



From Skills to Careers:

What new job-focused learning models mean
for students, educators and employers

About EdSurge

EdSurge was started in 2011 by Betsy Corcoran, Matt Bowman, Nick Punt and Agustin Vilaseca to connect the emerging community of edtech entrepreneurs and educators. We wanted to share detailed information about what new technologies could—and could not—do to support learning.

We report on the latest news and trends in the edtech industry to help:

- Entrepreneurs who build new products and businesses;
- Educators who use these tools;
- Investors and others who support companies and schools.

In addition to reporting on trends, we share other information vital to all in the learning ecosystem including [available jobs, opportunities](#) and [events](#). We are building a database of rich information (the [EdSurge EdTech Index](#)) about emerging products and how they're used. And we run a series of [Ed-tech Summits](#) where educators and entrepreneurs meet on common ground and exchange feedback on how to build and refine tools to improve educational outcomes.

We also do [research](#) that provides entrepreneurs and educators with information to make decisions, inform practice and build bridges of communication between communities. We combine reporting, market intelligence and a growing community of readers with independent research that is easy to consume and fits into the daily life of educators and entrepreneurs.

With the right tools, technology can transform “learning” from something we did in classrooms at fixed hours of the day to something we can do anywhere, anytime.

Table of Contents

Forward	4
Acknowledgements	5
By The Numbers: Is The Skills Gap Real?	6
Employer and Employee Expectations	8
Emerging Options for Skill-Building	9
New Models: BootCamp Take Off	10
Evaluating The Outcomes.....	12
Casting a Small Net: Diversity in Bootcamps	12
Believe What You See?	12
Sources	14

Forward

This report examines the current “skills gap,” or the mismatch between the skills employees have and those that employers seek. The purported phenomenon is driving high wages for in-demand tech jobs like data scientist, programmer and engineer. It is also the force behind a booming market for nontraditional education providers, including MOOCs, bootcamps and corporate training programs. Students are flocking to these programs to “skill up” in pursuit of available lucrative jobs, ripe for the taking with the right combination of skills.

As the foundation for our research, we sought to make sense of the many—and sometimes conflicting—descriptions of the skills gap. We examined quantitative data around the economic drivers, such as unemployment, open jobs and productivity, as well as a multitude of employer and employee survey results. Job projections and salary data from the Bureau of Labor Statistics were at the heart of our analysis. We learned that high-paying tech jobs are here to stay—at least for the next decade.

Across industries, employers report extended job vacancies and trouble finding qualified candidates. At the same time, young professionals today envision changing jobs many times over the course of their careers. More than [90 percent of Millennials expect to stay in their jobs less than three years](#). They’ll weave between work and learning opportunities throughout their careers. As they continue to build foundational knowledge, they’ll retool specific skillsets along the way, getting a certificate in data analytics one year, for example, and picking up a programming language or two in the next.

While postsecondary institutions are the hallowed providers of foundational knowledge, some of the strongest trends emerging in the “skill-up” economy are driven by alternative education providers that are laser-focused on skills and job placement.

Job-hungry skill-seekers who can afford to pick and choose between expensive in-person immersive programs or online classes have a smorgasbord of options, but can these models scale? At this point, the average bootcamp student is college-educated, white, male, 31 years old, already working and able afford the \$5,000-to-\$20,000 price tag of skills-training programs without loans. The student descriptors paint an exclusive picture.

Will these new models of learning help more adults achieve the quality of life they want? Or will they drive inequalities between those who can afford to shell out for one-off learning experiences and those who can’t risk leaving their current position? Whether or not these programs lead to systemic change in postsecondary education is up for debate, but they represent a rapidly evolving step in the lifelong learning path. Let us know what you think! Drop us a note at feedback@edsurge.com.

-- Allison McLaughlin, EdSurge Researcher

Acknowledgements

This report reflects three months of research, data analysis and interviews with industry experts, boot-camp providers and students.

We are thankful for the conversations we've had with so many people working to equip students with the tools to navigate as lifelong learners.

