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Q&A: Dartmouth engineering dean Alexis Abramson on instilling human values in tech education

Article

Thayer School of Engineering at Dartmouth dean and professor of engineering Alexis Abramson

Worsening climate change, escalating cybersecurity threats, and an uncertain economy are just a sampling of the challenges that face recent graduates entering the workforce. Against

an increasingly complicated societal backdrop, the ever quickening pace of technological advancement means higher-education institutions need evolved curriculums to get students ready for career paths with unprecedented demands.

According to **Thayer School of Engineering dean Alexis Abramson**—who's also co-founder of **Edifice Analytics**—there's heightened awareness about the need for a human-centered approach to engineering that addresses the needs of all members of society. Achieving this requires students with more than technical skills; they also need to grasp diverse perspectives, present ideas with clarity, and have enough business savvy to successfully get their ideas to market.

In light of this, **Dartmouth College** revamped part of its campus with a new **Engineering and Computer Science Center**, which, along with the **Irving Institute for Energy and Society**, provides a holistic interdisciplinary tech education and entrepreneurship hub.

In an interview with Insider Intelligence, Abramson talks about how the school is helping students leverage tech as a solution for social issues and the push for a curriculum to meet global needs.

The following has been edited for clarity and brevity.

Insider Intelligence (II): There's a lot of talk right now about the gap in workforce skills in areas like quantum computing, AI, robotics, and cybersecurity. How are these deficits being addressed in the curriculum?

Alexis Abramson (AA): We're taking a different path than other institutions that are, for example, making sure that they offer specialized cybersecurity majors rather than just computer science majors. That's not my concern in terms of preparing students for the future. Because it's not going to really matter if they take five cybersecurity classes or eight. What matters is making sure that everybody gets a well-rounded education that includes those tech skills to some extent.

We obviously offer courses in AI, data science, and cybersecurity, and are going to be offering one on blockchain as it's becoming relevant for applications beyond crypto. Our approach to addressing the skills gap is to offer what we call sub-20 classes—classes where there are no prerequisites, so that if you're an economics major or philosophy major, for example, you can gain technical skills without changing your major.

II: Are you seeing a lot of non-engineering students take those classes?

AA: Yes. Right now, 70% of all Dartmouth students graduate having taken at least one engineering or computer science course. That might be typical at other institutions that don't have as much of a liberal arts emphasis. It's something we're pushing for, and our goal is to get to 90% by 2030.

II: What challenges are students currently facing in their tech education?

AA: The world is getting more complex, and you can't just go to school, study one thing, get a job, and be successful for the rest of your life. That may have worked for my grandfather's generation, but not anymore.

So how do you cram everything you need to know in four years? You're never going to be able to do it all in one degree, so I think the solution is building a strong foundation that contains all the elements. It's about loving learning and setting people up so that after they graduate they can pivot throughout their career. So they've tackled the philosophical questions, done some economics, had the engineering training, and can then pull on all of that to adapt to new realities. We're seeing more of these short certification programs, but without a strong foundation, it's much harder to gain new skills.

II: What initiatives are helping engineering students prepare for issues with social and environmental components like climate change?

AA: We're focusing on what we call human-centered engineering in teaching and research. We're really striving to bring those societal impact pieces into courses. We offer many project-based courses where students can look at how to address real-world problems facing humanity. There are courses with topics on biofuels, solar panels, and predicting what 1.5 degrees (global average temperature rise) means and what 2 degrees means.

For example, when students are studying differential calculus equations integrated with data science, they look at how we can better predict increased frequency of hurricanes. On the healthcare side, when they design technology to intubate infants, they learn that it's not just about talking to the doctors—you have to talk to the nurses and parents as well to bring the human-centered approach to the functionality of the device.

II: What's ahead in the tech world?

AA: There's a lot more automation that's going to happen in the future. Five to 10 years ago, students were writing a lot of their own code. Now, because of open-source packages, they aren't writing as much code and are instead building on these packages that someone else

wrote. We'll always have some people that are head-down trained in a specific discipline, but over the next five to seven years, I think there's going to be an escalation in the ability for people to use skills that they don't fully understand.