As we look ahead to 2022-23, new initiatives are on the horizon: the upcoming grant cycle focuses attention on a new Grand Challenge: Building Critical Mass in Data Science; additionally, Learning Lab will look to further deploy many of the faculty-created assets Learning Lab funded and develop an infrastructure to further spread effective and inclusive teaching practices across California; and, finally, Learning Lab will seek to better measure and evaluate the effectiveness of new approaches and innovations on student success.

As always, we are immensely grateful for the support of the Legislature, the Newsom Administration, and the Governor’s Office of Planning and Research for their support in continuing this work. In the coming year, we look forward to strengthening our partnerships across public higher education in this time of tremendous change and opportunity as we seek to better serve the students of California.

Lark M. Park

DIRECTOR
CALIFORNIA EDUCATION LEARNING LAB
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LEARNING LAB OVERVIEW

Our History

In 2018, Assembly Bill 1809 established the Learning Lab in order to improve learning outcomes and close equity gaps across California’s public higher education segments, particularly in the Science, Technology, Engineering, and Math (STEM) disciplines.

Housed in the Governor’s Office of Planning and Research (OPR) and administered in partnership with the Foundation for California Community Colleges (FCCC), Learning Lab funds innovative, intersegmental, faculty-led projects that leverage technology tools and the science of human learning to foster student success in online and hybrid learning environments.1

Learning Lab’s small team operates in consultation with OPR leadership and an eight-member advisory council, and is supported by the FCCC’s administrative structure.

As Learning Lab enters its fifth year of operation, the program continues to grow its portfolio of funded projects and expand its faculty community, while creating new resources and learning opportunities for faculty, and leveraging synergies across its networks to bolster individual and collective capacity for transformative change.

Our Partnership with the Foundation for California Community Colleges

In August 2020, OPR entered into a partnership agreement with the FCCC, a 501(c)(3) nonprofit entity that serves as the official foundation supporting the California Community Colleges Board of Governors, Chancellor’s Office, and the entire California Community College system, including 116 colleges and 73 districts, and its students.

The multi-year partnership agreement allows Learning Lab to utilize FCCC’s infrastructure, networks, and expertise to support administration of the program, expand its reach, collaborate more closely with other higher education entities, and to grow and provide enriched supports to its grantee community.

Footnotes

1 Learning Lab takes a broad view of what qualifies as an online or hybrid course. Online courses allow students to interact, either synchronously or asynchronously, with course materials/other students/lecturers in a technology-mediated, remote environment. Hybrid courses use both online and in-person formats, with some component of the course accessible in an online environment.
Our Mission and Approach

Learning Lab’s mission to improve learning outcomes and close equity gaps to increase student success in California’s public higher education systems is directly aligned with Governor Newsom’s recent compacts with the University of California, California State University, and California Community Colleges. Our work is grounded in the premise that all students are capable learners with potential for success, and our goals reflect the shared priorities established in Governor Newsom’s compacts, including:

- Improving student success and advancing equity by funding faculty-led innovation in teaching and learning
- Increasing the affordability of higher education through the creation of open educational resources
- Increasing intersegmental collaboration requirements and programming
- Supporting workforce preparedness by focusing on high-demand career pipelines in STEM and other disciplines

Learning Lab’s unique value is to be a testing ground for faculty innovation, foster faculty collaboration across the three segments of public higher education, generate free and low-cost resources from its funded projects, and bridge educational research and practice for the benefit of all students.

---

INNOVATION
Award grants to faculty to test and enhance innovative approaches to teaching and learning.

COMMUNITY
Foster collaboration across public higher education systems and build a learning network among faculty.

EDUCATIONAL PRACTICE
Collect and promote data-driven teaching and learning practices.

EDUCATIONAL POLICY
Support workforce preparedness by focusing on high-demand career pipelines in STEM and other disciplines.

THEORY & RESEARCH
Contribute to the science of human learning through funded projects and disseminate findings to faculty and other stakeholders.
The program has evolved from its initial phase to set up its operations and grantmaking structure to developing a strategic direction and plan for achieving its mission. As Learning Lab’s strategic plan has evolved, so has the constitution of its Advisory Council. Each year Learning Lab has assembled a unique group of individuals with varied expertise in higher education to guide the program through its subsequent phase of development. In 2021-22, the Advisory Council welcomed the addition of four new Advisory Council members and thanked retiring members for their service.

2021-22 CONTINUING MEMBERS

SONYA CHRISTIAN
Chancellor,
Kern Community College District

MICHAEL DENNIN
Vice Provost for Teaching & Learning & Dean, Division of Undergraduate Education, UC Irvine

CANDACE THILLE
Director,
Learning Science & Engineering, Amazon.com Inc.

NEW MEMBERS

LANDE AJOSE
Vice President & Senior Fellow, Public Policy Institute of California

CHRISTOPHER CABALDON
Mayor in Residence, Institute for the Future

SANDRA FRIED
Vice President, Success Center, Foundation for California Community Colleges

JEFF GOLD
Interim Associate Vice Chancellor, California State University Chancellor’s Office

OUTGOING MEMBERS

ESTELA BENSIMON
University Professor Emerita & Former Director of the Center for Urban Education, University of Southern California & Founder, Bensimon & Associates

JONATHAN BRACK
Director of Collaborative Impact Programs, Foundation for California Community Colleges

JAMES T. MINOR
Assistant Vice Chancellor & Senior Strategist, CSU Office of the Chancellor

WAYNE SKIPPER
Founder & CEO, Concentric Sky Co-Founder, Light At Play Co-Founder, Open Skills Network Investor & Technology Strategist, Stealth Venture
2021-22 Achievements

- Launched the first competitive opportunity for existing Learning Lab grantees to further scale successful projects to reach more students and faculty.
- Hosted the inaugural intersegmental INSPIRE Convening, which gathered 200 academic, state, and philanthropic leaders to advance systemic change and promote cutting edge teaching and learning research and practices.
- Launched the first RFP aimed at academic department level change.
- Awarded an additional $5.1 million to 22 project teams.

Facts at a Glance

- **310** Faculty and key personnel leading funded projects
- **$29.9** Million in committed funding
- **61** Funded projects
- **85** Funded higher education institutions
- **1-3** Years of funding for each project to demonstrate their impact

Engaged approximately 2,400 faculty and 49,000 students through funded projects since inception.

Grew grantees community from 225 to more than 310 faculty and key personnel leading Learning Lab projects.

Supported the expansion of two Learning Lab-funded projects to significantly reduce the cost of STEM homework systems, and improve the transparency of educational pathways across the state, including transfer from community colleges to UCs and CSUs.
Learning Lab launched two RFPs in the 2021-22 grant year. The first was designed to close the calculus equity gap and further the intent of the previous year’s Grand Challenge, and the second was created to scale Learning Lab-funded projects that have demonstrated student success.

Seeding Strategies to Close the Calculus Equity Gap

The previous year’s Grand Challenge: Overcoming the Calculus Barrier to STEM Success resulted in nine awards to intersegmental project teams to reconceptualize the role of and approach to calculus. Given the pervasiveness of the calculus equity gap across all three public higher education systems, Learning Lab committed to deepen its investment to close the gap and improve learning in calculus course sequences, especially among historically underrepresented student groups.