These folks include: Adam Enbar (Flatiron School), Mo Akade (Telegraph Academy) Shanna Gregory (Grace Hopper Academy), Mercedes Bent (General Assembly), Ryan Orban (Galvanize) Paul Freedman (Entangled Ventures), Todd Zipper (Learning House) and Darrell Silver (Thinkful).

A number of EdSurge staff and contributors put tremendous energy into creating this report. These include Allison McLaughlin, Marguerite McNeal, Ray Batra and Allison Dulin-Salisbury. EdSurge Senior Editor Marguerite McNeal and Director of R&D Christina Quattrocchi edited the report.

Through the support of Salesforce, we are able to make this report freely available to all. This work has deepened our understanding of the trajectory of people as lifelong learners. In the current economy, people switch jobs often and are taking control to build the skills for the journey.

By The Numbers: Is The Skills Gap Real?

"I always kind of knew that I wanted to be an engineer. I was just missing all the skills." This sentiment may have raised a few eyebrows a decade ago, especially coming from a college graduate, who already has work experience. Now it has become the new credo of a growing subset of upwardly mobile workers seeking short-term learning experiences. They're looking to capitalize on an abundance of lucrative, highly skilled jobs and a shortage, whether perceived or real, of qualified workers to fill those jobs.

Despite mixed opinions on the existence or severity of the skills gap in the U.S., [research shows that since the 1980s, the wages of the top 10 percent of workers have risen sharply](#) relative to the median worker even after controlling for characteristics like education level and experience. The Bureau of Labor Statistics projects that computing and information technology jobs will grow by 12 percent by 2024. The median salary for these jobs is roughly [\\$89,000—\\$40,000 higher than the median salary for all jobs in the U.S.](#)

For potential job-seekers, the number of open high-paying jobs in high-tech fields, such as programming and analytics, is encouraging. [For instance the number of data scientist job postings is expected to grow another 18 percent by 2020.](#) While the exact definition of a data scientist may still be a bit hazy, the job requires knowledge of some of the most lucrative programming languages and computing skills, similar to those used by software engineers.

The talent shortage in the workforce does not mean that there is a shortage of workers with high education levels, but rather a shortage in workers who are experienced in the most valued skills to fill the open job postings.

Aside from surveys, there have been few widely agreed upon methods for quantifying the elusive skills gap. Gary Beach, publisher emeritus of CIO Magazine and author of "The U.S. Technology Skills Gap: What Every Technology Executive Must Know to Save America's Future," has extensive experience studying the skills gap and invented the [Skills Gap Misery Index \(SGMI\)](#) to quantify and measure it. His methodology is straightforward: compare the number of open jobs to the number of people who are unemployed to determine the U.S.'s ability to place unemployed workers into unfilled positions over time. According to Beach's index, the gap is 40 percent worse now than in 2000 (the baseline year).

While it may be an oversimplification to compare unemployment and open jobs—both of which are influenced by macroeconomic and political forces, such as population growth—the SGMI does support the existence of a skills gap. But by these measures, the skills gap was worst during the recession of 2009 and is slowly climbing back to pre-recession levels.

According to Grovo, a learning management system for employers, productivity growth (or lack thereof) is a better measure of a "gap" in workers' technological skills. To measure productivity, the BLS publishes the U.S. nonfarm productivity rate, which divides the national output by a calculation of all hours worked. U.S. productivity grew at historic rates in the 1990s and early 2000s, but this growth

has slowed considerably since then. [Productivity grew a mere 0.6 percent in 2015—half the average annual increase from 2007 to 2015.](#)

Like the SGMI, productivity is only a rough, and potentially dubious, estimate of the skills gap. It is nearly impossible to align open positions with unemployed workers or calculate the productivity hit caused by a lack of technological skills. Perhaps because of the lack of agreed upon quantitative measures of the skills gap, there has been no shortage of surveys of employers and employees, who have mixed thoughts on the existence and magnitude of the gap.

