EDUCATING STUDENTS

Colleges and universities have a responsibility to prepare students for success in a changing climate. To understand our changing world, every student should know how the climate affects their lives and society, from their personal healthcare to broader public policy. In the narrowest sense, higher education must train people for new types of work in specific industries like clean energy or clean transportation. More broadly, all jobs face climate impacts and require people who understand climate change, its consequences, and how to advance solutions as they relate to their particular field, industry, or area of study.

Higher education enrolls 19 million students annually, ranging from undergraduates just out of high school, to adult learners returning to education, to graduate students pursuing doctoral research.[1] The sector's ability to deliver a skilled and knowledgeable workforce and citizenry who can generate new ideas contributes substantially to our economic growth, national security, and societal well-being.[2] As climate change accelerates, a foundational and applied understanding of a changing climate is essential to develop the skilled workforce and engaged citizens we need.

Climate Education for All

Most Americans believe in the importance of helping people understand climate change and solutions to help address the challenge. In fact, polling by the Yale University's Center on Climate Communications consistently finds teaching about climate change as one of the most popular climate solutions, with 77% of Americans indicating their support.[3]

While many institutions have started recognizing the need for trans- and inter-disciplinary climate education, the work to integrate climate across higher education institutions is in its infancy with limited understanding of the most effective strategies for success. Many of the news headlines about climate education have been spurred by extremely large philanthropic gifts to elite private institutions.

For instance, in 2022, Harvard University, with a philanthropic gift of $200 million, established the Salata Institute to foster cross-university climate education partnerships.

WHAT WE HEARD: "In every single county in America, you have a substantial majority of Americans who support climate being taught by our schools. That's true in Texas, it's true in Oklahoma, it's true in Wyoming, and North Dakota and West Virginia and Alaska; all of our big large fossil fuel patches. People everywhere think this is an important thing that we should be doing for our kids." — Dr. Anthony Leiserowitz, founder and Director of the Yale Program on Climate Change Communication.

For the vast majority of institutions, securing this type of philanthropic support is out of reach, but several colleges, recognizing the urgent need, have made strides to prepare students for the future. The California State University system currently offers over 4,500 sustainability-related courses and a growing number of campuses are creating sustainability-focused general education pathways to reach a wide variety of students regardless of major. Similarly, Eastern Connecticut University made significant strides in climate education by adding coursework and supporting their faculty to integrate climate with their curricula.

WHAT WE HEARD: We have now added climate courses and sustainability courses across the curriculum—it's in Sociology, it's in Political Science. We are at a place now where the curriculum is deep and wide in terms of climate action, with an equity lens." — Dr. Elsa Núñez, President, Eastern Connecticut State University

UNDERGRADUATE EDUCATION

Over 15 million students attend undergraduate higher education every year in the United States.[4] The vast majority of those—roughly three out of four—study at public colleges and universities. While some liberal arts colleges emphasize cross-disciplinary studies, most undergraduate students choose a field of study for their major and take the balance of their classes focused on that subject.

Historically, colleges have relegated climate change to environmental studies and science disciplines. According to a recent survey of college students, fewer than half take a course related to environmental sustainability.[5] But the scale of the challenges we face demands that all people have baseline understanding. With climate change existing as an underlying context, crosscutting our experiences in society, higher education must advance a learning agenda that mirrors this reality with cross-disciplinary educational offerings. If climate education is available only through courses on environmental sustainability, many students are missing the opportunity to develop climate literacy. In order to help all students develop a foundational understanding of climate, higher education can make adjustments to policies, coursework, and curricula to ensure all students are prepared for success in our changing world.

Bright Spot: The University of Washington Bothell (UWB)

The University of Washington Bothell (UWB)—a leading voice for an expansive climate curriculum—demonstrates how a curriculum on climate and sustainability can be integrated in student learning. The institution was founded through a transformative journey from a cattle ranch to college campus. Located on a 58-acre restored floodplain, the University opted to restore the wetlands and incorporate the natural asset into all of the school's academic programs. The University invests heavily in policy, infrastructure, and institutional incentives to encourage faculty to develop a climate-focused curriculum and research.