Seeding Strategies to Close the Calculus Equity Gap was released in November 2021, alongside the Learning Lab-commissioned report “Charting a New Course: Investigating Barriers on the Calculus Pathway to STEM.” The report included several pedagogical and curricular strategies with evidence of effectiveness to improve learning in calculus course sequences. Of these, six strategies were identified by Learning Lab as holding potential for impacting California students and were embedded in the RFP’s requirements. Grant awards up to $100,000 each over a duration of up to two years were provided to implement one or more of these promising strategies.

Seeding Strategies was Learning Lab’s first RFP geared toward STEM departments, with the recognition that systemic change and scaling of successful approaches require departmental commitment and leadership. To this end, a department dean or chair was required to serve as the project Principal Investigator.

The funding opportunity was also designed to attract submissions from California Community Colleges, given that the majority of Grand Challenge funds were awarded to its UC and CSU counterparts. To support applicants in this grant round, Learning Lab created logic model, workplan, and assessment templates and held office hours for applicants that needed additional consultation.

Report Commissioned by Learning Lab

“Charting a New Course” explored the reasons students leave Calculus sequences and STEM majors at two- and four-year postsecondary institutions, and shed light on strategies for addressing the barriers identified. Findings included validation that Calculus is a primary reason undergraduates leave the STEM pathway and the conclusion that Calculus teaching practices need to be redesigned in order to result in more equitable outcomes, especially for racially minoritized student groups with disparate access to Calculus in high school. The report also provided an analysis of Calculus enrollment and success patterns for CCC, CSU, and UC. Some key findings include:

- UC students were three times more likely to enroll in Calculus than CSU students in Fall 2019.
- Black and Latinx students that took Calculus in both university systems enrolled in Calculus later in their course of study than White and Asian students.
- At the CSUs, males enrolled at 2.5 times the rate of female enrollment in Calculus.
- At UC and CSU systems, the DFW rates of students with Pell Grants were double or nearly double those of non-Pell students.

Footnotes

2 The 2021-2022 grant year refers to grants awarded during the respective fiscal year, that is, from July 2021 through June 2022.

3 Grand Challenge grants were awarded to 3 UCs and 1 CSU, and smaller prototype grants awarded to 3 CSUs and 1 CCC; the Cohort Facilitator grant was awarded to the UC system office. Eight CCCs are involved as partner institutions across all Grand Challenge grants.
Learning Lab empaneled a three-member selection committee, supported by a team of readers, to make funding recommendations. Collectively, the selection committee held expertise in mathematics education and research on pedagogy, inclusive practices, and department-level change, in addition to longstanding experience as advocates for STEM equity within and beyond the three public higher education systems in California.

2021-22 Seeding Strategies Selection Committee Members

Learning Lab empaneled a three-member selection committee, supported by a team of readers, to make funding recommendations. Collectively, the selection committee held expertise in mathematics education and research on pedagogy, inclusive practices, and department-level change, in addition to longstanding experience as advocates for STEM equity within and beyond the three public higher education systems in California.

**NANEH APKARIAN, PH.D.**
Assistant Professor of Mathematics Education, Arizona State University
Dr. Apkarian’s experience includes research focused on students’ thinking and learning, classroom design experiments, and the roles of classroom discourse; investigating the social context of STEM departments and how that relates to institutional change; and mixed-methods national studies of precalculus and calculus education to produce national portraits and in-depth case studies.

**CONCHA GÓMEZ, PH.D.**
Professor of Mathematics, Diablo Valley College
Dr. Gómez brings expertise as a mathematics instructor for over two decades with experience teaching and leading equity efforts within the CCC, CSU, and UC systems.

**ELISHA SMITH ARRILLAGA, PH.D.**
Managing Director, The University of Texas at Austin, Charles A. Dana Center
Dr. Arrillaga’s expertise includes research on and advocacy for educational justice for students of color, students from low-income communities, and English learners. Dr. Arrillaga serves as co-chair of the California Department of Education’s Closing the Achievement Gap Taskforce.

Six Strategies to Improve Learning in Calculus

1. Course coordination within a department
2. Redesign placement practices and/or course(s) in the prerequisite pathway or streamline the pathway
3. Redesign calculus for disciplines such as life sciences or computer science
4. Re-sequence course content
5. Integrate active learning and enhance the learning environment
6. Institutionalize professional development and/or community of practice
Seeding Strategies Awards

Fifteen grants were awarded to 8 CCCs, 5 CSUs, and 2 UCs that collectively have potential to impact over 18,000 students and nearly 200 faculty over the next two years. The majority of funded projects will be implementing more than one of the six strategies noted previously, and most will be integrating active learning and/or will enhance the learning environment. Nine projects will employ course coordination within their departments as an equity strategy. Geographically, funded projects reached across the state as shown in the following graphic, which also indicates the strategies to be implemented at each campus.

<table>
<thead>
<tr>
<th>REGION</th>
<th>PROJECT TITLE</th>
<th>HOST INSTITUTION</th>
<th>PROJECT STRATEGIES</th>
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<td>College Algebra: A Mastery-Based Grading Approach</td>
<td>Stanislaus State</td>
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<td>Humboldt Stretch Calculus Course Pilot</td>
<td>Cal Poly Humboldt</td>
<td>✓ ✓ ✓ ✓ ✓</td>
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<td>Closing Equity Gaps in Calculus Through Equitable Grading Strategies</td>
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<td>CENTRAL COAST</td>
<td>Improving Calculus Learning Outcomes for Student Success in Engineering</td>
<td>UC Santa Cruz</td>
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<td></td>
<td>Increasing Student Success Through Faculty Engagement and Sustainable Professional Development</td>
<td>CSU Monterey Bay</td>
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<td></td>
<td>Innovations Around Interview Exams</td>
<td>Hartnell College</td>
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<td>CENTRAL VALLEY</td>
<td>Calculus for Data-Driven Applications</td>
<td>UC Davis</td>
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<td>INLAND EMPIRE</td>
<td>SBVC Calculus Pathways</td>
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<td>Confronting Structural Inequities Impacting STEM Mathematics at West LA College</td>
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<td>ORANGE COUNTY</td>
<td>Cypress College Calculus: A New Equitable Direction</td>
<td>Cypress College</td>
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<td>SAN DIEGO</td>
<td>Calculus in Action</td>
<td>San Diego Miramar College</td>
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<td>Effective and Equitable Mathematics Pathways in the STEM Curriculum</td>
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<td>Equity-Minded Calculus Redesign</td>
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<td></td>
<td>Holistic Approach for Closing Equity Gaps in Precalculus and Calculus</td>
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</tr>
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</table>
Scaling Success to Expand Impact in STEM

To build upon the momentum of Learning Lab’s inaugural grantee cohorts that were set to conclude in summer/fall of 2022, Learning Lab released an invitation-only RFP to provide funding to scale the most successful and promising projects to expand positive impacts on STEM in public higher education. Through a competitive application process, 15 of the 25 eligible grant projects applied to compete for up to seven awards ranging from $200,000 to $700,000 over a two-year period.