Employer and Employee Expectations

In CareerBuilder's 2014 yearly survey of roughly 1,000 employers, more than 80 percent said that it was at least somewhat difficult to fill open jobs. Another 61 percent admitted to hiring people who did not meet the listed qualifications for a role. That being said, [only 41 percent of companies are doing something to address the skills gap](#), and an even smaller percentage are providing on-the-job training.

The same survey included perspectives from 1,500 job-seekers, 50 percent of whom said they believe that the skills gap is worsening as a result of a lack of on-the-job training. Even after people find jobs, [survey results indicate that workers lack the skills necessary to thrive in high-tech positions](#).

A 2014 poll of employed U.S. workers, conducted by Harris Interactive, revealed that only one in 10 survey respondents has mastered the digital tools that they need at work. These results were consistent across age groups. Only 14 percent of respondents age 18 to 35 consider themselves to be experts when it comes to using these tech tools, compared to [9 percent of workers between 55 and 64 years old](#).

As more people seek to gain career-related skills, many new models of professional learning are emerging. The formats range from in-person, full-time degree programs (e.g., typical master's programs), to short-term, career-focused immersive programs, and myriad part-time and online options. With promises of career-readiness, these programs acknowledge learning in various ways, from degrees to certificates to micro-credentials.

The average age of students in these programs ranges from 27 to 31 and most already have a college degree or at least some exposure to higher education. They generally have work experience and are looking for programs to change careers or advance their knowledge within their current role.

Emerging Options for Skill-Building

The emerging “skill-up” economy is largely driven by people looking to take control of their careers by beefing up their resumes with additional credentials. These skill-seekers are turning to traditional post-secondary institutions, including universities and community colleges, as well as alternative credentialing programs, such as online courses and in-person bootcamps.

Though traditional four-year colleges and universities often aren’t solely focused on career prep and skill-building, they serve approximately [10 million undergraduate students and 2.3 million graduate students per year](#). Job-related skills training is often handled by continuing education departments at these institutions.

Community colleges and for-profit colleges may be uniquely poised to bridge the skills gap. They often offer flexible schedules, affordable programs and focus on skills tied more closely to the workforce. However, declining enrollment in these programs and dwindling completion rates at these institutions have made them less attractive as skill-up solutions.

Though there are [12.4 million students at an average age of 28 enrolled in credit and noncredit programs](#) in community colleges, the overall community college enrollment rate has dropped steadily over the past three years with a [3.5 percent drop in 2014](#). Additionally, only [30 percent of students enrolled full-time in community college graduate](#) with an associate’s degree in three years. For-profit universities share a similar story of high-but-declining enrollment numbers and low completion rates, with costs often six times higher than the average community college. As of 2015, roughly 28 million students were enrolled in for-profit colleges, a [4.5 percent decrease from 2011](#). Only [32 percent of those enrolled graduate within six years](#).

Through innovative partnerships, community colleges and for-profit education options are gaining traction in the skill-up market. Capella Learning Systems, the operator of for-profit Capella University that serves roughly 35,000 students, has partnered with CareerBuilder, a platform connecting job-seekers and employers, to create RightSkill. This program is a 90-day training series with courses in in-demand skills, such web development and retail management. It will cost students less than \$1,000 with a moneyback guarantee that promises job placement within 90 days of completing the program. The first cohort began in spring 2016, so it has yet to be seen whether RightSkill will become a serious contender in the skill-up economy. The company recently purchased Hackbright, the all-women’s coding bootcamp, in April 2016, and coding school DevMountain in May 2016—putting serious skin in the skills-training game.

Skill-seekers are also flocking to MOOCs to pick up expertise. More than 35 million people enrolled in MOOCs in 2015, up from 17 million in 2014. However, a 2014 joint study by Harvard and MIT of 1.7 million students enrolled in over 68 MOOCs revealed very low completion rates. At the onset of the study, [participants were asked whether or not they intended to complete the course to earn a certificate](#). Of the 57 percent who initially planned to earn a certificate, only 25 percent actually did. Because of the massive quantity of students participating at various levels of intensity, it is difficult to measure the impact of MOOCs on bridging the skills gap. However, they are still gaining in popularity and students are increasingly focused on learning high-demand skills such as data analytics and coding.

