associate's Degree	Bachelor's Degree	Graduate Degree	...More than Nominally Required
DOL O*Net or Burning Glass Classification	<High School Degree (O'Net Zone 1)	78.39%	21.38%	0.09%	0.14%	0.01%	21.61%
	High School Degree (O'Net Zone 2)	*	86.29%	5.38%	8.27%	0.06%	13.71%
	Post HS Specialized Training (Burning Glass Category)	*	96.55%	1.81%	1.59%	0.05%	3.45%
	Associate's Degree (O'Net Zone 3)	*	36.94%	27.03%	34.88%	1.15%	36.03%
	Bachelor's Degree (O'Net Zone 4)	*	15.18%	4.12%	76.61%	4.09%	4.09%
	Graduate Degree (O'Net Zone 5)	*	1.12%	3.78%	32.42%	62.68%	0.00%
	All Job Categories						

Table 1: Percentage of job postings requiring the stated degree, within each job category recognized by O*Net. An additional job category was added to represent jobs requiring a post-high school certificate or credential but less than a college degree, using Burning Glass' classification system. All categories are mutually exclusive (a given job/occupation was assigned to only one category).

Burning Glass Technologies (burning-glass.com), which tracks job demand through online ad counts (and provided the raw data for Table 1), comments that this insistence on bachelor's degrees doesn't always make sense, even for the employer: "In some roles, employers prefer bachelor's credentials even when that makes the position harder to fill. For example, Construction Supervisor positions that require a B.A. take 61 days to fill on average, compared to 28 days for postings that don't require a bachelor's degree."¹⁰

Another contributor to bachelor's degrees being a default credential is the trend of professionalizing a discipline by requiring a licensing test – but then requiring a degree as a prerequisite to take the test.

Over the 20th century, several professions – nursing, teaching, and social work, for example – which began under an apprenticeship training model sought to professionalize by requiring licenses for those seeking to enter the profession. Gradually, the licensing boards began to require degree completion as a prerequisite for taking the test. This fundamentally does not make sense: doesn't passing the test itself guarantee competency? And if it doesn't, why have the test at all? The trend has persisted, and today the combined occupations of elementary and secondary school teachers, registered nurses, and social workers represent 9% of the job openings requiring bachelor's degrees. Individuals lacking college credentials are not permitted to perform these occupations even if they are able to pass the licensing test and have significant work experience (e.g., from another country or military).

A major conclusion of this report is that it is not possible to generate more bachelor's-degreed individuals by "fixing" the education system or increasing the desire of people to obtain a degree. The rationale follows.

Encouraging more people to go to college will not close the degree shortfall, for a surprising reason: nearly everyone who could possibly have gone to college has already attempted it. For the minority that hasn't, their draconian economic situation precludes the attempt.

The message that "you need to get a degree to get a good job" has been heard, loud and clear. Sixty-three percent of Americans aged 25-64 have at least attempted college.^{vi} Some 33% obtained a bachelor's degree or higher.^{vii} An additional nine percent received an associate's degree.^{viii} However, 21%^{ix} of the U.S. population aged 25-64 attempted college but left before obtaining either degree. The supply-demand gap in bachelor's degree recipients could be more than completely filled by this 21%. These individuals have heard the message. They gained entry to college and, as shall be seen, 66-90% did not struggle with coursework. They left because they had to hold down their present jobs.

A 2009 report issued by the Bill and Melinda Gates Foundation and Public Agenda demonstrates that 71% of students leave school primarily, or in part, to keep their jobs. These data are reproduced in **Figure 4**. Only 10% (primarily) to 34% (partially) claim academic rigor caused them to leave. The financial stress, driven by the need to pay for school and living expenses simultaneously, is clearly mirrored in dropouts' recommendations on how to improve their chances of success in college. Their top recommendation is allowing financial aid to be given to part-time students – i.e., students who work.

For the remaining 37% of the population, those who never attempted college, simple survival ends up taking precedence for most of their lives. At age 18, this demographic has an income of \$3,063/yr.^x Income rises slowly with age as these individuals become more fully employed. However, only by age 48 does this demographic have enough income (\$28,980/yr^{xi}) to finally survive at the poverty level (\$12,060/yr^{xii}), work, and attend a 4-year college (\$14,797/yr^{xiii}, after subtracting the more generous financial aid packages given to those earning less than \$30,000/yr). These individuals desperately need a new route to good jobs. While workforce agencies and others could theoretically teach the skills required, employers continue to fall back on the bachelor's degree requirement.