Key Elements of Scaling Success:

- **Scale Adoption** regionally or statewide
- **Increase Access** to strategies, tools, resources, and technology platforms
- **Strengthen** team capacity
- **Gather and produce** STRONG EVIDENCE
- **Contribute** to the science of human learning
- **Leverage** other public and private resources

2021-22 Scaling Success Selection Committee Members

For this grant opportunity, Learning Lab recruited a five-member selection committee with knowledge of and experience with higher education research and practice; student learning experiences, pedagogy, and inclusive teaching practices; understanding of institutional change; and leadership in STEM equity. It was important for this particular grant opportunity that the selection committee collectively possess a broad range of expertise and experience to align with the variety of disciplines and approaches represented amongst prospective applicants. Additionally, this selection process was unique from previous processes in that, as opposed to judging the potential of hypothetical projects, selection committee members were asked to assess the quality of applications based on an existing project’s evidence of impact and the breadth and depth of its proposed scaling effort. Because the common goal of all of the proposed projects is to achieve broad pedagogical and/or curricular reform, this selection process greatly benefited from experts who had been involved directly in systemic reform in various higher education contexts.
FRANK A. GOMEZ, PH.D.
Executive Director of STEM-NET, CSU Chancellor’s Office
Dr. Gomez’s current work lies in increasing the pipeline, preparation, graduation, and employment of outstanding, diverse STEM students. Dr. Gomez has also been a Professor of Chemistry for nearly 30 years and has received over $20 million in research funding.

YVETTE GULLATT, PH.D.
Vice President and Vice Provost, UC Office of the President
Dr. Gullatt brings leadership experience in student affairs, diversity, and institutional equity and has developed key initiatives for expanding UC’s public education role. At the root of all of Dr. Gullatt’s work is the mission to improve the academic preparation for more first-generation, low-income and underrepresented students.

KATHY KUBO
Mathematics Instructor, College of the Canyons
Professor Kubo’s expertise includes redesigned statistics pathways; faculty training programs; transforming remediation; statistics education and courseware; and best practices in pedagogy for teaching introductory statistics.

MITCHELL L. STEVENS, PH.D.
Professor of Education, Stanford University
Dr. Stevens’ expertise lies in the organization of US higher education, the quantification of academic performance, and alternative school forms. Dr. Stevens’ research focuses on learning experiences; how families, schools, and workplaces recognize and reward learning; and how learning opportunities can be made more effective, equitable, enjoyable, and humane.

SHAWN WHALEN
Program Director, College Futures Foundation
Director Whalen brings expertise in higher education and student-centric pedagogy as both a faculty member and university administrator. Director Whalen is an expert on academic policy, student achievement, strategic planning, and facilitating institutional partnerships.
Shifting Faculty Mindsets to See ALL Students as Capable STEM Thinkers and Learners

The traditional design of STEM courses perpetuates narrow views about who can be successful in the sciences, which negatively impacts students historically underrepresented in STEM. To combat this problem, this project tested the power of group-worthy tasks through the engagement of students in sorting, using, and making sense of data, trends, and patterns. These tasks, which require a set of skills that no one student has all of, but that all students have some of, surface the value of each student's contributions to the team so that all students may see themselves as STEM thinkers and learners. These classroom practices and out-of-class experiences led to observed shifts in students' sense of their capabilities, including evidence of increased student retention and success.

Scaling Success Awards

More than 50 unique institutions from the CCC, CSU, and UC systems were part of 15 project teams that applied for the Scaling Success grant opportunity, and ultimately 21 unique institutions were part of the seven awarded projects.

The seven Scaling Success grant projects vary in approach, ranging from creating stronger transfer pathways in engineering and public health, to developing novel concept mapping tools to achieve “A’s for All” in computer science, to equipping faculty with the knowledge and skills to promote students’ sense of belonging. These awarded projects were selected because of their strong evidence of impact in the initial phase of funding, the breadth and depth of the proposed scaling, and their strong plans for sustaining efforts beyond the grant period.

Scaling Success to Expand Impact in STEM Funded Projects

Shifting Faculty Mindsets to See ALL Students as Capable STEM Thinkers and Learners

HOST
College of Marin

PARTNERS
Diablo Valley College
Sonoma State University
UC Berkeley

AWARD
$650,000

The traditional design of STEM courses perpetuates narrow views about who can be successful in the sciences, which negatively impacts students historically underrepresented in STEM. To combat this problem, this project tested the power of group-worthy tasks through the engagement of students in sorting, using, and making sense of data, trends, and patterns. These tasks, which require a set of skills that no one student has all of, but that all students have some of, surface the value of each student's contributions to the team so that all students may see themselves as STEM thinkers and learners. These classroom practices and out-of-class experiences led to observed shifts in students' sense of their capabilities, including evidence of increased student retention and success.

Scaling Humanized Online Teaching in STEM

HOST
Foothill-De Anza Community College District

PARTNERS
UC Irvine

AWARD
$700,000

Student demand for asynchronous online courses has increased enormously because of their flexibility and as a result of the shift to online instruction during the COVID-19 pandemic, but unfortunately, online courses exacerbate the problematic equity gaps that exist in face-to-face courses. The Humanizing Online STEM Academy, an evidence-based professional development program, has responded to this challenge by influencing faculty mindsets and teaching behaviors. It hones the equity-mindset and digital fluency of faculty through a six-week online faculty development program where faculty learn about social psychological factors that interfere with a student’s ability to perform to their full potential, and how validation, trust, and care mitigate these threats and cultivate an anti-racist learning environment—all of which create the conditions for achieving equity in student success.
Precalculus has a high rate of student failure, with disproportionately higher rates for underrepresented minority students. This project builds on the work of the Bay Area Math Collaborative (BAM-C), which restructured precalculus around “Big Ideas” so that the content is more coherent, with emphasis on the most crucial concepts. The project also focuses on leveraging student-driven problem-solving for deeper learning and professional development to math faculty. The scaling effort will reach more faculty and students with the “Big Ideas” approach and will include additional topics from Algebra as well as some Calculus topics. Importantly, the project will create assessment resources, which align with the existing re-organized content and activities in their Precalculus Course Guide, designed to be both inclusive and flexible. Alternative assessment strategies will promote students’ conceptual understanding and progress toward attainment of learning goals, with multiple ways for students to demonstrate understanding and skills. The project will also develop a checklist tool for teachers to reflect on daily teaching practices and on their alignment of instruction and assessment.

Mastery learning occurs when students have acquired sufficient practice, with instructor feedback and guidance, to master a skill or concept before being tested on it. The challenge of implementing a mastery learning approach for students is that developing practice problems requires significant instructor effort: homeworks and labs take time to create and grade, and exams must be administered to all students simultaneously to thwart cheating. As a result, few instructors take this approach and many students who could have benefited from additional practice don’t get the chance. With the observation that with sufficient time, any student can in principle achieve any desired proficiency, this project utilizes PrairieLearn, a computer-based assessments platform, to create, deploy, evaluate, and refine computer science course materials with a mastery learning approach. Thus far, students have reported positive experiences with the platform, and faculty have developed policies for late student work and other equitable grading practices which have inspired this A’s for All movement in computer science education.