Bright Spot: The University of Miami's Climate Resilience Academy

The University of Miami's Climate Resilience Academy aims to support the University's 12 schools and colleges in undertaking interdisciplinary climate research, training the next generation of climate scientists and practitioners, and addressing pressing climate change challenges through partnerships with industry, government, and other stakeholders. Through the Academy, teams at the University of Miami along with local stakeholders lead over 85 projects in the local and regional area to support adaptation and resilience efforts.[6]

Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

INDIGENOUS KNOWLEDGE SYSTEMS

Indigenous peoples have a deep relationship with the land, water, and other natural elements, which are integral to their cultures, knowledge, and livelihoods. These relationships have been developed and taught in Indigenous communities since time immemorial, long before the American public education system was established. Indigenous Knowledge Systems (IKS) shape Indigenous youth identity and perceptions of the world.

Indigenous peoples, despite representing 6% of the population globally, manage 80% of the world's remaining biodiversity.[7] They have maintained long-standing respect for, connection to, and a reciprocal relationship with the natural world. As a result, they are essential leaders and partners in addressing climate adaptation. For instance, Native American tribes practice controlled burns to limit the reach of wildfires.[8] Federal government policy prohibiting this practice during the 20th century may have contributed to the increase in wildfires in the American West.[9] Some leaders have pointed to the resilience of Indigenous communities in surviving historical trauma like forced removal from their lands and forced assimilation that could provide further understanding for climate adaptation and resilience.

While science and social science education in the U.S. often includes human-environment interactions, there is an emphasis on empirical data and Western science. Rarely do these classes include IKS, which is a holistic, observational, and systematic way of understanding the environment and its connection to culture and society. With IKS, Indigenous communities have been leading on mitigating and responding to climate change, as well as in management of the lands in which the majority of the world's remaining biodiversity is found.[10] Culturally informed education and interventions related to IKS in science and social sciences can lay the framework for best practices in climate education across higher education.

WHAT WE HEARD: "Universities must embrace that, when it comes to climate change, we need to go deeper in advancing and applying Indigenous Knowledge in our programs. We need to bring in Indigenous Knowledge holders and give them the same standing as faculty with PhDs so that they can be part of research design projects - because that will bring success in working on climate change." — Mr. James Rattling Leaf, Sr., Tribal/Indigenous Advisor at CIRES and the University of Colorado Boulder

When integrating Indigenous Knowledge, it is crucial that higher education institutions prioritize engaging in thoughtful conversations with tribal communities and leaders regarding their initiatives, research, and curriculum. Colleges and universities of all types can partner with Tribal Colleges and Universities to integrate IKS across higher education.

Photo by Allison Shelley for American Education: Images of Teachers and Students in Action.

Bright Spot: Leech Lake Tribal College

Leech Lake Tribal College provides an Associate of Arts Degree in Indigenous Science, featuring courses that incorporate traditional and modern knowledge sources. The curriculum is designed to not only provide students with the knowledge to transition to a four-year STEM Bachelor of Science degree, but instill Anishinaabe values, teachings, and cultural history. The college received funding from the American Indian College Fund (AICF) Scholarly Emergence for Environmental Design and Stewardship (SEEDS) program to help prepare students for environmental careers through community building, place-based research, and environmental awareness and stewardship.[11]

OVERCOMING BARRIERS TO CLIMATE INTEGRATION

Integrating climate change across curriculum requires extended planning, supports, and incentives to overcome institutional barriers. For instance, many faculty may need support in understanding climate change, how it interacts with their area of expertise, and how they might incorporate it into their teaching. To improve climate literacy among professionals across the system, the California State University (CSU) system created the Faculty Learning Community for Climate Change and partnered with faculty development centers across all 23 of its campuses.

Faculty incentives, including tenure, may pose another barrier. Faculty, in particular in the earlier stages of their career, are incentivized to specialize their research within a discipline rather than pursue cross-disciplinary pursuits. As a result, there are few incentives for younger faculty to invest heavily in adapting curricula or better understanding cross-cutting issues. As institutions of higher education seek to integrate climate across curricula, they should provide faculty with effective supports that further develop their careers.

