

CodePath Theory of Impact

The Problem

The college-to-career pathway is broken for underrepresented minority and low-income students, and the problem has only starkened with the 2020 COVID-19 pandemic. [Underrepresented minority students are less likely to have access to K-12 computer science \(CS\) classes, to use a computer at home most days of the week, to have an adult in their life who works with computers or other types of technology, and to find industry mentors and role models.](#) Introductory college Computer Science (CS) programs are heavily biased towards students with prior programming experience, even though only about [1% of high school students](#) took an Advanced Placement CS course in 2019. The lack of computer science exposure in K-12 education, combined with an insufficient support structure in college, makes Black and Latinx CS students [far more likely](#) to drop the major than their peers. This is consistent with the overall trend in STEM, [with Black and Hispanic students dropping STEM majors at twice the rate of their white peers.](#)

Those students who do stay in CS, especially those from underrepresented backgrounds or low-ranked CS schools, struggle with another form of inequitable access—the recruitment process. Many CS programs suffer from outdated curricula, a professor shortage, and lack of connection to the industry – all of which leads major technology companies to focus their recruiting efforts on a [small subset](#) of elite campuses. This means that recruiters from many major tech companies may never come into contact with, for example, [the 12% of Black female CS graduates who come from historically black colleges and universities.](#)

Even those underrepresented students who do manage to gain the attention of hiring managers can still struggle to pass the “gatekeeper” to employment—the rigorous technical interview. The average rate of students from top CS schools, such as MIT and Stanford, who make it through an initial phone screen to an onsite interview for top technical companies is only 35-40%¹. Most students graduate from college still needing multiple months of practice before they would be ready to pass a technical interview at a top technology company. Prior to CodePath, students who did not pass technical interviews had no additional, rigorous and low cost learning options to close their interviewing gaps. All of these issues represent a big problem for the tech industry, which is short nearly [one million](#) workers.

In addition, [recruiting systems inside tech companies systematically discount underrepresented—particularly Black—applicants’ skills, education, and work experience.](#) Black engineering talent is out there, but the proxies companies rely on—degrees from prestigious schools and referrals from engineers—keep most from even getting a foot in the door.

Now, the COVID-19 crisis has shuttered many of the technical internships that serve as the entryway to the industry for underrepresented students. Low-income students are facing financial pressure to drop

¹ This is direct feedback from multiple industry recruiters from Facebook, Quora and others. “Tech industry norm for phone to onsite is at 35-40%. We see top-tiered schools land at about industry average while those from lower-tiered schools anywhere between 20-30%.”

out. As job openings disappear, underrepresented students have even fewer avenues to tech careers, and companies have fewer resources than anytime in the last decade to invest in new employee development.

The Solution

CodePath's mission is to build the largest pipeline of high-performing underrepresented software engineers in the industry. Our approach drives systemic change by supplementing college and university C.S. programs with industry-informed curriculum, personalized student support, career preparation, and jobs placement. CodePath believes that the most scalable way to bring more underrepresented software engineers into tech is to improve existing school programs by addressing two significant problems across the CS landscape:

- Low enrollment of underrepresented groups in CS
- Low-quality CS programs, including curriculum and career-readiness support

CodePath takes a systemic, sustainable approach to increasing student enrollment in CS by introducing new courses directly on college campuses. Courses are designed to inspire and educate students about the creative and practical aspects of software development while improving access for students who have not taken Advanced Placement CS or have weaker programming fundamentals. In addition, CodePath prepares students for industry employment by providing professional development activities, access to internship opportunities, and hands-on support preparing for the technical interview. With 150+ hours in the Software Engineering Fundamentals course, support from our Career Center, and introductions to potential employers at the Virtual Career Fair, students enter even the toughest interviews confident and ready.

Approach

CodePath's approach consists of three elements:

1. Education: Deliver high-quality computer science (CS) education through tested curricula and expert pedagogy incorporated into scalable, rigorous industry-backed courses deployed to campuses nationwide.
2. Career Services: Provide personalized support and mentorship to all students and offer access to top-tier jobs in tech through industry partnerships
3. Partnerships: Create partnerships with industry and higher-education programs to create a leveraged impact on the college-to-career pipeline

EDUCATION: DEPLOYING CLASSES TO CAMPUSES NATIONWIDE

Our courses are built to maximize quality while minimizing barriers to scale. Each course is structured around a thorough curriculum, rigorous learning exercises, and extensive classroom resources, which enable new campuses nationwide to quickly and seamlessly adopt our programs regardless of whether their faculty has deep expertise in the relevant subject matter. Our courses are deployed in three different configurations, allowing for maximum reach and flexibility: 1) For-credit courses on-campus; 2) Free non-credit courses on-campus; 3) Free digital remote video classroom sessions.

