

Community Colleges Are Training the Applied AI Workforce

As artificial intelligence reshapes the labor market, community colleges are a practical engine for training workers at scale to develop the skills and fluency they need to get jobs.

One night after work, a midcareer student in one of Miami Dade College's applied artificial intelligence courses opens her laptop at her kitchen table and works through an assignment that looks like a real workplace task: Draft a customer-service response with a language model, test it against an accuracy-and-privacy checklist, and document what the model got wrong and how it was corrected. The goal of this exercise is not basic AI literacy but AI fluency—the ability to use AI in a repeatable workflow, produce an auditable output, and explain the human decisions behind it. These are the kinds of skills that increasingly show up in job postings for roles such as AI support specialist, machine learning operations technician, AI data annotator, and AI agent developer.

Community colleges like Miami Dade College (MDC), where I serve as vice president of innovation and technology partnerships, sit at the intersection of two urgent nationwide realities: Employers are racing to adopt AI, and millions of working adults need a practical pathway to secure the new jobs emerging around applied AI. For the United States to develop an AI-capable workforce that can spread opportunity beyond four-year campuses and a handful of tech hubs, the country needs to harness community colleges' unique strengths.

More than 1,000 public community colleges already educate a substantial share of the US workforce and are deeply embedded in local labor markets; they can adapt

programs quickly to meet the needs of regional employers. To open job pathways into applied AI across income levels and geographies, and to help incumbent workers train without relocating, community colleges are positioned to deliver industry-validated skills through certificates and degrees that lead to better jobs.

MDC educates over 125,000 students at eight campuses, offering paths to both associate and bachelor's degrees. Over the past five years, my colleagues and I have built one of the nation's first undergraduate applied AI degrees and partnered with other community colleges to create the National Applied AI Consortium (NAAIC), a hub to help institutions replicate and adapt this approach across the country. Our goal is to demonstrate that community colleges can quickly build applied AI pathways that are credible to employers, affordable for students, and scalable across the country.

One of the most gratifying aspects of establishing these educational pathways is seeing how students respond. "What inspired me to join the AI program was the desire to future-proof my career and understand AI not just as a user, but from a more technical and practical perspective," said Belgica Reyes, who became an AI data annotator and large language model evaluator at the recruitment software company Handshake after graduating from MDC's applied AI program. "I wanted to be part of what's coming next, not just watch it happen."

Adapting existing playbooks

A decade ago, when I began as dean of engineering, technology, and design at MDC, I set out to build a cybersecurity degree that could place students in high-demand roles. I quickly realized that the fastest route was not to start from scratch, but to learn from community colleges that had already built excellent analogous programs. Two National Science Foundation (NSF) Advanced Technological Education (ATE) centers—National CyberWatch Center at Prince George's Community College in Maryland and the National Cybersecurity Training and Education Center at Whatcom Community College in Bellingham, Washington—offered that kind of practical support, providing conference programming, curricula, faculty development programs, and mentorship.

By following that playbook, in just three years, MDC secured NSF ATE funding for faculty professional development, launched an associate degree in cybersecurity, and earned National Security Agency designations as a National Center of Academic Excellence in Cyber Defense for our newly developed two-year and four-year cybersecurity programs. The lesson was durable: When community colleges have access to shared standards, faculty upskilling, and guidance on workforce needs from employers, they can move quickly and effectively.

After cybersecurity, MDC used the same workforce-development formula—faculty development, industry feedback, and targeted NSF ATE grants for the school—to create and expand programs in data analytics, cloud computing, and electric vehicles. But by 2020, we faced a much harder question: Could we build an applied AI program for undergraduates, including working adults, at a time when most AI education lived in graduate programs and elite research labs?

We started by convening a Business & Industry Leadership Team (BILT) of AI professionals, hiring managers, and practitioners from both technology companies and AI-using sectors such as health care, finance, logistics, education, and professional services. Our vision was not to assemble a traditional academic advisory board that meets once a year to react to a draft curriculum, but to create an employer-led process in which industry speaks first about the jobs they are filling; the tasks they expect entry-level talent to perform; and the knowledge, skills, and abilities those roles will require over the next 12–36 months.

Because both local employers and broader market shifts shape AI demand, BILT members helped us identify needs at multiple levels. This included where South Florida companies were hiring, where regional industry clusters were adopting AI, and where national trends were changing what employability in applied AI would mean.

Based on those workforce needs and trends, BILT offered guidance to MDC curriculum designers. “We don’t need every

hire to build new models from scratch,” BILT member and CEO at AI Leadership Institute Noelle Russell explained. “We need people who can work with data, test outputs, document decisions, and apply AI in a real process where mistakes have consequences.”

