MBAs Who Code
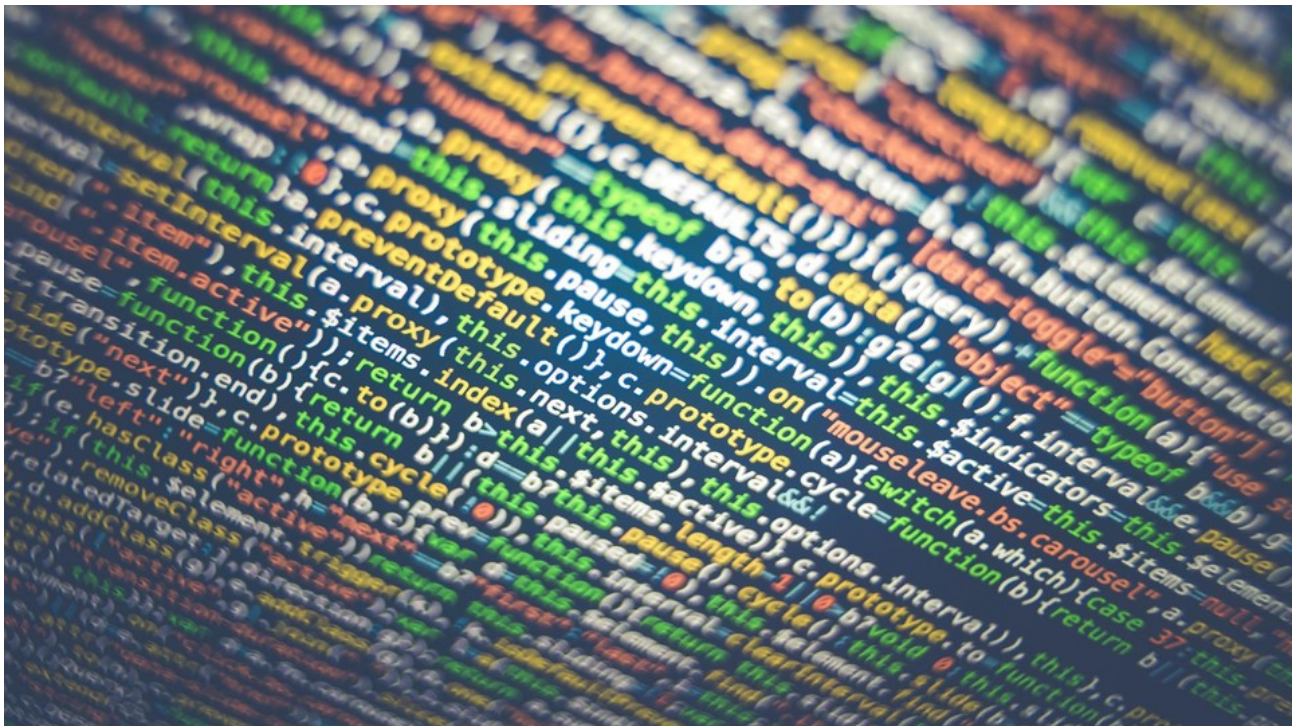
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Stephen Kurczy

Three years ago, Costis Maglaras took on a challenge.

As the new chair of the Decision, Risk & Operations division, Maglaras was tasked with overseeing the Business School's analytics curriculum and ensuring that students were being trained in quantitative, data-driven decision-making. But he spotted a big gap.

Despite the business world's increasing need for tech-savvy managers who could speak the language of coders and technicians, the School offered few courses in computer programming or deeper dives into artificial intelligence and machine learning, and lacked a focused curriculum in the area. When virtually every business is online and operating in a world of big data, Maglaras felt that MBAs needed to add digital tools to their toolkit.

So in 2015, Maglaras applied for a $130,000 grant from the University's Collaboratory Clinic to develop a series of MBA-level programming- and analytics-focused classes, guided in part by the student-run Technology Business Group's desire to see courses around the programming languages SQL and Python. The DRO division has since launched nearly a dozen electives that have exploded in popularity and reverberated across the Business School, touching more than a quarter of the student population and propelling graduates to management positions at Amazon, Facebook, and Microsoft, among other top tech firms.

