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Brief

The Many Ways Universities Are Exploring the Coding Bootcamp Trend

By Emma Gallimore

Idea in brief

Universities are experimenting with the coding bootcamp trend as a way to help students build high-demand technical skills and to develop clear career paths. Most early examples, both as part of undergraduate degrees and in continuing ed programs, are classroom based, but online models are emerging. We talk to several experts about trends in funding, hiring, and quality assurance for bootcamp/university partnerships.

Coding bootcamps are a booming model in the for-profit education sector. In 2016, the number of full-time providers grew from 67 to 91, according to Course Report, and the estimated 18,000 graduates is up significantly from the 2,100 who graduated in 2013. These emerging companies offer a solution to a growing skills gap in the employment marketplace: as software engineering and web development have become critical functions of more businesses and not necessarily limited to tech companies, the demand for skilled professionals has skyrocketed. According to the Bureau of Labor Statistics, the overall job market for computer and information technology occupations is expected to grow from 3.9 million jobs to about 4.4 million jobs by 2024 — that's 500,000 new jobs.

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Coding bootcamps are usually an 8-12 week long immersion program conducted at an intense pace to prepare students to fill jobs immediately after graduation. According to Course Report, average tuition is $11,451. Each school emphasizes its own mix of programming languages, builds its own instructional staff, and has developed its own curriculum, usually in partnership with the employers waiting for the graduates at the end. Notably, the model is attractive enough to students and employers that code schools are also developing tracks in other high-demand domains, including data science, web design, and digital marketing.

The first businesses using this model operated entirely in person and in a few major cities, but seeing a bigger market opportunity — and limitations on space and the number of instructors they could find — companies have began growing schools in other smaller tech hubs like Charleston, Austin, and St. Louis. And they have begun to develop programs that are partly or entirely online. Bloc's online version, for example, takes six months and serves working adults holding down full-time jobs.

Now the model is starting to show up on college and university campuses. Educational Quality through Innovative Partnerships (EQUIP), an initiative of the U.S. Department of Education, is designed to help low-income students access new models of learning and career preparation. It permits the use of federal financial aid funds on projects that partner with non-traditional education programs. Several of the early pilot projects involve partnerships with coding bootcamp operators.

But that is only one way that institutions of higher education are exploring the bootcamp trend. In the past year, several colleges and universities either launched their own versions, often using a private vendor for the curriculum, or started working with a code school to provide instruction or support in some way. They are doing so without financial aid subsidies, anticipating there is a market of students who will pay full fare.

Those of us in adaptive learning are watching this trend closely and feel the widespread incorporation of adaptive learning technology into this model is imminent. In fact — as discussed later — adaptive learning technology already plays a key role in Northeastern University's Level bootcamp. Students learning software engineering and web development, for example, benefit from a mastery-based learning approach, and one of the advantages of an adaptive platform is the ability to capture, analyze, and demonstrate prerequisite knowledge before moving forward to learn subsequent information.

Adaptive learning technology also has in common with coding schools the vision of giving students a more active problem- and project-based learning experience. For students endeavoring to land a coding job after the learning experience ends, the ability to "learn by doing" is invaluable. Artifacts, generated from learning experience, could also become "evidence of learning" to a prospective employer.

Looking at the coding bootcamp trend in higher ed

Because boot camps are a big investment of time and money, there is some inherent risk for the career changers and underemployed college graduates these code schools market to. But high demand on the employer side means some boot camps boast placement rates of 95% in positions with salaries that return that investment very quickly. According to Payscale, a compensation analytics company, the median salary nationally for entry-level software engineers is $73,000 and is up to 50% higher than that in some tech hubs.

What makes the bootcamp model so attractive to universities? With less state investment in higher education, more working adults in the student population, and increased calls for performance-based funding, universities are looking for creative ways to connect foundational learning with clear career paths.

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"Universities are trying to find new paths for tuition revenue," says Dr. Joseph Kozusko, co-founder of Skills Fund, a company that provides financing to students attending coding and data science programs. "They're trying to find a way to have this halo effect to improve outcomes."