Clean Economy Workforce Development

Our changing climate is reshaping our economy. The clean energy transition is dramatically shifting job market demands. New policies such as the Inflation Reduction Act (IRA) and the Infrastructure Investment and Jobs Act (IIJA) have accelerated private sector investment in clean technologies. Researchers estimate that the U.S. will need a million more electricians to meet its clean energy goals.[12] LinkedIn reported that jobs in renewable energy and environmental fields rose by 237% in the five years prior to 2022.[13]

The need for new skills extends beyond traditionally environmental or clean energy sectors. Jobs for the Future recently analyzed over 198 million job postings demonstrating an increasing demand for green skills across a much wider range of industries than commonly expected.[14] Business leaders increasingly make decisions that account for anything from carbon emissions in supply chains to investment risk from climate change. Engineers must design climate-adaptable structures.

WHAT WE HEARD: "All jobs have the ability to become quality, green jobs." — Taj Ahmad Eldridge, Managing Director of Climate Innovations, Jobs for the Future

Teachers and health care workers need to understand how increased heat and disaster recovery affects the people they serve. Higher education institutions can better prepare students for this new reality by including employers and other key stakeholders in conversations about developing educational programs.

Photo courtesy of California State University

COMMUNITY COLLEGES

Community colleges, in particular, play a major role in workforce development in communities across the country. Students can earn short-term credentials or associate's degrees that prepare them for specific jobs in a range of fields from nursing to advanced manufacturing. Students can also use their experience as a springboard to pursue bachelor's or graduate degrees. They are typically among the most affordable options in higher education. In addition to cost, community colleges tend to offer more flexibility geared toward working students who may need to take classes at night and on weekends. Given their reach, affordability, and flexibility, they can play a pivotal role in building community support with new industries.

Many new, clean economy careers can start at a local community college. Central New Mexico Community College (CNM) exemplifies the role that these colleges can take in clean energy workforce development. The college built a 1.3 megawatt solar farm which it uses to train students in its electrical trades solar program. The faculty also updated its automotive curriculum to include hybrid and electrical vehicles to meet increasing demand for skills in these areas. The college partners directly with businesses in the energy sector through its non-profit affiliate CNM Ingenuity to deliver skills training tailored to specific employer needs.

WHAT WE HEARD: "The role of the community two-year college cannot be underestimated. We really are an economic engine when it comes to workforce training and development." — Karin Hilgersom, President, Truckee Meadows Community College

PROFESSIONAL AND GRADUATE EDUCATION

While undergraduate institutions typically provide broader general education, graduate and professional programs are designed to prepare students for specific careers. Currently, over three million students are enrolled in graduate and professional schools.[15] With the focus on specific careers, the need for climate literacy may go unnoticed. However, because climate change affects every aspect of our society, a wide range of professional fields will need to understand how climate change impacts and intersects with their profession. Graduate and professional schools should look to analyze existing curricula and identify opportunities to support climate learning.

The student organization, Medical Students for a Sustainable Future, launched for exactly this reason. A group of medical students felt underprepared for health issues exacerbated by climate change including heat stroke, heart attacks, and preterm births. Now, their medical school chapters use the Planetary Health Report Card to grade their school's curricula on its ability to prepare doctors for a climate-changed world. Students can use this tool as leverage to advocate for a comprehensive incorporation of climate change-related health impacts, including topics from neurological flare-ups in hot weather to mandatory hospital waste training. The efforts of these medical students demonstrates how widely climate will impact fields in sometimes unexpected ways, as well as the power of students to shape their own learning experiences.

Beyond knowledge required for professional careers, individuals need to understand climate change as citizens and to live healthy and safe lives. Building broad comprehension of climate, from understanding how climate affects economic opportunities to how individuals can advance solutions in their homes and communities, will assist the transformational shift to a more sustainable and adaptable society.