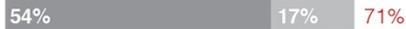
For those who cannot afford college, work-related credentials do not provide a pathway out of poverty because even work-related-credentials are inaccessible to non-college goers.

Table 2 shows that for those with less than a high school degree, only 7% will ever get a license or certificate in a useful trade. Ironically, it requires some exposure to college before a trade-related credential is accessible. This is in part because two-year college itself offers many work-related experiences and credentials in collaboration with local employers (e.g., one-year certificates in trades), which one can discover once one is in college, but also because – as stated earlier – many externally-issued licenses and certifications now require a college degree prior to taking the certification test or licensing exam.

REASONS FOR LEAVING COLLEGE:

Having to work is the top reason young adults gave for why they left school. Percent who say the following is a reason why they did not complete their program.

I needed to go to work and make money



I just couldn't afford the tuition and fees



I needed a break from school



I had to take too many classes that I did not think were useful



I didn't have enough time for my family



I thought many of the classes were boring



All things considered, it just didn't seem to be worth the money I was paying



I didn't like sitting in class



Some of the classes were too difficult



■ Major Reason ■ Minor Reason Total

SOLUTIONS FAVORED BY THOSE WHO LEFT COLLEGE

(did not graduate):

81%	Allow part-time students to qualify for financial aid
78%	Offer more courses in the evenings, on weekends or in the summer so people can work while attending school
78%	Cut the cost of attending college by 25 percent
76%	Have the government offer more college loans
76%	Provide day care for students who need it
73%	Make sure students learn good study habits in high school so they're prepared for college work
69%	Have more programs for students who are interested in hands-on learning, apprenticeships and nonclassroom work
69%	Provide health insurance to all students, even those taking classes part-time
68%	The opportunity to talk with advisers who know all about the different college and job-training programs so you can make a good choice
67%	Improve teaching so the classes are more interesting and relevant
57%	Put more classes online
50%	Make the college application process easier

Figure 4: Reasons why students drop out of college and solutions favored by the dropouts. The data above are taken from a 2009 report issued by Public Agenda and the Gates Foundation, Jean Johnson, John Rochkind, Amber N. Ott, and Samantha Dupont, "With Their Whole Lives Ahead of Them," Public Agenda, New York, 2009. These figures are reprinted with permission via a Creative Commons Attribution-Noncommercial-Share Alike 3.0 license.

	Less than a High School Degree	High School Degree	Some College No Degree	Associate's Degree	Bachelor's Degree or Higher
Individuals having a work-related license or certification not issued by a college or university	5%	11%	18%	30%	34%
Individuals having a work-related postsecondary (i.e., issued by a college or university) certificate that is not a formal degree.	2%	7%	15%	17%	4%
Individuals having any type of work-related credential (not quite the sum of the above because some individuals have both)	7%	17%	29%	31%	49%

Table 2: Rate at which work-related credentials are attained at each level of education. Note that the bottom row is not equal to the sum of the top two rows because individuals who have both types of credential are not double-counted in the total. Data for this table was compiled from Stephanie Cronen, Meghan McQuiggan, Emily Isenberg and Sarah Grady, “Adult Training and Education: Results from the National Household Education Surveys Program of 2016 – First Look” (NCES 2017-103). Washington, DC: U.S. Institute for Education Sciences, Department of Education, 2017.

Paid apprenticeships are a sure pathway to a job for those who have some college but less than a bachelor’s degree. However, only 11 states encourage employers to offer apprenticeships. And, even then, the overall numbers are incredibly small.

For would-be electricians, plumbers, construction workers and others, apprenticeships have been a proven path to a job. For example, an Indiana Department of Workforce Development study of 4,911 Ivy Tech Community College apprenticeship participants showed 81% employed overall 5 years later, with salary gains of about 100% for the younger individuals who had no/little prior work experience coming into the apprenticeship.¹¹ Unfortunately, apprenticeships are not easily scaled. They cost money and time on all sides to implement: money for tuition at the college providing instruction, money for the salary of the individual in training, money for the insurance and benefits the employer must legally provide, and, finally, money to replace the salaried time of a senior employee mentoring a new unproven one. Currently only 11 states provide tax

incentives for employers to take on the costs of an apprenticeship program and 12 offer tuition assistance for registered apprentices.¹²

Burning Glass Technologies' recent report on apprenticeships¹³ echoes the frustration of having a potential solution remain largely unimplemented. The report states, "many employers are asking for bachelor's degrees for these otherwise middle-skill jobs. Yet employers are still open to those with alternative credentials. For example, roughly 60% of IT help desk jobs ask for a bachelor's degree, yet the specific skills requested are the same whether a degree is requested or not." The report calls for consideration of more apprenticeships, but also references the "great deal of work that must be done" to make apprenticeships viable.