Introductory Biology is often taught using traditional lecture-based pedagogies that have been shown to be ineffective, resulting in poor academic performance in Introductory Biology and future classes. Active learning pedagogy is known to support deeper learning especially for historically underrepresented students. To enable students to develop strong foundations in biological science courses with complex content, this project has trained faculty to use an iterative design process to develop online, active learning modules for biological concepts to encourage social interaction, collaboration, and sense of belonging for students. This project will host two cohorts of faculty in a year-long training program where faculty from across systems will work together to develop the active learning modules. The program aims to result in positive changes in faculty mindset, increase faculty confidence in using active learning in online and hybrid learning environments, and develop or strengthen their identity as educators through a Community of Practice.
Expanding Equity and Access in Discrete Mathematics

HOST
San Francisco State University

PARTNERS
San José State University
Hartnell College
West Valley College

AWARD
$650,000

Fundamental to computation (logic, networks, algorithms), discrete mathematics is a gateway course for mathematics, computer science, and engineering. However, there are long-standing, persistent inequities in those degree programs in student outcomes and in access to classes that consequently prolong the time to graduation of both 4-year CSU students and students transferring from community colleges. This project proposes to scale systemic change in discrete mathematics through revising state C-ID policy, expanding the collection of classroom materials of team-worthy lessons with demonstrated potential to improve student success, and leveraging instructor guides to develop and implement an asynchronous instructor short-course for teaching with such lessons in college classrooms across the state of California.

Clarifying and Communicating Engineering and Computer Science Transfer Pathways

HOST
Bakersfield College

PARTNERS
UC Merced

AWARD
$200,000

Too few California community college students transfer into Science, Technology, Math, and Engineering (STEM) programs at the University of California. The transfer process and coursework requirements are confusing to students, particularly in STEM fields, with their long sequences of prerequisite and requisite courses. Simple missteps in sequencing often add additional semesters or even years to a student’s time to completion resulting in wasted time, unnecessary unit accumulation, and increased risk for changing majors or simply dropping out. Program Mapper has successfully responded to this challenge by providing a clear path to each degree or certificate offered by a college and creates seamless intersegmental transfer pathways published on a tool that displays a visual map of core courses by term to achieve a 2+2 bachelor’s degree pathway. The scaling proposal seeks to build upon the success of Program Mapper in increasing the percentage of students “on-path” to transfer and will focus on complex, high-demand pathways for Engineering, Computer Science, and Public Health.
Historically, Learning Lab has awarded grants in three broad categories: 1. Larger dollar amounts for 3-year projects geared toward more robust innovation and addressing “grand challenges” that require several approaches in a single project; 2. Moderate dollar amounts for 2-3 years for projects to foster faculty professional development or support focused institutional change efforts; and 3. Smaller dollar amounts for 1-2 years to seed innovative ideas and support proof-of-concept or prototype projects. One exception to these broader categories has been the Cohort Facilitator grant, which supports a single team charged with fostering collaboration among the Grand Challenge Calculus project cohort, and producing collective recommendations for model first-year STEM curricula.

<table>
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<tr>
<th>GRANT OPPORTUNITY</th>
<th>DISCIPLINE</th>
<th>AWARD AMOUNT</th>
<th>DURATION</th>
<th># of AWARDS</th>
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<td>Innovation</td>
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<td>Scaling Success</td>
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Distribution of Currently Awarded Projects

In alignment with its mission to improve undergraduate STEM education across all of California’s public higher education segments, Learning Lab strives to achieve disciplinary, geographic, and institutional diversity among awarded projects.

Disciplinary Distribution

The current state of Learning Lab’s grant portfolio is reflective of the strategic focus on addressing the calculus equity gap over the past two years, which is a critically important problem to solve given the role calculus courses have played as gatekeeper and oftentimes barrier to STEM success. This strategic focus has produced a concentration of 32 funded projects in Math and Statistics disciplines. The seven Scaling Success grants were awarded to reinforce Learning Lab’s commitment to broader impact across STEM disciplines (Note: Projects spanning more than one discipline are counted in each of the respective fields and are also included in the “More Than One STEM Discipline” category).

Disciplinary Distribution of All Learning Lab Funded Projects

<table>
<thead>
<tr>
<th>8 PROJECTS</th>
<th>8 PROJECTS</th>
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<td>BIOLOGY</td>
<td>CHEMISTRY</td>
<td>MORE THAN</td>
<td>MATH &amp;</td>
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<tr>
<td></td>
<td></td>
<td>ONE STEM</td>
<td>STATISTICS</td>
</tr>
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</table>

Funding by Discipline

Currently, 37% of funded projects address multiple STEM disciplines. "Interdisciplinary STEM" projects (16%) are unique in that they are designed to attract faculty from any STEM discipline to participate in the project intervention. "Two Fields" projects (21%), on the other hand, are targeted specifically at two distinct disciplinary groupings, such as a project operating at the intersection of Computer & Data Science and Physics & Engineering. The multiple-discipline projects were awarded as part of the Innovation, Institutional Change, Professional Development, and Scaling Success grant opportunities. The greatest contributors to the Math & Statistics category are the Calculus Grand Challenge and Seeding Strategies projects (Note: Figures in the “Distribution of Awarded Grant Funds by Discipline” chart are unduplicated).
Well-represented in Learning Lab’s geographic distribution are historically populous areas such as the Bay Area and Los Angeles, as shown in the table below. Even though the Scaling Success awardees consisted primarily of existing grantees/institutions, the grant opportunity called for broad intersegmental, regional, and/or statewide scalability, so many of the project teams expanded to the include additional partner.
Learning Lab awarded $5.1 million in 2021-22 bringing its total committed funding to date to $29.9 million. For both the 2020-21 and 2021-22 grant award years, Learning Lab has held some funds in reserve to allow for continuation funding for prototype projects and to lengthen the application period for some grants. (Example: The Seeding Strategies grant opportunity was split into Seeding Strategies I and II, in order to accommodate institutions that wanted to apply for grant funding but were unable to given the pandemic’s ongoing impacts during this period.)

### Project Dashboard

Learning Lab’s interactive Tableau dashboard provides a visual overview of Learning Lab grantee projects and funding allocations. Improved sorting features allow viewers to disaggregate allocations and projects by the geographical regions they serve, segmental and project team affiliations, and by grant years or cycles. The dashboard, accessible through the Learning Lab website, is updated regularly and is an active reflection of Learning Lab’s reach.
Funding by Segment

Learning Lab recognized that the Calculus Grand Challenge awards exacerbated a disparity that existed in the distribution of funds going to community colleges. (CCCs, which generally have less administrative support for grant applications and management, were already lagging as host institutions of applications and awarded projects, and therefore were receiving and managing less of the award share than their counterparts.)

