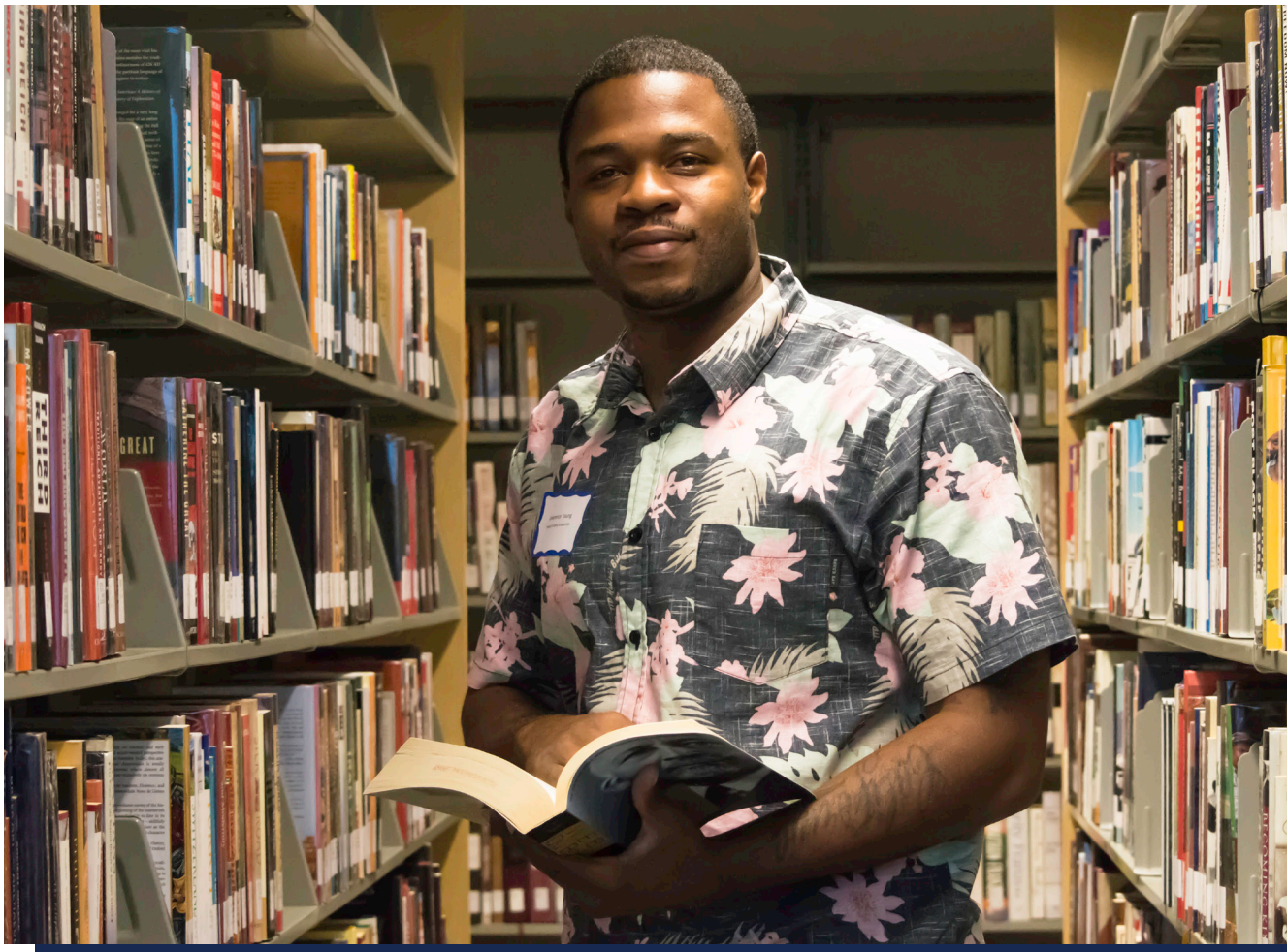
California Community Colleges



The Invention and Inclusive Innovation Initiative

An initiative of the California Community Colleges Chancellor's Office Workforce and Economic Development Division in collaboration with the Lemelson-MIT Program.