Shifting to a Work+Learn Future

This report, *A Nation Upside Down*, offers data that suggest—not surprisingly, and not for the first time—that the current education and employability pipeline is not working for the majority of Americans. Credential-based requirements for work and the ability of individuals to obtain those credentials are at an impasse. However, there is evidence that employers are beginning to forge a new path into a future that values performance above everything else, discretizes performance into individual skills for measurement purposes, and creates interoperable work-education systems to upgrade skills as needed, eventually replacing the existing model of degree-before-job. Individuals' ability to navigate this new work+learn future will depend critically on their ability to learn how to learn.

As the science fiction author William Gibson said,^{xiv} "The future has arrived — it's just not evenly distributed yet." Examples of new approaches to job attainment can already be found. For example, Tufts Medical Center has substituted a healthcare-oriented assessment, rather than degree or prior work experience, as a first filter for 22 different job titles, about 25% of its workforce. The result has been a far more diverse pool of vetted new hires. In addition, candidates' reactions to assessment feedback were very positive. The assessment was short but provided a "teachable moment" on healthcare-related knowledge and skills. Even rejected applicants leave with something of value.

In another example, CVS and Dallas Area Rapid Transit in the Dallas market both worked with Innovate+Educate and Earn Dallas, a project of the Walmart Foundation, to embrace the work+learn paradigm with Supervisory Certificates tied to advancement opportunities within the company. The certificates are offered by a local community college via online, competency-based courses but are informed by industry standards and used as currency for within-company promotions. In this case, the credential is obtainable part time in off-work hours, it requires little monetary investment, and its ROI is neither vague nor distant nor uncertain (as it often is with a degree). The certificate ties directly to within-company promotion opportunities. Because employers are beginning to value learned skills more than seat time in a formal academic setting, the many varieties of learning capable of producing higher performance are beginning to count towards obtaining a job or promotion. This is the work+learn future.

The work+learn future will come sooner than later, due to pressure from both supply and demand.

From the supply side, there is already tremendous political and economic pressure from the 67% who do not have a 4-year degree, to find pathways to a well-paying job. The crisis of college unaffordability has led to a crisis of job unobtainability for a large portion of the American public. The resulting pressure has already boiled over, very visibly, into national political dissatisfaction with the U.S.' status quo. Meanwhile, the stakes for completing a college degree – as demonstrated by the percentage of job ads demanding them – keep rising. The degree demand is unsatisfiable by any current means.

If the economy keeps expanding, employers will be under tremendous pressure to find skilled employees somewhere. The closest and most qualified pool are the 35 million individuals, already present within companies, who attempted college but dropped out because of their need to work. Sixty-six to 90% percent of these employees have college-level motivation and skill (when interviewed, they said they had no difficulty with their college-level studies¹⁴), but they badly needed learning opportunities compatible with work.

Colleges, likewise, will need different strategies to satisfy this demographic's need for learning-with-job. The rise of the massively online open courses (Udacity, Coursera, edX) has demonstrated the scale of unmet demand but is still struggling to make a consistent last mile connection to job entry or advancement. Without such a connection, and without the four years of time and money needed for more formal education, many individuals have fled to workplaces that rely solely on performance-based measures: TaskRabbit, Upwork, Toptal. In so doing, they have demonstrated that client ratings or scores on rigorous skills tests can also be a currency for job entry. The last mile connection to a job has historically been the degree, but it is starting to shift to something slightly different. Meanwhile, a profusion of learning and education pathways is likely to place a premium on individuals who have learned how to learn, making that one skill the most necessary attribute of future college graduates.