To encourage community colleges in becoming host institutions of awarded projects, Learning Lab tailored the Seeding Strategies grant opportunity to be more appealing to CCCs by providing additional support and resources, and streamlining the application process. These efforts proved successful with CCCs receiving the largest share of Learning Lab funding in the 2021-22 award cycle, which produced a more even distribution of both cumulative funding and host institution status across the segments.
After four years of grantmaking, Learning Lab’s funded projects have and continue to impact both students and faculty statewide. While projects vary widely in scope and design, collectively they have reached over 2,400 faculty and nearly 49,000 students as of December 21, 2022. Final project evaluations required of all grantees will provide both quantitative data and qualitative insights about the particular impact of each project. By January 2023, Learning Lab expects to have received 28 final evaluations for projects that concluded in 2022. This will be the first set of evaluations for Learning Lab funded projects.

In order to capture project data analysis, outcomes, and valuable lessons learned, Learning Lab developed an evaluation template modeled after a template used by the National Science Foundation. Learning Lab modified the template to reflect the values and priorities of the Learning Lab program, including but not limited to: student success, faculty development, pedagogy, scalability, learning environments, educational technology, and learning science research. The types of information requested are outlined in the following graphic.

<table>
<thead>
<tr>
<th>Topics</th>
<th>Data Gathered</th>
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</thead>
<tbody>
<tr>
<td><strong>APPROACH &amp; ACCOMPLISHMENTS</strong></td>
<td>Project goals and assessment of success</td>
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<tr>
<td></td>
<td>Impacts on student success</td>
</tr>
<tr>
<td></td>
<td>Impacts on faculty practices and mindset</td>
</tr>
<tr>
<td><strong>IMPACTS &amp; SCALING</strong></td>
<td>Broad applications of project</td>
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<td></td>
<td>Contribution to the science of human learning</td>
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<td></td>
<td>External engagement/scaling efforts</td>
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<td></td>
<td>Institutional adoption</td>
</tr>
<tr>
<td></td>
<td>Educational technology implications</td>
</tr>
<tr>
<td><strong>OVERALL LESSONS LEARNED</strong></td>
<td>Factors contributing to project successes and/or challenges</td>
</tr>
<tr>
<td></td>
<td>Implications of strategies and tactics</td>
</tr>
<tr>
<td></td>
<td>Impacts of COVID-19</td>
</tr>
<tr>
<td><strong>COLLABORATION &amp; ORGANIZATION CHANGE</strong></td>
<td>Team composition/structure</td>
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<td></td>
<td>Collaboration as a boost and/or barrier</td>
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<tr>
<td></td>
<td>Institutional policies/practices as boosts and/or barriers</td>
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<tr>
<td></td>
<td>Department/institution stakeholder support</td>
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<tr>
<td><strong>DISSEMINATION &amp; PRODUCTS</strong></td>
<td>Scholarly publications (e.g., articles, book chapters)</td>
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<td></td>
<td>Conference papers and presentations</td>
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<tr>
<td></td>
<td>New educational technologies</td>
</tr>
<tr>
<td></td>
<td>Open educational resources</td>
</tr>
<tr>
<td></td>
<td>Patents, inventions, websites, and other products</td>
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</tbody>
</table>
In order to increase teams’ ability to evaluate their projects and produce meaningful evaluations, particularly in the context of COVID disruptions, Learning Lab engaged WestEd—a California-based nationally recognized leader in research, evaluation, and technical assistance—to provide webinars about evaluation best practices and one-on-one technical assistance to principal investigators and co-principal investigators in order to optimize qualitative and quantitative outcomes and data, as well as lessons learned.

The first webinar held in March 2022, “Program Evaluation: A practical approach to explaining what works,” was intentionally developed to introduce common evaluation questions and considerations, in part to gauge the knowledge base and experience of grantee participants. Polling responses among 28 attendees revealed that 50 percent considered themselves at a beginner level, with the remaining participants as intermediate or advanced. In response to grantee interests, a second webinar held in May 2022 explored, “Did the program ‘work’ and why? A framework for examining process evaluation and implementation insights.” Up to 6 project teams over 8 meetings received evaluation consultation offered on an as-needed basis, and anecdotal feedback indicated that grantees were very satisfied with the guidance they received from WestEd.

Emerging Findings

Initial data and findings gleaned from project annual reports and a small sample of final evaluations, received as of December 2022, show positive outcomes for faculty and students and related measures. It should be noted that projects were either a year into project implementation or newly launching their projects when the COVID pandemic resulted in swift changes to online courses as well as steep declines in student enrollment. The extent to which projects were able to pivot from their original implementation plans and retain fidelity to intended goals depended on a variety of factors that included, but were not limited to, the specific project design, institutional circumstances, and team agility.

Over the past two years, Learning Lab has observed tremendous commitment among faculty who remained invested in improving learning for students and faculty development, especially during these difficult times. Their resilience is reflected in the ways in which projects changed their respective course and attempted to meet new challenges to, for example, gather student data in an online environment that had intended to be in-person, as well as to re-think the analysis of such data in light of atypical conditions. In the pages that follow are project-specific examples of early findings and indications of positive impact on faculty and students.

Impacts of COVID on Data Collection

All funded projects faced challenges related to COVID to varying degrees depending on the project’s design, evolving institutional policies, team member circumstances, and other factors. The use of control groups intended for impact analysis, for example, were not always feasible with unanticipated pivots to online course formats. In particular, data gathering whether through surveys or interviews became increasingly difficult, even impossible in some cases. Faculty commonly reported that survey fatigue and life stressors related to the pandemic precluded many students from providing feedback about courses or interventions, which often resulted in reduced data sets. The challenge to data collection was compounded by existing protocols for student consent, the application or interpretation of which varies by institution. Any requirement such as completing an online form may have posed a barrier to student participation or engagement in surveys, as students faced adjustment to changing learning environments, personal loss, and/or managing family caretaking, work and school obligations. Furthermore, changes to grading policies—such as shifts to pass/fail options for students during COVID—created significant barriers to creating direct comparisons and analyzing differences in course outcomes over the duration of the grant period.
To systematically understand student perceptions and experiences in the humanized courses taught by the Academy participants, we administered two waves of student surveys in participating instructors’ courses, one during week two of the course (responded by 825 students with an average response rate of 45%) and another one administered at the end of the course (responded by 599 students with a 62% response rate).

Overall, students in humanized online courses reported that they felt like they had high levels of sense of belonging, instructor-student relationships, sense of teaching presence, social presence, and cognitive presence, as well as positive attitudes towards online learning. Among students who responded to both waves of the student surveys, Black, Hispanic, Native American, and Pacific Islander students, who are traditionally considered disadvantaged in online STEM courses, reported higher levels of sense of belonging, higher levels of engagement in student to student interaction, instructor-student relationships, and sense of teaching presence and cognitive presence than their White and Asian counterparts in both the week two and end-of-course surveys.