The California Community Colleges Chancellor's Office through its Workforce and Economic Development Division (WEDD) invests in the state's economic growth and global competitiveness through career education, training and services that develop a highly skilled and productive workforce and advances economic and social mobility for all Californians.

The Initiative: 'Big Picture'

The Invention and Inclusive Innovation initiative will encourage, harness and develop the inventive talents of communities across the State. The goal of the initiative is twofold: 1) to inspire anyone regardless of age, race, geography, and professional status to be an inventor; and 2) to redesign learning environments to be accessible and support lifelong learning.

Catalyzing innovation and invention are key to spurring local entrepreneurial growth and investment which will be critical to our economic recovery with equity from the COVID-19 pandemic.

The Invention and Inclusive Innovation Initiative: California Community Colleges

Led by the California Community Colleges Chancellor's Office in collaboration with the Lemelson-MIT Program, the initiative integrates an emerging learning approach for working across disciplinary boundaries, known as *invention education*, with an innovative teaching and learning approach that incorporates the concept of for-benefit enterprises.

Faculty at four colleges will work together to develop a program prototype that will guide learners on a path to discovery and facilitate the invention of new products that solve community problems for larger social good.

Learners will work in teams to:

- Research challenges experienced by communities;
- Conceptualize systemic or technological solutions;
- Develop working prototypes through the invention process; and
- Learn to commercialize their inventions while keeping the social benefit at the forefront.

As one of the most diverse systems of higher education, California community colleges will increase access to invention education to women and communities of color who have historically been underrepresented in the innovation and invention economy, but whose life experiences provide valuable insights and perspectives to tackle systemic challenges.

The Invention and Inclusive Innovation initiative incorporates the following to expand local entrepreneurial ecosystem:

Problem Solving:
The engagement of students in learning through open-ended problem solving, inquiry, community service and applied creativity.

Startups:
The potential to create and incubate startups to solve community problems ties directly into regional economic development goals.

Strengthened Innovation Ecosystems:
Working in teams, students will build and strengthen local innovation ecosystems through collaborative development projects that address real-world problems.

Scalability:
As part of the program, colleges will foster innovation in creating transdisciplinary education with the focus on teaching problem solving as a 21st century skill. These learnings will be shared broadly throughout the community college system.

Partnerships:
Establish and expand partnerships with people in the community, CSUs and UCs to advance career pathways in STEM, student mentoring, networking opportunities, prize programs, competitions, and partnerships with high schools that expand dual enrollment. These efforts will contribute to greater success for all students, especially students of color.

Invention Education

The instructional approach to invention education responds to the need for creative problem solvers who draw on expertise from multiple disciplines, cultural knowledge, and a diverse range of lived experiences to construct solutions to real-world challenges. The growing dialogue about invention education assumes that the creativity and inventiveness needed to create new and novel, useful and unique solutions can be nurtured and cultivated in people of all ages and from **diverse walks of life.**

Additionally, the Chancellor's Office goal in implementing and expanding invention education within community colleges as a means to support and further the following:

- Competency-based education
- Expand transdisciplinary programs
- Advance new ways of teaching and learning to prepare students for the future of work
- Infuse an entrepreneurial mindset in faculty, staff, and students

Research on invention education offers evidence that this creative, transdisciplinary problem-solving approach also helps students of all backgrounds develop interest, confidence and capabilities in science, technology, engineering and math (STEM).

Diversity is Key to California's Recovery

Community colleges are assets and anchors in the communities where they are located and serve. The open access model of community colleges is in many ways a 'placemaking' strategy. By implementing invention education at community colleges, the activities are not only anchored by a community college as a physical hub, but also help to coalesce entrepreneurial activities and spark innovation within the diverse student population, particularly in rural communities. As a result, students participating in the Invention and Inclusive Innovation initiative are critical partners in the State's economic recovery.