Together, BILT and MDC designed a curriculum around short courses yielding certificates that can build into associate and bachelor’s degrees—also known as stackable credentials—with multiple entry and exit points for students. The intent was to build AI fluency for applications in real-world scenarios. These classes help realtors, accountants, logistics supervisors, small business owners, and career changers develop competence in job-relevant AI skills such as preparing data, evaluating models, workflow design, documentation, and responsible deployment. For students who want to specialize in AI applications, we also developed deeper pathways into machine learning, computer vision, natural language processing, simulation, and automation.

Meanwhile, MDC faculty built their own skills and prepared to teach them to students. There were no textbooks for the kind of applied AI education we envisioned at the time, so computer science and data analytics faculty trained with partners including IBM, Microsoft, and Intel while creating course materials.

Within a year, we translated employer needs into learning outcomes and created new courses and programs. We also redefined prerequisites for each course, removing barriers for undergraduates who want to access AI education.

While we waited for the required state approval to launch the new degree programs, we piloted courses in subjects such as AI fundamentals, AI in business, and AI ethics, with a handful of students in each course. Not long after ChatGPT launched publicly in late 2022, the Florida Department of Education approved our associate degree program in applied AI. Overnight, student demand surged. But we had already built the scaffolding necessary to grow with the demand, including faculty capacity, industry guidance, and stackable programs designed for working learners.

What scaled—and what had to change along the way

We launched the associate degree in applied AI in fall 2023, and enrollment immediately bulldozed our expectations. Instead of a typical new-program cohort of a few dozen students, more than 750 students enrolled in AI courses in the first academic year, and participation increased rapidly over the next two years. By fall 2025, MDC had more than 2,000 students of many ages and backgrounds taking AI courses.

The demographics told us we were meeting the needs of a different kind of student population. Over the first three academic years since launching the applied AI degrees, about 60% of our students were older than 26, and roughly 30% were older than 41—often experienced professionals and career changers who wanted a realistic on-ramp into applied AI roles,

rather than a four-year detour. Women comprised about 40% of enrollment, which is double the typical computer science enrollment, suggesting to us that a jobs-first, applied framing can broaden participation.

With the stackable pathway, students could earn a three-course AI essentials certificate, continue into an AI practitioner certificate, or ladder into an associate or bachelor's degree, with each step designed to provide competencies needed by employers.

Scaling enrollment was the easy part; increasing skilled faculty and keeping the courses up-to-date with AI advances was harder. BILT continued to play a crucial role beyond the initial curriculum design. Through recurring reviews of competencies, course sequencing, and emerging tools and use cases, the members provided ongoing guidance that helped MDC keep the program updated as the technology and labor market evolved.

We were also lucky to have a faculty body committed to continuous upskilling and to reviewing the course materials and learning outcomes every semester. However, we didn't have enough faculty to cover the high demand for AI courses.

Building the National Applied AI Consortium

MDC's success at creating new AI courses and degrees was not simply the result of local demand or the concentration of AI companies in Miami, but also of faculty leadership, employer partnerships, and MDC's willingness to build new pathways quickly. Around the same time, other community colleges were emerging as AI role models, including Maricopa Community Colleges in Arizona and Houston City College in Texas. As interest in applied AI surged, the three institutions began receiving frequent requests for site visits, curricula, and faculty guidance.

That demand brought me back to the NSF ATE model—national centers that help colleges replicate what works. Under MDC's lead, the three colleges formed NAAIC and secured NSF ATE funding to serve as a hub for undergraduate applied AI education. Launched in 2024, NAAIC partners with AI companies, trains faculty, mentors colleges, hosts events, and shares courses and resources at no cost to community colleges. By design, NAAIC treats applied AI curricula as infrastructure the nation can build once and improve continuously.

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Thanks to funding from a local foundation, we expanded our AI faculty headcount with seven new full-time faculty members and over 20 part-time adjuncts. Additionally, partnerships with companies such as Amazon Web Services, Google, OpenAI, and NVIDIA supported faculty capacity building through training, curriculum materials, and access to AI tools.

This support has helped our faculty adjust to the new demands of the subject. "Teaching applied AI differs from traditional textbook-based instruction," observes Eduardo Salcedo, an assistant professor in computer science at MDC. Faculty have to update their knowledge frequently while keeping an eye on the longer-term goals of instruction. "While the tools used in AI are constantly evolving," Salcedo notes, "the habits we aim to instill in students—testing, documentation, privacy considerations, and judgment—remain and are crucial for their employability."

Meanwhile, feedback from BILT members has allowed us to refine course sequencing. For example, we kept AI fundamentals open with no prerequisites but added math and programming prerequisites for machine learning fundamentals once we saw where students struggled and what employers expected of graduates.