This 3-year project was designed to improve teaching and learning in online undergraduate STEM courses by developing a model for humanized online teaching and designing an online professional development program: the Humanized Online STEM Academy. To mitigate the inherent isolation of asynchronous courses—especially for students from minoritized groups, the six-week Humanizing Academy prepares faculty to intentionally integrate kindness cues of social inclusion into their course to diminish belongingness uncertainty, validate students, then leverage relationships to hold all students to a high standard and empower learners to achieve their full potential. The Humanizing Academy is delivered asynchronously, which allows faculty participants to practice and model asynchronous interventions.
PROJECT DESIGN
This project developed, implemented, and continuously improved a free, online interactive textbook for introductory statistics modernized with data science approaches. The project focuses on statistics because statistics is critical not only for gaining entry into STEM careers, but also for excelling in them. Additionally, statistics may be the most direct pathway for students seeking to overcome poor mathematical preparation, and, significant from a psychological perspective, the notion that statistics is “not math” may provide an inroad for students who have been convinced that they can’t learn math. The project’s design involved repeatedly engaging students with the deep conceptual structure of statistical modeling, and included a heavy emphasis on simulation, randomization, and bootstrapping as tools for both doing data analysis and understanding statistical ideas. The goal was not simply students’ course completion, but the development of flexible and transferable knowledge—i.e., deep understanding—in all students.

EVIDENCE OF IMPACT
Because implementation began before the COVID-19 pandemic and continued as classes transitioned to remote work, this project had the unique opportunity to examine how the transition to remote instruction affected students’ performance. Surprisingly, when comparing student performance on end-of-chapter review questions in the online textbook before COVID and during COVID—UC and CCC student performance actually increased during periods of fully remote instruction. In addition to the overall improvement in UC and CCC student performance, some of the pre-pandemic data show that among students who work (and tend to miss more synchronous classes), there is a higher correlation between time spent on these interactive instructional materials and performance in the class. Remote classes with high quality online materials may be particularly effective for students who have extra demands on their time.

"In high school, when I took algebra I and II, I got Ds, I almost actually did not graduate high school because of algebra... After that I am never going to do anything math related ever again. When I got to college, community college, I was an English major because... I wanted to stay as far away from that [math] curriculum as possible. When I switched to being a Psychology major, and I realized I had to take statistics... I thought this is going to be it, this is what’s going to get me out of the major and it wasn’t! I ended up getting a B and I was striving to get an A, and I have never experienced feeling a will for math like that. It changed my complete perspective on the whole subject. It wasn’t about the fact that I was stupid or couldn’t do it... it was just about learning math in a different way.”
EVIDENCE OF IMPACT

The first research study showed that students in courses using the videos and coding exercises (n=55) had significantly greater gains in affective outcomes (e.g., self-efficacy, sense of belonging) than that of students in courses with traditional homework/reading assignments (n=161). Analysis was conducted via pre- and post-survey responses to measure affective gains from students who were provided with the supplementary video and practice sets for coding, as compared with responses from students in control courses without the supplementary materials. While both groups showed positive gains in affective outcomes, the results showed a statistically significant greater gain in affective outcomes for students in the experimental group.

A second study showed that students were more likely to watch the videos and engage in the coding exercises when they were integrated in the website, as compared with when the videos and coding exercises were offered separately. The usability study showed unanimous positive satisfaction with the website and feedback was used to update website design specifications, such as organizing material by difficulty, and including presenter profiles and links to related resources.
#### Challenge

The traditional pathway to calculus, required for all STEM and many business majors, includes precalculus which is typically taken during a student’s first year in college. Precalculus has a high rate of student failure. For example, at Cal State East Bay in 2017, the DFW rate for this class was 29%. Underrepresented minorities had an even higher DFW rate (47%) for the same period.

#### Evidence of Impact

The project demonstrated a correlation between an increased level of implementation of the Big Ideas Framework, a novel approach to teaching precalculus, with improved student grades across intersegmental partner institutions. Statistical analysis showed courses that partially or fully implemented the Big Ideas Framework had a higher student grade point average and a more positive distribution of student grades. As shown in the charts below, based upon student sample sizes from Spring 2021 (n=692) and Fall (n=406) courses where the framework was implemented, a higher proportion of students in Fall 2021 (nearly 61 percent) received As or Bs in precalculus as compared with students that received As or Bs previously in Spring 2021 (roughly 51 percent of students). The data also suggests an overall conclusion that the Big Ideas Framework is making a positive impact on student outcomes for all students, while having a positive impact on equity for underrepresented minoritized students.
LEARNING LAB HIGHLIGHTS

Multiple learning opportunities were developed and implemented over the year, in the form of virtual webinars and an in-person convening, which were designed to reflect the most relevant topics in higher education and be responsive to the needs of Learning Lab grantees. Some programs were made broadly accessible to higher education stakeholders and the public.

2022 INSPIRE Convening

To advance Learning Lab’s strategic goals to expand our network of faculty and forge strategic connections with key stakeholders, Learning Lab—with generous support from philanthropic partners—hosted its 2022 INSPIRE Convening on October 14-15, 2022, at the UCLA Meyer and Renee Luskin Conference Center. Learning Lab’s vision for the convening was to INSPIRE innovation and motivation to pursue equity in creative ways; INFORM attendees through workshops and project showcases highlighting cutting edge teaching and learning research; CATALYZE change through speakers and panelists that challenge traditional thinking and approaches; and UNITE our community to collectively improve student success in higher education.

Programming Highlights

Workshop sessions shared KPOXQ CVXKGCIPRTCEVKKCN tips to support current CPFRTQURGEVXXGTCPVGXU KPCXCTKGV QHYCJU
Higher education leaders engaged in thought- RTXQM KPIFKUEWUKQPUQT teaching and learning, funding priorities, initiating EJCPICPFQOQTG
Learning Lab grantees and other faculty teams UJQYECUGFKPQQXCVXG approaches to teaching and learning to foster ITGCVGTUWVFPGPVIWEEGU
&T.CPFG#LQUGOQFGTCVGF an engaging and emotional EQPXGTUCVQPKYKVJT(TGGGOC Hrabowski III, a nationally renowned leader in STEM GFWEVCKQPCFGSWKV[

The convening was well attended by a variety of stakeholders, but most attendees (57%) were Learning Lab grantees—faculty and administrative leadership from California public institutions of higher education (CCCs, CSUs, and UCs). The remaining attendees represented non-grantee faculty and administrative leadership from UC/CSU/CCCs, nonprofit organizations, philanthropic entities, and other higher education stakeholders.

Survey data and personal experiences that attendees shared suggest a high level of satisfaction amongst attendees with nearly QUHWTXG[TGURQPGPVUTCVKPIV]GGXGVCUP ZEGNNPGVq—the highest rating respondents could select. Additionally, convening attendees gave high marks to all other elements of the programming, suggesting that the event was able to provide attendees with actionable information, valuable resources, and the opportunity to create connections amongst fellow attendees.

97% 75% 95%
Strongly agreed/agreed that they learned ACTIONABLE information that may help them KPVJGTQRTQHUUKQPCNTQNG Strongly agreed/agreed that they were interested in accessing session materials CHVGTVJGGXGPV Plan to, or may, collaborate with someone they met CVVJGEQPGPKPI
Virtual Faculty Learning Opportunities

Throughout the year, Learning Lab executed a series of virtual programs that targeted Learning Lab grantees, while also more broadly marketing some opportunities to the public through Learning Lab’s listerv that includes non-funded faculty statewide and other higher education stakeholders.