"Taking those classes gave me a lot of confidence for my interviews," says Neha Bansal '18, who credited the new curriculum with preparing her to join Google this summer as a product manager.

During Bansal's hiring process, one of her nine interviewers was a software engineer who asked her to code in Python, which she had only just learned in the new DRO course Introduction to Programming in Python. She was one of more than 300 students enrolled in the class this past academic year, making it one of the School's most sought-after electives.

"Had I told somebody that we'd have more than 300 students taking Python, they would have laughed," says Maglaras, the David and Lyn Silfen Professor of Business. "But the students themselves are so interested — they realize it's useful. It's a marketable skill. It's an important skill."

Now, Maglaras has a new problem, albeit one that he's proud to pass along to the new DRO chair: The tech and analytics courses are straining under the weight of their popularity, spurring the division to hire additional faculty and the School to strategize how programming might be threaded through the overall curriculum.

"Being technically literate is almost a core skill," says Angela Lee, Chief Innovation Officer and Associate Dean of Teaching Excellence and Innovation. "We're responding in a way that provides the technical skills that the business leader needs."

"We're not trying to graduate best-in-class coders," Lee adds. "It's about graduating business leaders with an understanding and appreciation of technology given that it is central to every company today."

'How do you solve problems like an engineer?'

To be sure, tech isn't taking over the Business School. More than two-thirds of graduates still pursue careers in finance and consulting. But across the spectrum, businesses are seeking MBAs who understand programming.

Citigroup recently announced it would train all incoming analysts in Python. Goldman Sachs traders are increasingly expected to know how to code. Auditor EY last year launched a program for employees to boost their digital credentials in fields such as artificial intelligence and data visualization.

According to Jennifer Merchant, senior associate director of the Career Management Center, recruiters are increasingly requesting that MBAs have a working knowledge of data tools and the coding languages Python and SQL. A recent Financial Times survey named "understanding digital impact on businesses" as one of the most important skills for MBAs and "big data analysis" as one of the most difficult skills to recruit from MBAs.

These skills are at the heart of the new DRO curriculum that Maglaras began developing in 2015 with Hardeep Johar, a faculty member of the Engineering School and adjunct professor at the Business School. The first course came online in the 2015-2016 academic calendar: Web App Programming in Python, in which Johar teaches how to build a web app from scratch. The following year, Johar began teaching Data Analytics in Python, which shows how to use the coding language to extract information from large data sets.

"The reality is we're living in a very data-centric world, and whether we like it or not it's going to be an important factor in any decision-making process down the road," says Johar. "We need people to be savvy about how to use data analytics and artificial intelligence on all the important decisions of today."

The 2016-2017 academic year brought in adjunct professor Mattan Griffel, who began teaching Introduction to Programming Using Python and Intro to Databases for Business Analytics. Well-familiar with the needs of fledgling developers, Griffel had been named to Forbes' list of 30 Under 30 in Education for co-founding the Y Combinator-backed start-up One Month, which provides month-long coding boot camps.

Griffel was soon teaching Python, application programming interfaces (APIs), web scraping, data analysis, and querying to packed classes of 150 students. By the end of the 2017-2018 academic year, one-quarter of full-time MBAs were learning how to code in either Python or SQL.

"What I'm teaching is, how do you solve problems like an engineer would? How do you build up the confidence to not be afraid of diving into code?" says Griffel. "When someone takes my class, they have 'aha' moments where they say, 'I didn't know anything about code but it's kind of fun.' Down the road, when they're in a role where they have a problem requiring them to dive into code, they're not going to be afraid to get their hands dirty."

To keep up with the student demand, the DRO division has continued adding courses in programming and analytics as well as brought on more faculty. The new full-time lecturer Daniel Guetta will be teaching this fall's pilot course of Business Analytics II, which delves into the field of machine learning.