Partnering with existing coding schools allows universities to implement their programs quickly, he explains. "They can put their name on something and say they have programs leading to direct skills-based outcomes and they're doing some revenue share model with the person who's actually delivering it," Kozusko says. "It's a great tool so they don't have to do it themselves."

Flexibility as an asset and a challenge

The Department of Education is allowing limited pilots for the use of financial aid dollars, because bootcamps are largely unregulated, falling outside the purview of traditional college accreditation systems, and no common system yet exists to track their efficacy. Though some for-profit schools voluntarily provide data about graduation rates and post-graduate job placement, their reporting is not standardized, and the advertised placement rates are largely unaudited. (The EQUIP projects all have quality assurance partners.)

In the meantime, some companies, including General Assembly and Reactor Core, are trying to establish industry-wide evaluation standards and recruiting other schools to use them.

Darrell Silver, co-founder of Thinkful, which uses an online mentorship model, says, "Schools that publish outcomes data are very different from schools that don't. Generally speaking, schools that publish have students who succeed, and schools that don't are over promising. It's not that the schools are being nefarious, but it is the case that they aren't clear on what students need to do to succeed."

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Partly as a result of this lack of evaluation standards, students in these programs rarely qualify for federal financial aid except in the EQUIP pilot. The tuition puts coding bootcamps outside the reach of many. Skills Fund is one of the specialized lenders emerging to serve students in the bootcamp market.

"Financing is our product," Kozusko says, "but before we work with any schools we sit down and go through a fairly extensive underwriting process to look at if students are going to get good jobs."

Meanwhile the website Course Report has become a well-known source of reviews and reporting about bootcamps, such as the annual market size study cited above. According to their 2015 Alumni Outcomes + Demographics Study, 89 percent of those graduates found jobs within 120 days of graduation with an average annual salary increase of $18,000.

Even the oldest coding bootcamps have only been in operation for five years or so. General Assembly and Bloc were founded in 2011; Thinkful, Dev Bootcamp, Hack Reactor (now Reactor Core), and Coding Dojo all launched in 2012. Each grew independently from the others — in Boston, New York, Seattle, and, of course, San Francisco — developing a format based on the industry knowledge of its founders and the needs of local technology companies.

Silver, for example, says, "In the first couple of years, people would finish one of our programs and say, 'Now what do I do to get a job?' And we didn't really have an answer for them." So Thinkful started adding elements — like job guarantees, support services, and published outcome data — and revising the curriculum to achieve placement goals.

This ability to adapt to student demands and industry changes is part of what makes bootcamps so attractive to students looking to enhance their careers. Adaptability may also make them attractive to higher education leaders looking for innovative ways to serve their students and their local workforces.

Clint Schmidt, COO of Bloc, says, "We update our curriculum every day. If there's a new framework or a new release of a particular software that we teach, we update as we go, on the fly."

Remaining nimble is particularly vital in the IT world where programming languages and processes evolve constantly. "Traditionally," Schmidt adds, "accredited universities have to go through quite a long process to adapt and approve a curriculum, and by the time it's approved, it's dated."

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Partnership takes many forms

Colleges and universities that have recently developed bootcamp partnerships in various forms include Bellevue College, Concordia University, Baker University, University of New Haven, and Barnard College. The University of New Haven, for example, provides the transcript of record for an M.S. in Data Science completed over 12 months at the San Francisco location of Galvanize.

The Software Guild and Concordia University have an articulation agreement under which completion of the coding school's existing classroom program translates to 12 credit hours toward a Concordia computer science degree. For Baker University students, the Software Guild offers its existing online course, and students receive a certificate from Baker College at the end.

In Coding Dojo's agreement with Bellevue College, Coding Dojo staff teach all the courses at the Seattle community college's campus. By contrast, Barnard University reached out to Thinkful for help in designing a coding bootcamp. Once the design was in place, Barnard took over and now administers the program completely independently from Thinkful.

One company, Trilogy Education Services provides coding curriculum, development resources, career placement services, and support to continuing education departments that want to oversee and run their own code schools. These white label programs have opened in the last year at Rutgers, UNC-Chapel Hill, and UCLA. The coding bootcamps are aimed at both working professionals and full-time students who meet in classrooms on nights and weekends.