New Models: Bootcamps Take Off

In contrast to the the high enrollment and attrition numbers of online courses and community college options, bootcamps have seen tremendous—though often unverified—initial successes. A bootcamp is a short-term, in-person immersive educational experience designed to teach the skills necessary for career advancement to meet the current demand of high-tech jobs.

The industry is very young: the first bootcamps were founded in 2012. According to Course Report, the number of bootcamps doubled between 2013 and 2015, with that figure now close to 70. Over the same time period, the number of bootcamp graduates increased from 3,000 to 16,000. These grads enjoyed a [38 percent wage increase on average](#), and more than 60 percent of them were working full-time as programmers after graduation. A word of caution here: many bootcamps report unaudited job-placement rates near 100 percent.

A bootcamp is designed to produce highly skilled workers quickly, even for students with a limited technical background. Most students who seek out bootcamps are looking to change roles or careers in the short-term. The majority of programs last from 10 weeks to six months, with some lasting as long as a year. Their [pricetag ranges from roughly \\$5,000 to \\$20,000, with the average cost hovering around \\$14,000](#). Students learn high-demand skills, mostly in areas including web development, data science and analytics, marketing, design and product management. These programs incorporate in-person instruction that is difficult to recreate in online and part-time models. According to Shanna Gregory, director of partnerships at Grace Hopper Academy, “a bootcamp provides students with an element of feeling like you may not belong, but are surrounded by a community of misfits. Everyone sitting around you has the same goal.”

Bootcamp offerings align with skills needed for high-paying jobs in the technology and computing sectors. The most popular programming languages based on current job postings align with the languages most commonly taught in bootcamps, as well as those covered in the most popular MOOCs. Job-matching company Gooroo conducted a study analyzing more than 500,000 vacant IT positions across the U.S., UK and Australia to determine which programming languages were most commonly referenced in open job descriptions. The study also noted the average salary across all open job descriptions for each language. [According to Gooroo:](#)

1. Java—featured in 18 percent of ads with an average salary of \$100,000 USD
2. JavaScript—17 percent, \$90,000
3. C#—16 percent, \$85,000
4. C—9 percent, \$90,000
5. C++—9 percent, \$95,000
6. PHP—7 percent, \$75,000
7. Python—5.5 percent, \$100,000
8. R—3 percent, \$95,000
9. Scheme—3 percent, \$65,000
10. Perl—3 percent, \$100,000

According to the 2015 Course Report survey, the most common programming languages bootcamps offer are:

1. Ruby
2. JavaScript
3. Python
4. PHP
5. Java
6. .NET
7. Android
8. iOS

The 2015 Course Report survey of bootcamp grads found that those students who learned Python in bootcamps had the most lucrative average post-bootcamp salary at roughly \$80,000. The [average salary increase across all bootcamp students is still a whopping 38 percent, or \\$18,000.](#)

Evaluating the Outcomes

Without standard metrics to connect educational experiences to jobs, it's difficult for people to identify the right skills and training resources they need. Companies also have difficulty identifying the necessary competencies and recognizing qualified applicants. Even so, many people are taking a leap of faith in learning the popular skills of the moment, as new skills often precede new career paths.

Todd Zipper, president and CEO of Learning House, an online learning management platform that acquired online coding bootcamp Software Guild in 2015, notes, "the notion of creating curriculum that can evolve quickly isn't an overnight sensation. It still requires instruction and recruiting the right students, and the student market is limited." As the industry matures and faces increased regulation, bootcamps will be forced to fine-tune their offerings and pinpoint their target students.

Casting a Small Net: Diversity in Bootcamps

It is important to remember that bootcamps have mostly been "tested" on an elite subset of students. The average student is [31 years old, with seven years of work experience and able to finance the entire program without loans](#). Bootcamps also require a level of financial flexibility to devote a full three months—likely without a source of income. Presumably, the students who enter bootcamps have some knowledge of the careers they seek and required skills to find the experience in the first place.