Working with industry partners such as Google, Microsoft, OpenAI, Amazon Web Services, Intel, Cisco, IBM, EC-Council, and Lenovo, NAAIC helps align what colleges teach with the competencies employers are looking for in applied AI job postings. Through a train-the-trainer model, faculty gain the confidence to teach applied AI topics, including machine learning, natural language processing, and computer vision, using hands-on assignments and real-world use cases. Colleges can then launch certificates and degrees grounded in practice, preparing graduates for roles that blend domain knowledge with AI operations such as data curation and quality, model evaluation and testing, workflow automation, and junior AI agent development.

Because employers are deploying AI in high-stakes environments, ethical and responsible use is not an optional add-on—it is part of every program. In our courses and NAAIC shared resources, faculty learn how to prepare their students to classify tasks by risk, remove sensitive data from prompts, document assumptions, and stress-test outputs before they touch customers, patients, or the public. A simple example from the AI fundamentals course available in NAAIC's AI Resource Hub: Students compare how different prompts change a model's recommendation, then record

which prompt they used and why, an early habit that supports accountability, compliance, and trust on the job.

In 18 months, NAAIC has trained more than 3,000 faculty and staff across 550 colleges and universities in 48 states, Washington, DC, and two US territories. Those educators are now positioned to reach tens of thousands of students with applied AI coursework. Additionally, our annual AI Summit at MDC drew more than 500 faculty, administrators, industry partners, and policymakers.

NAAIC has also mentored 16 community colleges as they developed new AI degrees or credit certificates. The mentorship is practical and structured. Over the course of an academic year, colleges receive guidance on where an AI program should live institutionally, how to build a local BILT, how to adapt shared curriculum and teaching resources, how to prepare faculty to teach applied AI, and how to create a recruitment plan that can attract working adults as well as traditional students.

Across institutions, we have seen several recurring challenges. Many colleges begin with strong interest but limited faculty capacity in AI, which means they must upskill existing instructors while also identifying adjuncts or new hires with relevant experience. Others struggle with internal questions about ownership—whether AI should sit in computer science, business, engineering technology, or as a cross-college pathway—which can slow planning. And in many states, the approval of new degrees or credit certificates still moves slower than the technology itself, making it difficult for colleges to respond at the pace employers expect. Mentorship through our network helps college leaders navigate these barriers more quickly by giving them a playbook, a peer network, and direct access to industry and academic partners who have already built these pathways.

The next step will be to continue scaling while measuring not just participation, but outcomes such as credential completion, job placement, and wage gains. At Miami Dade College, Maricopa Community Colleges, and Houston City College, we can see what's coming for the rest of the community colleges offering AI degrees: Students like Belgica graduate with meaningful job opportunities in AI and feel they can not only survive upheaval in the job market but thrive.

What government, industry, and higher education should do next

To genuinely strengthen AI competitiveness across the United States, community colleges must be recognized for the vital contributors that they are rather than as afterthoughts. Funders should invest in scalable, high-quality models and support collaborations that turn curriculum and training into a shared benefit for the public. This effort will require action across the public and private sectors.

Community colleges and their accreditors should encourage stackable credentials with clear learning outcomes,

transparent prerequisites, and routine revision cycles.

Competencies for using AI responsibly should be built into every applied pathway. Industry should treat community colleges as strategic partners in developing applied AI talent by providing paid internships and project-based learning as well as externships for faculty. And by helping to define competency frameworks, they can ensure that instruction and curriculum keep pace with real-world needs.

Federal agencies should expand workforce investments beyond research grants to also fund faculty development, shared curriculum, and applied lab capacity at community colleges. Congress should increase the budget for NSF's ATE program, a proven catalyst for building technician pathways through curriculum innovation, faculty upskilling, and college-employer partnerships. But NSF cannot do this work alone. Agencies focused on economic development, labor, and sector-specific missions can complement NSF's program with workforce and career-technical funding to support short-term AI credentials and work-based learning, along with new or expanded programs that help community colleges prepare AI technicians.

State governments, too, have a crucial role. In fast-moving technology fields, swift approvals can make or break a program. States should modernize program-approval and articulation processes so that AI certificates can ladder efficiently into degrees and transfer pathways—without multiyear delays that make curricula obsolete.

Community colleges are the nation's fastest, most scalable engine for applied AI workforce development, and they must be treated that way. These schools require support from federal, local, industry, and philanthropic funders to enable foundational investments like multiyear funding for faculty hiring and upskilling, modern computing and lab capacity, and shared curriculum and instructional materials. Other acute needs are student support—the childcare, transportation, and emergency aid that make it possible for working adults to complete credentials—and pathways to jobs such as paid work-based learning with employer partners.

AI will reshape work everywhere, not only where the largest labs are located. The institutions that can translate that reality into opportunity for millions of people are already in nearly every county in America. The remaining question is whether we will provide the resources for them to do it.

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