Vision for Success Indicators and Outcomes for the Invention and Inclusive Innovation Initiative Success

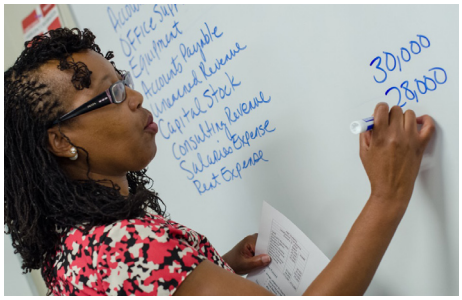
Creating mini labs for inventors and innovators is urgently needed as communities grapple with the short- and long-term impacts of COVID while simultaneously addressing chronic social problems that were present before COVID. The Invention and Inclusive Innovation initiative advances several of the Chancellor's Office's Vision for Success goals including:

- Increase credential obtainment
- Increase transfer to UC and CSU systems
- Increase employment for career education students in their field of study
- Reduce equity gaps by increasing participation of female and students from underserved / underrepresented groups

Program Success Metrics are being designed and will include:

- Increase enrollment of Black, Latinx, Asian Pacific Islander, Indigenous, and adult learners disproportionately impacted by the pandemic
- Increase diversity of patents held by females and other underrepresented groups
- Increase job creation
- Amount of startup investments to communities
- Grow innovative teaching and learning models
- Increase interdisciplinary program connections
- Increase work-based learning opportunities for students

During the Great Recession, 8.8 million people lost their jobs and thousands of businesses closed or filed bankruptcy. However, it also resulted in a sizable increase in rates of entrepreneurship. Data from 250 regions across the US demonstrated higher local unemployment rates were tied to higher rates of entrepreneurship. Further, while minority and women owned businesses were more likely to close during the Great Recession, they helped stabilize the economy during the recovery period.



The Model

The Invention and Inclusive Innovation initiative program is modeled after the Lemelson-MIT InvenTeams®. The InvenTeams are groups of high school students, educators and mentors that invent technological solutions to real-world problems of their own choosing. The InvenTeam students rely on inquiry and hands-on problem solving as they integrate science, technology, engineering, and math to develop invention prototypes.

The InvenTeam initiative has been changing the way educators teach and providing young people – especially young women and students from underrepresented backgrounds - with creative problem-solving skills to flourish in college and career for over 15 years. The InvenTeam initiative has worked with over 2,900 students across the U.S. to invent technological solutions to real-world problems. Twelve InvenTeams have received patents for their high school projects.

Current InvenTeam projects include:

- A system to administer and monitor prescription medicine for seniors living at home
- A system to detect embers and actuate a roof sprinkler system
- A device to monitor social distancing for students with autism spectrum disorders
- A device to open drain covers in the presence of water only

A full list can be found here.

Next Steps

Four California community colleges have been selected to work with the Lemelson-MIT Program to develop an Invention and Inclusive Innovation program prototype customized to the needs of community college student experiences over a seven-month period (Dec 2020 – June 2021) focused on ensuring diversity, inclusivity, and equity of invention education in the California Community College population.

The colleges participating in the program prototype are:

- Modesto Community College: Modesto, Yosemite Community College District
- Chaffey Community College: Rancho Cucamonga, Chaffey Community College District
- Sierra Community College: Rocklin, Sierra Joint Community College District
- College of the Desert: Palm Desert, Desert Community College District

The community college Invention and Inclusive Innovation prototype developed by the four colleges is expected to be scaled to 20 additional colleges for implementation in 2022.

To learn more, please visit the California Community Colleges Chancellor's Office Workforce and Economic Development Division website at: www.cccco.edu/About-Us/Chancellors-Office/Divisions/Workforce-and-Economic-Development