With these factors in mind, bootcamps have some interesting diversity statistics. Based on a [2015 Course Report](#) survey of 43 bootcamps, 36 percent of bootcamp students in 2015 were female, which is a step above the 15 percent of female undergraduate computer science majors. Though these preliminary counts show more diversity than the typical undergraduate CS program, they are still a long way from equal.

When thinking of bootcamps as a long-term solution for skill-building, it is important to remember the difference between career advancement and economic mobility. "There is a difference between retraining students and creating economic mobility," says Adam Enbar, cofounder and CEO of Flatiron School, a New York-based coding bootcamp. "People in most bootcamp programs have a certain pedigree or background and are looking to transition into a new job requiring different skills. On the other hand, creating economic mobility involves taking people who may never have gotten a degree and helping them transition to the professional sphere." In the current market for short-term skill-building programs, bootcamps are a nascent industry sustained by people seeking career advancement.

Believe What You See?

The current growth in bootcamp providers and students may seem like a bubble that is bound to burst. The near 100 percent job-placement rates and salary spikes that some programs advertise often seem too good to be true. However, students, employers and even the bootcamps themselves are starting to demand transparency. General Assembly recently released an open-source framework for standardizing the measures of student outcomes. GA uses the framework in its own data analysis and

is encouraging other providers to follow suit. Other bootcamps, including New York-based Flatiron School, have turned over their results to third-party auditors to verify their graduate placement rates and data. Its audit report verified strong outcomes: 55 percent of graduates got a job within the first 30 days of job searching and by 120 days, 98 percent of students were employed. The self-driven call for transparency is [yielding some promising results.](#)

There is potential for bootcamps to thrive in the future, but success will likely be driven by the growth in programs that define a niche in the market and produce verified outcomes. Providers must recognize the unique needs of their students rather than a one-size-fits-all model focused solely on meeting the needs of job postings. They'll need to keep up with popular programming languages and have iterative, nimble courses and curricula. The best programs will allow students seamless access to courses and skills for accumulating the building blocks of their learning journeys.

Sources

http://futureworkplace.com/wp-content/uploads/MultipleGenAtWork_infographic.pdf

<https://www.coursereport.com/reports/2015-coding-bootcamp-job-placement-demographics-report>

<http://www.ed.gov/news/press-releases/fact-sheet-department-education-launches-educational-quality-through-innovative-partnerships-equip-experiment-provide-low-income-students-access-new-models-education-and-training>

<http://www.indeed.com/jobtrends/q-%22Data-Scientist%22.html?relative=1>

<http://economics.mit.edu/files/4124>

<http://www.bls.gov/>

<http://venturebeat.com/2013/11/11/data-scientists-needed/>

http://go.osuit.edu/advancement/research/skills_gap/misery_index

<http://a1.grovo.com/asset/whitepapers/Grovo-Digital-Skills-Gap-whitepaper.pdf>

<http://www.careerbuildercommunications.com/pdf/skills-gap-2014.pdf>

<http://nces.ed.gov/>

http://www.aacc.nche.edu/AboutCC/Documents/FactSheet2015_grey.pdf

<https://www.insidehighered.com/quicktakes/2015/03/09/community-college-enrollment-and-completion-data>

http://www.aacc.nche.edu/About/completionchallenge/Documents/Completion-Fact_Sheet.pdf

<https://www.insidehighered.com/news/2015/07/24/number-profit-colleges-declines-enrollments-wither>

http://nces.ed.gov/programs/coe/indicator_cva.asp

<http://dspace.mit.edu/bitstream/handle/1721.1/96825/SSRN-id2586847.pdf?sequence=1>

<https://www.coursereport.com/reports/2015-coding-bootcamp-market-size-study>

<http://www.sitepoint.com/best-programming-language-learn-2015-job-demand-salaries/>

<http://flatironschool.com/jobs-report-2015-ty?submissionGuid=8add110e-077a-47ff-81c9-cb45128411da>



For more insights, go to
edsurge.com/reports

Tips? Questions?
feedback@edsurge.com