'It gave me a leg up'

The course additions are already opening doors for students and graduates. Among the earliest MBAs to take the electives were Malachi Zussman and Hayley Duus. Both graduated in May 2017 and used their tech training to springboard into careers on the West Coast:

Zussman is a product marketing manager at Facebook, while Duus is a senior product manager at Amazon.

Duus recalls being asked during her Amazon interview about how APIs worked and if she could pull key performance indicator (KPI) metrics using SQL, two skills she'd learned at the Business School and that she now uses day-to-day at Amazon. "Those courses were helpful to have on my resume," she says. "It gave me a leg up."

Understanding the basics of programming languages such as SQL was also essential for Zussman to get a foot in the door at Facebook. "These tech companies are so data-driven," he says. "If you don't have a foundational SQL knowledge then you're like a kid who needs to be babysat."

Zussman has since become a booster for the School in Menlo Park. He helped coordinate MBA intern recruiting this past summer, which led to Facebook recruiting at the Business School for product marketing for the first time ever. Columbia MBAs ultimately made up four of the nine total interns in product marketing management. (Another Business School student also interned in business operations at Facebook.)

Zussman plans to be on campus this fall to recruit more students, but he'll have competition from fellow alumnus Bansal, who will make a trip back east as Google's campus ambassador. Another beneficiary of the new curriculum, Bansal did an independent study on machine learning and took the introductory classes on Python and web programming, which she thinks should become part of the School's core.

"These courses should be mandatory," agrees Aaron Springut '18, a program manager at Microsoft. Like Bansal, Springut came to the Business School with a quant background, but he still soaked up the programming and analytics electives. Now at Microsoft, he oversees a team of coders and frequently conducts his own data queries in SQL to extract business insights, which allows him to act quicker than if he were reliant on someone else to run the code.

"Even if you're not going to be a programmer, something really big in all the tech companies right now is that seat-of-the-pants-decisions are no longer acceptable," says Springut. "Every decision has to have data backing it. How do you get data in the first place?"

'Programming is going to be like writing'

It's not just the DRO division that is preparing MBAs for a digital world. The School has also launched a new electives on blockchain and cryptocurrencies and technology entrepreneurship. Among other classes that alumni mentioned as influential in their tech careers were the Economics course Modern Econometrics For Business, the Marketing course Intro to User Experience, and the Management course Technology Strategy. The Finance division is also looking to incorporate Python into select classrooms.

"You'll find people in every division who think this stuff is important because it's aligned with the biggest change over the past several decades, which is the availability of data," says Kent Daniel, the William von Mueffling Professor of Business in Finance. "Any manager needs to

think about how to analyze this data."

A former co-chief investment officer at Goldman Sachs Asset Management, Daniel says that managers at his old firm are now playing catch-up by learning Python and SQL, and are starting to look for more coding knowledge in their hires at all levels.

"I think you need to know enough about how coding and data manipulation work so you can evaluate whether the people under you are making smart, correct decisions, and so that you can suggest alternative techniques." he says. "One of the things that I think every manager should be terrified about is that you hire somebody to do this stuff and they completely screw it up."

Daniel and Maglaras both believe that the question of whether to train MBAs to code will melt away as students increasingly arrive with prior coding experience. More than 40 percent of public schools in the US teach computer programming; computer science is among the fastest growing high school classes and university courses; and organizations such as Girls Who Code are encouraging tens of thousands of kids to get comfortable with programming.

Two of the kids who learned Python this past summer through Girls Who Code were the daughters of Kimberly Johnson '00, the chief operating officer of mortgage giant Fannie Mae; she wanted them to learn what she calls the language of the future.

"Programming is going to be like writing was when we were in school," Johnson says. "Everyone doesn't have to be a coder, just like everyone doesn't have to be a writer. But I think having these communication skills, and being able to put them in a format that other people can access, is going to be really important."

Especially for MBAs, she adds.