Formal preparations for the work+learn Future are underway

A number of events, national discussions, and papers are starting to guide thinking about pathways into the work+learn future. As far back as March of 2016, the Work+Learn Futures project within the Institute for the Future hosted an interactive forecasting game.¹⁵ The event at which *A Nation Upside Down* is being released, Future Skills (Palo Alto, CA: Feb 21-23, 2018) is putting forth an overall framework for navigating the shift. Another gathering, the Close-It Summit (Brooklyn, NY: Oct. 15-18, 2018) will delve into new technologies and tactical approaches companies and colleges can use in their shift to the new model. Scholarly papers are also beginning to emerge^{16,17} and can be found referenced below. Keeping the conversation alive, Innovate+Educate has also committed to issuing state-level analyses in stages throughout 2018.

The first demonstration partnerships are also beginning to emerge. These are coalitions of willing employers designed to escalate innovations up the adoption chain by:

- field testing innovative approaches amongst early-adopter companies. These are companies whose leadership is willing to risk-manage potential failure in exchange for early returns in the areas of employee attraction, selection, development and/or advancement;

- sharing early adopters’ pilot results with other members of the partnership, who in turn pilot the “now-more-proven” strategies in larger scale trials.
- disseminating findings and best practices proven through the scaled field tests with the wider public through editorials, media appearances, etc.

Formal demonstration partnerships generally have, as a prerequisite for entry, a commitment letter stating the company will take on at least one demonstration during its tenure with the partnership. This ensures the focus remains on implementation rather than discussion. Informal demonstration partnerships are less strict. In the work+learn space, these include such organizations as Grads of Life and the Innovative Business Hiring Council 2020 (a joint partnership launched in January 2018).

Conclusion

In the future, employers will no longer be a separate entity from the education establishment. Pressures from both the supply and demand side are so large, employers will end up – through default if not desire – co-designing novel pathways to credentials, certifications, employment, and promotion in order to access skilled labor. A work+learn economy is emerging all around us. The first work+learn shifts are being faced employers themselves, who are beginning to create dynamic work+learn pathways into our future.

ⁱ The average salary for a high school graduate age 25-64 in 2016 was \$25,432, while the average salary for a 4 year college graduate of the same age in that same year was \$56,953 (US Census American Community Survey, 2016). The living wage in 2016 was \$30,668 for a parent who is part of a two income family supporting two children (Amy Glasmeier, <http://livingwage.mit.edu/articles/15-minimum-wage-can-an-individual-or-a-family-live-on-it>).

ⁱⁱ Job posting data from the first 11 months of 2017 online job advertisements as analyzed by Burning Glass. Census data are from the U.S. Census’ American Community Survey, 2016, using its Dataferret tool to query the degrees attained by individuals aged 25-65. SubAA specialized training is not an existing Census category and had to be estimated by multiplying the Census counts for high school graduates and “some college-no degree” individuals by the percentage of each category known have obtained work-related credential (note: the latter can be found in Table 2).

ⁱⁱⁱ Data from John E. Hunter and Ronda F. Hunter, “Validity and Utility of Alternative Predictors of Job Performance,” *Psychological Bulletin*, vol. 96, pp. 72-98, 1984. The study shows an $r=0.1$ correlation between job performance and years of education. Squaring this number gives the estimate of 0.12 or 0.01 (1%) of job performance explained by years of education.

^{iv} Job posting data from Burning Glass, covering the first 11 months of 2017.

^v Yearly estimate of degree-inflated jobs obtained by multiplying the sum of monthly job openings for 2017 by 0.14. Monthly job openings available from Department of Labor Job Openings and Labor Turnover data, <https://data.bls.gov/timeseries/JTS00000000JOL>.

^{vi} Population of 16-25 year olds by attained level of education. U.S. Census, American Community Survey, 2016.

^{vii} Ibid.

^{viii} Ibid.

^{ix} U.S. Census, American Community Survey, 2016, sum of 25-64 year olds who have “some college, but less than 1 year” and those who have “1 or more years of college credit, no degree,”

divided by the U.S. population of 25-64 year olds.

^x U.S. Census, American Community Survey, 2016. Average income vs. age for those whose education levels are less than “some college, but less than 1 year.”

^{xi} Ibid.

^{xii} HHS definition of poverty level, 2017.

^{xiii} Median U.S. cost of a 4 year college for families earning less than \$30,000/year. This number includes tuition, room, and board and subtracts financial aid. Department of Education, College Scorecard Data for 2015- 2016. [Online]. <https://collegescorecard.ed.gov/data/>.

^{xiv} More correctly, this version of the quote is from the journalist Scott Rosenberg, who morphed Gibson’s “The future has already happened” into an even more memorable quote.

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