WHAT WE HEARD: "It's not just doctors who need to be educated on this topic. It's college students, it's companies, it's our workforce. Everyone needs to have a thorough understanding of climate change and how it impacts our world. I urge you to recognize the wide-ranging and multifaceted ways that climate impacts your students, your organizations, your missions, and your communities." — Kanika Malani, Medical Student, Brown University & Medical Students for a Sustainable Future

Equitable Access to Climate Learning and Clean Economy Jobs

As colleges and universities prepare the next generation for success in a changing climate, it is critical that they work to overcome historical inequities that have marginalized Black, Latino, Indigenous and other students of color. An analysis of the U.S. green workforce in 2021 revealed that 80% of workers were white and 75% were male.[16] Further, areas of study required for the clean workforce are not currently being pursued by underrepresented groups. The academic field of environmental studies, for example, is among the least racially diverse in all of higher education.[17] Without actionable steps to address this issue, colleges risk perpetuating historic inequities by excluding marginalized students from clean economy jobs that will drive significant economic growth.

Despite the potential for new jobs, there remains a real risk that opportunities exclude historically marginalized communities or communities that currently rely on fossil fuel-dependent industries. Ensuring a just transition means institutions of higher education provide access to high-quality programs for communities disproportionately impacted by climate change, environmental injustice, and the transition to a clean economy. This is a challenge for a higher education system where nearly 90% of high school students from high-income families enroll every year, compared to half of students from low-income families[18]

Ensuring that the voices and experiences of populations disproportionately impacted by climate change play a central role in the development of climate-related curricula and workforce development programs can help. Community-based organizations can be critical partners in these efforts. While HBCUs, TCUs, HSIs, and other MSIs are essential in creating career pathways for Black, Indigenous, Latino, and other students of color, all colleges must provide equitable opportunity to prepare for success in our changing climate and economy. That entails evaluating recruiting pathways, financial aid, advising, and career coaching to ensure success for students from marginalized backgrounds.

WHAT WE HEARD: "Society will require an environmentally educated populace to sustain our lifestyle and save the planet. That will mean that equity and justice will become a natural component of all curriculum. And that we should train a workforce to lead an equitable transition to a renewable economy."— Dr. Beverly Wright, Founder & Executive Director, Deep South Center for Environmental Justice

Partnerships with high schools, and in particular with their career and technical programs, can also assist in supporting a just transition. Early college high schools, or other models such as dual enrollment, that allow existing high school students to enroll in college classes and receive credit, can help students—particularly students from low-income families—overcome barriers to college enrollment.

Bright Spot: The HBCU Climate Change Consortium

The HBCU Climate Change Consortium, launched in 2011 by Dr. Beverly Wright and Dr. Robert Bullard, seeks to diversify leadership in the environmental field. Through conferences, mentorship, and research partnerships, they work to build a diverse field of students, scientists, and advocates working toward environmental justice.

Bright Spot: P-TECH Programs

Pathways in Technology and Early College High School (P-TECH) programs provide workforce development and career opportunities for low-income students of color through partnerships with community colleges and businesses. The P-TECH model lets students both explore careers related to sustainability and learn the technical skills needed to qualify for jobs in sectors such as automotive engineering and construction. Students at P-TECH schools graduate with both a high school diploma and an associate's degree in six years and are first in line for jobs with industry partners.

Bright Spot: Climatarium Hubs

Climatarium Hubs work across rural Colorado to expand pathways to climate-related careers. They bring together K-12 schools, institutions of higher education, and industry partners to expose students to in-demand jobs and climate-related skills. As part of the Southwest Colorado Education Collaborative (SWCEC), Pueblo Community College and Fort Lewis College have supported school districts in Durango, Ignacio, Bayfield, Archuleta, and Silverton to understand new career pathways, including environmental careers focused on water quality, agriculture, and outdoor education.

Partnerships and Resources to Prepare Students

Higher education institutions of all types can expand partnerships with policymakers, private sector employers, and labor to ensure curricula, pathways, and programs adequately prepare students and meet demand for clean economy jobs.

Business partnerships in particular can help colleges develop practical curricula and create internships and other on-the-job training opportunities for their students. These learning opportunities can help institutions develop pathways to high-wage, high-skill jobs.