Coursework and services are delivered to students by professors or student leaders who have been carefully selected, on-boarded, and trained by CodePath to facilitate the course sessions each week in all three configurations. Our training program, which is 20 hours of instruction, prepares faculty and student leaders to run these courses, supported by our blended learning system, session plans, slide decks, online curriculum, and support infrastructure. In addition, instructors are empowered with the following:

- *Curricula developed with industry:* All of our course materials are “industry approved and industry relevant,” developed in direct coordination with external educators and experts in the technology industry. Every course we have built and deployed has a curriculum that was architected, designed and approved by both our internal engineering experts, as well as senior engineers at top companies like Google, Facebook, and Lyft.
- *CodePath’s learning platform:* Developed over several years as a proprietary system, our platform powers all of our courses at campuses nationwide. This system is an integral part of our unique blended learning model, connecting our students with live, expert instruction, rich digital course content, robust learning materials, mentors, and personalized learning support.
- *Centralized classroom operations team:* Running high-touch, personalized, and high-quality courses nationwide involves course admissions, student data collection and analysis, lesson planning and pacing, attendance, grading, individual homework help, extensive career services, and much more. To alleviate the burden on professors and students, CodePath’s operations team leverages a suite of proprietary tools to manage every aspect of course deployment, so each course’s facilitator can focus on building a strong community of students.

In addition, CodePath experts offer live instruction and personalized guidance for students throughout the course experience. This extensible scaffolding enables us to replicate courses with a high degree of student support across dozens of new campuses each semester with relatively modest increases in staffing support.

CAREER SERVICES: INDIVIDUALIZED EMPLOYMENT SUPPORT FOR STUDENTS

CodePath has created a thriving career services center and engaged student community, to ensure our students are supported at each step of their student experience and job searching process. We work alongside industry professionals and company partners to provide a robust suite of services to students, including hands-on workshops on topics like resume development and the internship search process, industry mentorship programs, industry Q&A panels, technical interview prep, and written materials and career guides. In addition to supporting students, actively working to create job opportunities for our talented, qualified graduates is key. To make this happen, we:

- *Develop industry champions:* CodePath alumni and supporters include engineering executives and hiring managers. As a result, we have been able to leverage this network to develop trusted industry partners who work closely with CodePath to provide volunteers, support, and opportunities to students,
- *Directly match students to companies:* We run virtual career fairs that include company partners who are recruiting for technical internships or full-time roles. Companies outline their specific hiring goals and we leverage a wealth of student data to companies with students who closely



meet their needs. This will often lead to follow-on interviews for students who would otherwise have a difficult time getting noticed by the company.

- *Leverage professional mentors:* We work with thousands of volunteer mentors from the tech sector to ensure our students have access to one-on-one career guidance, networking opportunities, and professional role models.

PARTNERSHIPS: SYSTEMIC CHANGE THROUGH NETWORKED APPROACH

CodePath partners with numerous tech employers, colleges and universities, and non-profit organizations to drive systemic change in both CS education and technical hiring:

- *Tech Employers:* In addition to partnering with industry on curriculum development as mentioned above, we also work directly with tech companies to diversify their hiring pipelines through programs like our Virtual Career Fairs, which allows the largest tech employers like Amazon, Microsoft, and others to access our students through a highly customized matching process. We also work with these organizations to create internships and apprenticeships for our students, to provide the important technical work experience which is key to the hiring process at many organizations.
- *Colleges and Universities:* Our college and university partnerships are an important aspect of course delivery, as our curriculum is complementary to existing CS programs. CodePath saves professors time, improves course quality, and increases student comprehension - all major challenges for many CS departments. We partner with many colleges and universities nationwide, with our program on campus at over 50 schools today. This includes HBCUs like Howard University and MSIs like University of Central Florida as well as remote students attending from over 300 schools.
- *Nonprofit Organizations:* CodePath partners with nationally recognized nonprofit organizations to broadly disseminate best practices in technical education and combine forces to create scalable, systemic impact. Our nonprofit partners include United Negro College Fund (UNCF), Management Leadership for Tomorrow, Code.org, Anita B.org, Women Who Code, and Hispanic Heritage Foundation.