Webinars
The first of three webinars provided to grantees and the public was The Power of CourseKata: Statistics & Data Science in the CCC, which featured Eddie Tchertchian (Pierce College), Ben Smith (Pierce College), and Ji Son (Cal State LA), who showcased the free CourseKata online interactive textbook and in-class lessons that seamlessly integrate learning statistical concepts with learning to code with R in Jupyter notebooks. Over 100 people participated in this webinar, including faculty and system leadership from other states such as the New York City Department of Education and the Iowa Department of Education.

The second was the C-ID 101 Webinar hosted by Eric Wada, the Academic Senate for California Community Colleges’ C-ID Curriculum Director, who discussed how courses can meet C-ID requirements, who decides, and how C-ID can facilitate articulation and transfer. Almost 125 California faculty and administrators registered and nearly 100 attended.

The final broadly promoted program—the largest and most far-reaching—was the Closing the Calculus Equity Gap Webinar, which was inspired by the Learning Lab-commissioned report, “Charting a New Course: Investigating Barriers on the Pathway to Calculus.” The webinar brought together leading scholars and educators to discuss the role college Calculus plays in achieving racial and gender equity in STEM, and how educators and policymakers can support student success in STEM pathways. Panelists included (from left to right) Omayra Ortega (Sonoma State University), Pamela Burdman (Just Equations), Nathan Alexander (Morehouse College), Francesca Henderson (Just Equations), and Christopher Jett (University of West Georgia). More than 300 people registered for the webinar and nearly 220 attended, which included higher education faculty and administrators representing 36 states.

A number of other programs were more tailored to Learning Lab grantees, including a series of meetings focused on adaptive learning technologies being developed and tested by Learning Lab projects. Multiple meetings highlighted varying approaches being taken to using adaptive learning technologies to improve student learning outcomes, presented successes and challenges associated with those projects, and provided an opportunity for shared learning and troubleshooting between PIs and co-PIs.

The final grantee-oriented program was the Digital Accessibility for Online Learning Webinar, which brought together experts from the UCLA Disabilities & Computing Program, including Travis Lee, Carolanne Link, and Sal Santa Ana, to discuss accessibility best practices in online education. From “what is accessibility?” to best practices in developing accessible learning materials and resources, this webinar provided practical information for grantees. Approximately 50 Learning Lab grantees attended, and the recording was shared publicly on Learning Lab’s website and social media.
Change Leadership Series

In an effort to support the professional development of Learning Lab grantees in the area of transformational change, nearly 40 grantees are participating in a six-part learning series of workshops designed specifically to help Learning Lab grantees lead change efforts at their respective institutions. Participants are using their existing funded projects as the basis for investigating their role in change. The knowledge, tools, and strategies gained from the expert-led sessions are described below:

<table>
<thead>
<tr>
<th>Session Title</th>
<th>Facilitator</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leading Change in Higher Education</td>
<td>Adrianna Kezar</td>
<td>University of Southern California</td>
</tr>
<tr>
<td>Successful change leadership does not happen in isolation, but within an ecosystem with several key features that need to be considered. Research has shown that individuals and teams leading change benefit from understanding the multiple opportunities, barriers, and conditions created by the ecosystem in which they are operating.</td>
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<tr>
<td>Strategic Communications</td>
<td>Alison Kadlec</td>
<td>Sova</td>
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<td>This session will focus on strategic communications (including issue framing) and other tools to help leaders at every level better understand how to build and maintain communication and engagement practices that undergird cultures that generate, sustain, and expand momentum around academic reform efforts.</td>
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<tr>
<td>Utilizing and Optimizing Data</td>
<td>Marco Molinaro</td>
<td>University of Maryland, College Park</td>
</tr>
<tr>
<td>An important aspect to creating a critical mass of supporters for any change effort is establishing the case for why the change should be undertaken in the first place. Using data to shape and drive change can serve an important role in removing barriers to buy-in.</td>
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<tr>
<td>Leveraging Relational Power</td>
<td>Alison Kadlec</td>
<td>Sova</td>
</tr>
<tr>
<td>Creating meaningful change involves more than just knowing about processes, power structures, and strategic planning—it also involves knowing about people. People bring different experiences, knowledge, personalities, preferences, and more to the table, and knowing how your own identity impacts collective change efforts, and knowing how to facilitate difficult conversations are both critically important to advancing change initiatives.</td>
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<tr>
<td>STEM Instructional Reform: What Does the Research Say?</td>
<td>Sandra Laursen</td>
<td>University of Colorado Boulder</td>
</tr>
<tr>
<td>In leading change in higher education, leaders need both an inspiring vision and a practical toolkit: eyes on the prize and hands on the wheel. This session aims to support both within the particular change context of STEM education. An overview of research on STEM instruction will help you communicate confidence in your vision of change, and a framework with examples from real STEM change projects will help you find practical tactics to move the work forward on multiple fronts.</td>
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<tr>
<td>Building Skills: Faculty as Change Agents</td>
<td>Alison Kadlec</td>
<td>Sova</td>
</tr>
<tr>
<td>Real, sustainable, positive change for students requires the creative commitment and courage of faculty. This session will draw on relevant research and practical insights from nearly two decades of work on the ground supporting faculty co-ownership of student-focused, equity-minded change.</td>
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<tr>
<td>STEM Instructional Reform: Does the Research Say?</td>
<td>Sandra Laursen</td>
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EXPANDING OUR REACH

Learning Lab benefits from meaningful relationships with external stakeholders, such as campus and system leaders who can inform Learning Lab grantmaking, promote grant opportunities more broadly to their faculty constituents, and support the success of current grantees within their systems; philanthropic organizations who may be able to support Learning Lab programming or support specific grant projects; or other aligned individuals or organizations who can offer a unique benefit to Learning Lab’s work. To that end, Learning Lab pursued a number of avenues to build and strengthen the community of stakeholders engaged in Learning Lab’s work.

Building Partnerships

Higher Education Funders

Over the last two years, Learning Lab staff members have nurtured existing relationships with philanthropic partners, and built new relationships through participating in regular meetings of funder collaboratives. There are a number of strategic benefits that have emerged from Learning Lab’s engagement in the funder community, such as raising awareness of and creating exposure for promising Learning Lab projects that may be prime candidates for philanthropic support, learning about projects supported by other funders that align with or complement Learning Lab funded projects; or gaining recommendations for strategic partnerships that support Learning Lab programming. Beyond the more relationship-oriented benefits, Learning Lab also received financial support from some of our philanthropic partners for the 2022 INSPIRE Convening, where those same philanthropic funders offered a session for grantees to learn about formal and informal channels for communicating with funders, understand what funders are looking for, and learn how to identify which funders may be the right fit for their project.