Revature, a code school based in Virginia, specifically markets to universities wanting to establish career pathways for students. Their proposal is that while universities prepare students well for the fifth job, Revature can help them get started on the first job. Joe Mitchell, senior vice president of academic partnerships, says, "The students get some genuine skills that put them onto a management path later on. We don't see coding as a career. We see it as a way of understanding that helps in leadership roles. The companies that use our students love people who have great coding experience as well as a liberal arts background."

Revature is now establishing campus-based outposts where universities can place recent graduates — often non-tech majors — in the Revature program. Perhaps most intriguing, Revature is so confident of the need for these skills, that their model recoups all the costs from employers; the program is free to students and their universities.

Mostly campus-based

Despite the high-tech subject matter and affiliation with tech employers, most bootcamps, though not all, are delivered in person. Nor does the general trend toward more online courses in higher ed mean these partnerships are necessarily prioritizing online formats.

For example, in the last two years Kaplan Test Prep acquired Dev Bootcamp, Apollo Education made a controlling interest acquisition of the Iron Yard Academy, Strayer Education acquired The New York Code+Design Academy, and Capella Education acquired Hackbright Academy.

Schmidt at Bloc says, "What we find interesting is that these companies have made millions of dollars producing accredited degrees online, yet their first foray into the bootcamp space is to purchase in-person bootcamps that are constrained by bricks and mortar. If the online model has proven itself, then why would you revert to an antiquated format?"

Similarly, most of the current programs administered by universities feature predominately classroom-based curricula. But online and hybrid models are starting to emerge. One example is Northeastern University's Level, a bootcamp for data science and analytics, which now operates in four cities. It includes weekly classroom meetings and delivers highly customized and targeted foundational curriculum online using Acrobatiq's adaptive learning platform.

Curriculum components in Level include interactive instructional content, "learn by doing" practice, and summative assessments. The learning platform dynamically analyzes data from students' online work to tailor instruction based on individual student progress toward learning objectives. Instructors use analytic dashboards to track the progress of students and quickly identify topics that may need review or more in-depth instruction, thus using class time more effectively.

Other programs may use a hybrid format or put prerequisite lessons online. For their partnership with Bellevue College, Coding Dojo employs a flipped classroom model, asking students to

review material prior to an in-class lecture. Katie Bouwkamp, former director of public relations, described the program as relying on a "tight feedback loop to improve material."

A partnership between the University of Texas at Austin and MakerSquare, which is operated by Reactor Core, will be taught by MakerSquare staff members on campus at UT-Austin, but it will start with a 4-week online session to build Javascript skills before the in-class sessions start.

Nick Mann, Policy Director at Reactor Core, says, "We kept adding curriculum, but we can't make the day longer. A lot of what happens in the four weeks used to happen in person, but we just kept adding content."

Kathleen Mabley, director of marketing at UT-Austin says, "Given the intensity of the program and the material the students are learning, the classroom experience allows for more interaction and support." They have instructors and teaching assistants working hands-on with students. Though students can work on their individual assignments using an online portal, most of the teaching is done in person.

Yet, purely classroom based learning, or even hybrid programs with a major classroom focus, suffer from natural space constraints. They have a fixed number of seats and so can only reach so many students.

"We think that's just representative of the trend in the industry," Schmidt says. "The next step for this industry is to dispense with the myth that technical skills have to be acquired in an in-person setting. The online model is just inherently more scalable."

Schmidt also expects the trend of partnership between code schools and institutions of higher education to grow. "Coding bootcamps are now past this phase where the perception was that this was just a fad," he explains. "Now this is a really high return on investment for consumers."

The existing partnerships are still relatively new, so outcomes data is not yet available. But with tuition rates rising by 2.7 percent in 2015-2016 according to the College Board, continuing education courses and programs focused on job placement are looking more attractive to students who want to enhance their earning potential. Forward thinking universities and colleges will likely continue to respond by providing more and more flexible options for these students. Partnership with coding bootcamps is one of the ways they do that.

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