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ON BUSINESS

A Boeing Exec's $20 Million Bet on Teaching College Students to Think

Not enough workers can see the big picture beyond the screen in front of them. A new program at Virginia Tech aims to teach students that problem-solving requires both sides of the brain.

Madeline Badger, one of the students in Virginia Tech's Calhoun Discovery Program, demonstrates a virtual reality training program during a remote meeting with visiting professors from Boeing last month.
HEATHER ROUSSEAU FOR THE WALL STREET JOURNAL

By *John D. Stoll*
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BLACKSBURG, Va.—It's been a choppy ride for many of the folks relying on paychecks from Boeing Co. BA 3.18% ▲ Slammed by the pandemic and the grounding of its most important plane, the aerospace giant said recently that it expects to end 2021 with 30,000 fewer workers than it started this year.

"Decisions like these are not easy," Boeing Chief Executive David Calhoun said on a webcast. These job cuts come as the airline industry weathers an unprecedented travel drought and Boeing endures a "year that is among the most difficult in our 100-year history."

Even as Mr. Calhoun shows current employees the exit, he is pushing forward a program at Virginia Tech, his alma mater, designed to better prepare the next-generation's workforce to avoid a similar fate.

Boeing CEO David Calhoun visits with students at the Calhoun Discovery Program at Virginia Tech last December.
PHOTO: VIRGINIA TECH

An accountant by training, the 63-year-old executive recently told me Corporate America mislabels what he calls a “discovery gap” as the “skills gap.” Colleges, he said, do a yeoman’s job churning out competent coders, scientists and engineers. Such skills are in long supply. Where they fall short is teaching how to think outside the cubicle or beyond the screen in front of them.

“We’re now trying to solve for things outside just the raw technology, and we have very few people who are really skilled at doing that kind of thing,” Mr. Calhoun said. Creating autonomous planes that don’t need a physical pilot in the cockpit (think pilotless cargo aircraft or urban air taxis) or repairing flawed product programs require as much understanding of how humans are designed as machines are.

“Usually we are left on our own to develop that discovery muscle, and we don’t usually get these program or project leaders—the one or two who look like they are really good at that kind of thing—usually they are in their mid 40s or early 50s,” he said.

Freshman students from the Calhoun Discovery Program in Virginia Tech’s 3-D printing lab.
PHOTO: HEATHER ROUSSEAU FOR THE WALL STREET JOURNAL

Virginia Tech’s Honors College serves as the starting point for Mr. Calhoun’s crusade to churn out more competent thinkers at a younger age.

He started the Calhoun Discovery Program with a $20 million gift in 2018 when he was on Boeing’s board and Boeing’s problems with the 737 MAX airliner had yet to turn the company upside down. The program resembles a hands-on mixer for people with different interests and ambitions in life, collaborating on projects that require a multitude of approaches and specializations to complete. The goal: teach students that problem-solving requires both sides of the brain.

I visited the Calhoun program in October as dozens of freshmen and sophomores with majors ranging from environmental policy to industrial design to journalism clustered in groups. They were discussing progress on real-world projects handed to them by active employees at Boeing, General Electric Co. GE 2.85% ▲ and Caterpillar Inc., and overseen by professors from diverse disciplines.

Most students in the program are on campus, often working from dorms or other locales that allow them to collaborate virtually. But Virginia Tech is open for classes, and students often congregate in workshops or areas where they can craft solutions and test ideas in person.

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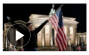

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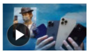

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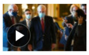

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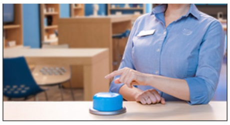

One group of freshmen, working on a GE warehousing problem, had drawn up a schematic to illustrate potential solutions. When I asked for details, Claudia Budzyn, an environmental policy and planning major, flipped around her laptop to show me how her team's "Speedy System" worked. As I looked, the team talked me through the complex web of sensors, data and checkpoints they created to hasten the order-to-delivery process.

One student told me if GE is going to survive, it needs to think more like Amazon and less like GE.