Outcomes and Results

Since summer 2019, we have taught over 2,300 students across 50 campuses and remotely the technical competencies, human skills, and career navigation tips they need to thrive in the tech industry. It's a powerful approach, as demonstrated by results from a July 2020 CodePath survey of 538 alumni who are either rising seniors or graduates:

CodePath Increases Student Confidence

- 88% of CodePath students surveyed agreed that CodePath increased their likelihood of graduating with a technical CS degree
- 93% told us that CodePath improved their perception of working in the tech industry

CodePath Empowers Great Career Outcomes

- 81% of our alumni, 1 year after their first CodePath course, currently have tech jobs or internships
- 91.67% of the Black alumni we surveyed are working in tech
- 80% of the Hispanic or Latinx alumni we surveyed are working in tech

- 93% of respondents said that CodePath courses improved their ability to obtain a technical work experience.
- Black CodePath students rated their preparedness for technical work experience (73.75 out of 100) nearly as highly as their White and Asian peers (77.29 out of 100).
- 70% of students received internships/full-time job offers in software engineering roles in the 3 months following
- 43% of Black CodePath participants received a technical job offer
- 50+ companies in tech, financial services, education, and healthcare hired CodePath students from 2018-2019

CodePath's Virtual Career Fair Directly Services Students and Employers

Results from our 2019 Career Fair:

- 59% of students received 2nd interviews during the Virtual Career Fair
- 42% of students received internships/full-time job offers from companies they met at the fair

Supporting Research

The structure of college computer science programs keeps Black, Latinx, and low-income students from enrolling, persisting, and graduating.

[Diversity Gaps in Computer Science](#): *Black, Latinx, low-income, and female students are less likely to have access to a computer at home, know an adult who works in the tech industry, or attend a high school that teaches computer science (CS), which creates disparities in opportunities to learn.*

[The Neglected College Race Gap: Racial Disparities Among College Completers](#): *Among a variety of entrenched barriers for underrepresented students, the high cost of a degree in engineering disproportionately impacts students of color. Additionally, Black and Hispanic students are much more likely to receive their credential from schools that spend less money on their students, as well as schools with lower average SAT scores, lower faculty salaries, lower retention rates for first-year students, and higher student-faculty ratios.*

[The State of African-Americans in Computer Science – The Need to Increase Representation](#): *The significant and disproportionate lack of Black CS faculty creates increased challenges with same-race mentorship for Black students.*

[Does STEM Stand Out? Examining Racial/Ethnic Gaps in Persistence Across Postsecondary Fields](#): *While Black and Latinx students join STEM majors at roughly the same rate as their white peers, they are about one third less likely to graduate.*

[Integrated Postsecondary Education Data System](#): *As of 2019, only 8.29% of CS graduates were Black, 10.07% were Hispanic, and 20% were women. Only 2.17% were Black women.*

Black, Latinx, and low-income students are overlooked and undervalued in the tech hiring pipeline.

[Black and Hispanic Computer Scientists Have Degrees From Top Universities, but Don't Get Hired in Tech](#): *Black and Hispanic students earn computer science degrees at twice the rate they are hired by leading tech companies.*

[American Community Survey](#): *Black (13%) and Hispanic (16%) CS graduates are less likely than White CS graduates (21%) to work in tech. In addition, while there were 7,360 Black computer science graduates in 2019, just 8% of Black computer science graduates are working in software development. That's about 588 new career-ready Black software developers each year, entering an industry of 1,365,500 software developers.*

[Whitened Résumés: Race and Self-Presentation in the Labor Market](#): *Minorities may be particularly likely to experience disadvantage when they apply to ostensibly pro-diversity employers.*

[Why Tech Degrees Are Not Putting More Blacks and Hispanics Into Tech Jobs](#): Workers at Google, Microsoft, Facebook, and Twitter were just 3 percent Hispanic and 1 percent black in 2016

[Which colleges do Facebook, Google and other top employers recruit from?](#): 50% of Facebook employees come from just 10 schools.

CodePath's approach leverages best practices for retention within Computer Science and persistence for Underrepresented Minority Students.

[Retention in Computer Science Undergraduate Programs in the U.S.](#) Even as an increasing number of schools are offering CS courses, the demographics of the students involved in computing remain stubbornly consistent. This report on retention in undergraduate CS programs in the United States reveals that retention is an incredibly complex issue and that empirical data to examine retention is both limited and messy. Based on the data examination, analysis, and case studies, this report makes a number of recommendations regarding data collection, successful interventions, and future research.

[Improving Underrepresented Minority Student Persistence in STEM](#) This study reviews current data and proposes deliberation about why the academic "pathways" leak more for URM than white or Asian STEM students. They suggest expanding to include a stronger focus on the institutional barriers that need to be removed and the types of interventions that "lift" students' interests, commitment, and ability to persist in STEM fields.