California Public Higher Education System Leadership

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Building Partnerships

• Facilitating a meeting for California Community College Chancellor’s Office academic leadership to learn about the free CourseKata statistics/data science textbook/faculty tool and explore its usefulness related to the dramatic increase/shift in enrollment to introductory statistics courses as a result of AB 705 implementation.

• Facilitating a meeting for California Community College Chancellor’s Office academic leadership to learn about adaptive learning technology used to promote mastery/proficiency-based learning.

• Attending CCC CEO meetings to promote RFPs.

• Consulting California State University Chancellor’s Office and Academic Senate leadership to discuss challenges and opportunities related to data science to inform the development of the Data Science Grand Challenge RFP.
LOOKING AHEAD TO 2022-23

Grant Opportunities

Learning Lab launched two grant opportunities for the 2022-23 grant year to date, which include Seeding Strategies (II) to Close the Calculous Equity Gap and Grand Challenge: Building Critical Mass for Data Science.

In response to the broad need for redesigning calculus courses and pathways to calculus to achieve greater equity in student outcomes, Seeding Strategies (II) was released as a second round of funding to expand the reach of the initial Seeding Strategies (I) funding opportunity from 2021-22 (see pg. 8). This second round of funding mirrors the first in that it is designed as a department-level funding opportunity to encourage the implementation of select promising curricular and pedagogical strategies to close equity gaps.

The Data Science Grand Challenge is a new funding opportunity that seeks to incentivize public higher education institutions to embrace data science as an opportunity to build new pathways, modernize majors, attract historically underrepresented students into STEM, and deepen both civic and interdisciplinary learning. Recommendations from the National Academies’ Data Science for Undergraduates report informed the foundations of this Grand Challenge, providing both rationale and guideposts relative to Learning Lab’s design of the following categories of grants:

- **Pathways Development**
  - ~$1.3 million
  - Duration over 3-4 years
  - Up to 3 awards

- **Faculty Development**
  - ~$200K to ~$350K
  - Duration over 2-3 years
  - Up to 5 awards

- **Interdisciplinary Collaboration**
  - ~$100k to ~$200K
  - Duration over 2-3 years
  - Up to 9 awards

- **Grand Challenge Cohort Coordinator**
  - Up to $500k
  - Up to 5 years
  - 1 award

By offering the above grants and promoting collaboration amongst awarded projects through a cohort model, Learning Lab hopes to promote the buildout of a data science educational infrastructure that will further educate and engage faculty, mobilize intersegmental collaboration, and create both clarity and plenty in the options students can pursue for their interest and future careers. Eligible applicants include intersegmental teams from the CCC, the CSU, and UC campuses (Interdisciplinary Collaboration Grants do not require intersegmental collaboration).

State Support for Scaling

In the 2022 Budget Act, two projects garnered additional state funding to expand beyond the scope of their Learning Lab project. One project was the expansion of a free, online, adaptive learning homework system (ADAPT) for chemistry that complements existing open source content accessed through the LibreTexts platform—a popular resource. The ADAPT project, also supported by funding from the federal Department of Education, has already reached thousands of students over the course of the Learning Lab grant. The project’s potential large-scale impact lies in not only the homework modules being developed for the entire General Chemistry sequence aimed at closing equity gaps, but also in the cost-savings potential for students who would no longer need to purchase expensive homework systems. Cumulative savings for students could reach millions of dollars depending on the pace and scope of adoption. The 2022 budget included $1 million per year over four years for Learning Lab to oversee this expansion, which is expected to increase the number of chemistry courses and other STEM subjects on the platform, as well as improve the functionality of the system.
The second project to gain additional state support was the inclusion of $25 million in the California Community Colleges budget for the expansion of the Program Pathways Mapper project (also known as Program Mapper). The Program Mapper project produces visually appealing and user-friendly maps of intersegmental curricular pathways at and between 2-year and 4-year institutions to help students choose their pathway, facilitate streamlined transfer between segments, and reduce excess units taken on the path to degree or program completion. Prior to its inclusion in the 2022 Budget Act, 42 CCCs, 6 CSUs, and 1 UC had already committed to bringing Program Mapper to their campus, and early data from Bakersfield College (the original campus to develop and implement Program Mapper) demonstrated effectiveness in increasing the percentage of students who are “on-path” to transfer in two years.

Golden State Awards

In the coming year, Learning Lab will launch, in consultation with the Governor’s Office, the Golden State Awards Program supported by $10 million in one-time state funding. Authorized in the 2022 Budget Act, the Golden State Awards Program is designed to recognize and reward high-impact innovations that are either based at, or associated with, a public college or university in California. By elevating and celebrating innovations, a new generation of innovators will be inspired to impact the state’s biggest challenges related to climate resilience, social justice, economic growth, and/or other areas. Innovations eligible for award will demonstrate potential to be scaled across the state.

Learning Lab will leverage its four years of grantmaking experience to award at least six grants for innovative efforts, working closely with a Selection Committee comprised of 12 members appointed by the Governor, Senate President pro Tempore, and the Assembly Speaker. Activities will include developing award criteria and a competitive grant award structure, in addition to supporting outreach efforts. Funds will be disbursed by June 30, 2025, and Learning Lab will submit a final report on the program to the Director of Finance and the Legislature by January 2026.

Curated Resource Library & Professional Development Portal

Another result of progress toward and completion of funded projects is the production of tangible resources. A requirement of all Learning Lab funded projects is that they make the final course and course series, and/or technology/platforms enabled with Learning Lab funds to be available as open educational resources. “Open educational resources” include, but are not limited to, full courses, course materials, modules, textbooks, faculty-created content, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.

The authorizing statute was forward-thinking and addresses the eventuality of Learning Lab acquiring such resources from projects, and encourages two related activities. The first activity is for Learning Lab to curate a resource library to include online and hybrid courses or course resources. The second activity is for Learning Lab to consider awarding funds for professional development to faculty who are interested in adopting successful courses/course materials developed or redesigned through Learning Lab funding.

To respond to both of these statutory goals, Learning Lab is exploring the creation of a curated resource library and a platform where California faculty can participate in real-time professional development opportunities where they can receive credit/stipends for their participation, and a single place where faculty from California and across the country can access materials that are produced by Learning Lab projects to adopt/use in their own context.
As we look ahead to 2022-23, Learning Lab is immensely grateful for the partnership of the state, UC, CSU, and CCC administrative leadership, as well as the countless faculty who have navigated the challenges that COVID and the post-COVID era have brought. New challenges like the great resignation, inflation, technology sector layoffs, learning loss, and new artificial intelligence like ChatGPT—make this a time of tremendous change but also present opportunities to newly discover how best to deliver higher education and the learning and skills necessary not just for a strong and equitable economy, but a strong and equitable democracy.

While Learning Lab’s role in this universe is limited, we are committed to maximizing our influence as a program through partnership, convening, and collaboration, as well as direct funding of projects and initiatives that are designed to make a difference in the structures of higher education that will support equitable and enduring change. The Newsom Administration’s compacts for the three segments of higher education, the state budget, and legislation will serve as guideposts for Learning Lab’s future initiatives and efforts.

California Education Learning Lab

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