Bright Spot: Truckee Meadows Community College (TMCC)

Truckee Meadows Community College (TMCC) built the Tesla START advanced manufacturing program in close partnership with Tesla Motors after the company announced a new factory in the region. The initiative offers paid apprenticeships to traditional and non-traditional students, integrating classroom learning with on-the-job training and building durable economic prosperity in the local community. Tesla helped finance the development of the program and TMCC has graduated more than 70 students ready to join the company's high-skilled workforce. The partnership serves as a model that other businesses and community colleges can replicate across the country.

Credit JK1991 via Getty Images

Businesses are not the only potential partners for institutions of higher education to help shape learning opportunities for students. States can also be critical workforce partners. States can create partnerships between economic development and educational agencies that align public universities with state economic goals. For instance, New Jersey identified offshore wind as a major opportunity—not only to generate emission-free power but as a potential economic driver around offshore wind expertise, manufacturing, and innovation. They launched the Wind Institute as a partnership between the New Jersey Economic Development Authority and the State Higher Education Agency. The initiative brings together public universities and community colleges to make New Jersey a hub of offshore wind learning, research, and innovation and provides the growing industry with trained employees.

Institutions of higher education can work with organized labor to ensure that students are prepared for success in high-wage jobs in in-demand industries. For instance, community college partnerships with local electrical unions can help to ensure electrician apprentices gain skills in solar installation, charging stations, heat pumps, and other clean energy skills. Apprenticeships and cooperative agreements provide paid, on-the-job training and help employees gain skills. Employers experience financial returns of $1.44 for every $1 invested by developing employees that meet their business needs.[19] Crucially, community colleges can support effective apprenticeships by providing classroom training to complement on-the-job training.[20]

WHAT WE HEARD: "New Jersey has been very intentional about making postsecondary opportunity more accessible and affordable while working with institutions to promote pathways that prepare students for careers as part of the green economy." — Brian Bridges, New Jersey Secretary of Higher Education

Research universities can further strengthen workforce development partnerships. For instance, AFL–CIO, the largest federation of unions in the country, has partnered with Carnegie Mellon University to increase worker voice in the innovation ecosystem. Through information sharing and research, the two organizations hope to find successful models to involve workers in technology development and to ensure safe, quality jobs during transitions to new forms of work.

WHAT WE HEARD: "As an economy transitions, it is imperative that workers at any point in their career, whether they are starting their apprenticeship or upskilling, have access not only to high-quality training but also to good jobs at the end of the training." — Amanda Ballantyne, Director, AFL-CIO's Technology Institute and Working for America Institute

ACCESSING RESOURCES

Higher education can seek federal, state, and private sector resources to bolster its efforts to prepare a clean economy workforce. Recent federal investments through the Infrastructure Investment and Jobs Act, the Inflation Reduction Act, and the CHIPS and Science Act, in addition to providing funding to support installation of clean energy, can support climate-related research and workforce development. For instance, the IRA includes a program through the U.S. Department of Agriculture to build and expand climate-related pathways in the agriculture sector. Specific states may also have funding available to support workforce development for clean economy jobs. For instance, Michigan recently created the Community & Worker Economic Transition Office to help residents take advantage of new clean energy jobs coming to the state. [21]

Bright Spot: The Kern Community College District

The Kern Community College District in California recently secured multiple federal and state grants to build a hub for carbon capture in the San Joaquin Valley.[23] Historically, Kern's community colleges trained local students for jobs in the oil industry. With oil jobs expected to decline, Kern community leaders identified its empty oil fields as a prime opportunity for carbon capture. California allotted a $50 million investment in a consortium of organizations across industry, technology, academia, national labs, community, government, and labor to seek additional resources from the federal government. Recently, the U.S. Department of Energy invested another $20 million in the consortium. The project exemplifies the increased public investment available for community colleges around the country and benefits of cross-sector collaboration.

Bright Spot: Binghamton University

Binghamton University in New York recently led a coalition that won a regional tech hub designation from the Economic Development Administration under the CHIPS Act. The coalition also includes Cornell University and SUNY Broome Community College alongside private sector employers, local governments, and community-based organizations. Binghamton and its partners are tasked with speeding up EV battery innovation and developing a skilled workforce to meet demand. Under the program, they will receive significant funding for multiple projects over the next several years, ultimately supporting development of better batteries and a fast transition to the clean energy economy.