A Calhoun Discovery Program student team meets with Boeing visiting professors.
PHOTO: HEATHER ROUSSEAU FOR THE WALL STREET JOURNAL

Mr. Calhoun checked in with Ms. Budzyn and dozens of her cohorts in late October, just days before the latest jobs-cuts announcement. He wanted to reassure them this somewhat unconventional style of education is valuable.

"Our own team of very experienced engineers and Ph.D.s are working on those exact same projects, trying to figure out how to foolproof our system or create opportunities in our businesses," he said during a 30-minute Zoom call that I listened in on. He concluded by saying his time spent with students is among his favorite memories in recent months.

"You're working on real things—these are not little projects," he said. He's given similar talks to sophomores who are in the second year of this program, which was established in 2019.

Sydney Szabos, an 18-year-old engineering major focused on electrical applications, told me the message took root.

She devotes countless hours to solving riddles the program throws at her, in addition to her other classes outside of it. Few of those riddles are solved without the help of non-engineering-minded colleagues.

Under the guidance of experts from Caterpillar, Ms. Szabos and a team of classmates currently are trying to figure out how to program drones to inspect autonomous mining equipment stationed in remote locations.

Ms. Szabos explained to me why computer-aided design renderings are more efficient than global positioning systems and less expensive than lidar technologies to guide drones. (Lidar is the gadgetry seen on the roofs of autonomous test cars, using laser light and other technology to judge distances.) One of her classmates told me they think it may be possible to dock and recharge these drones on the mining equipment.

Dhatri Manam, an 18-year old freshman, practices flying a drone at Virginia Tech's drone park.

Students there are working on a project that uses drones to inspect autonomous mining equipment in remote locations

PHOTO: HEATHER ROUSSEAU FOR THE WALL STREET JOURNAL

All of this is trial-and-error at this point. Student teams check in often on Zoom calls with working professionals to refine their plan or change course.

I asked Ms. Szabos how this differs from core engineering courses. “We’re making paper airplanes in one of them,” she said. I thought it was a joke until she walked me through how making a perfect paper airplane is an essential building block for the discipline.

“It’s just a different way of learning,” she said. “There, we’re starting smaller and working our way up. Here, we start big and stay big.”

Why?

Charles “Chip” Blankenship, an adjunct professor at Virginia Tech who worked with Mr. Calhoun at GE’s aviation business years ago, said companies have long encouraged single-minded focus on business problems.

When he was running GE’s appliance business he said the focus could be so heavily skewed toward hitting financial targets, or winning regulatory approval on a near-term project, or perfecting the technology on the next product launch, that staffers failed to consider the bigger picture. That unit was eventually sold off.

SHARE YOUR THOUGHTS

What would you change about the way you were taught in college? Join the conversation below.

“You need that short-term focus, of course,” he said. “But a big part of your organization needs to spend their time looking around corners.” Those who haven’t “flexed the discovery muscle” (one of Mr. Calhoun’s favorite sayings) by leveraging multiple fields of study while trying to problem solve don’t know what corners to look around.

As Boeing, for instance, tries to tackle autonomous airplanes, Mr. Calhoun said solving the technology isn’t the problem. “Our problem is going to be how do you get a regulator to allow for or provide for air traffic over a given city. You’re going to have to understand the political-science consequences” to make that happen.

For D’Arrin Calloway, that kind of cross-pollination was what he was looking for coming out of Lynchburg, Va.’s Heritage High School in 2019, but didn’t know how to pursue. He applied to 40 schools and was accepted to many. Virginia Tech wasn’t high on the list until he visited an open house and found out about this program and heard Mr. Calhoun’s pitch.

“I was pretty sold from then on,” Mr. Calloway said. One of the important keywords he heard was “collaboration” and the promise of meeting students from various backgrounds and interests—an experience he felt was lacking in his hometown.

Mr. Calloway’s interests are broad. He applied to several engineering schools, but then considered a double major in real estate and finance at Virginia Tech. The Calhoun program introduced him to the field of business information technology, which appealed to his entrepreneurial spirit.

Now a sophomore, the 19-year-old Mr. Calloway has worked on college-diversity projects, built a website, learned the art of video editing and conducted analysis on regional incentives for energy infrastructure.

“My major has nothing to do with a lot of these things, and I was never expecting to do classes like these,” he said. “It changes the way I approach every project.”

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