To the Members of the Legislature:

I am pleased to present you with the 2020-2021 Annual Report for the California Education Learning Lab. This report covers Learning Lab’s third year of operation, between Fall 2020 through 2021.

During this time, Learning Lab achieved several significant milestones: our grant community grew by 50 percent, and we increased our funding commitment from $18.5 million to almost $25 million. Twenty out of 23 California State University campuses and 43 out of 116 California Community Colleges are participating in one or more Learning Lab funded projects, in addition to all 9 University of California undergraduate campuses. Our partnership with the Foundation for California Community Colleges, launched in August 2020, has proven highly beneficial, and we expect it will prove even more fruitful in the years ahead.

In 2021, Learning Lab initiated a strategic planning process and outlined three strategic goals for the year. Our primary aim is to amplify the success of our grantees and expand their reach, so that more students can benefit from these advances.

Not surprisingly, 2021 continued to be a challenging year for all grantees as college instruction underwent a third evolution with a return to in-person learning for some but not all, and pandemic management continued to be a top priority for many communities. Nonetheless, our grantees showed tremendous resilience and found ways not only to sustain momentum, but find further avenues for productive collaboration.

Learning Lab owed much of the year’s progress and successes to the new Advisory Council, which was convened in August 2020 and included higher education experts across the spectrum—from members with deep institutional and systems knowledge to experts in diversity, equity and inclusion, with all members embracing the innovation and change agenda. Additionally, our outstanding Selection Committee members convened for our first ever Grand Challenge took constructive feedback to new heights, ensuring that our Grand Challenge projects have high potential for success—especially for supporting our Black/African American, Latinx, Native American, and first-generation students. Lastly, our partnership with Just Equations generated an important new resource for operationalizing strategies for STEM equity, which will help advance Governor Newsom’s goals to ensure that historically underrepresented students are not left behind, but will be central to California’s preeminent role in fighting climate change and driving new economic opportunities.

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. We look forward to reporting even greater success next year!

Sincerely,

Lark M. Park
Director, California Education Learning Lab
January 2022
Learning Lab Overview

In 2018, Assembly Bill 1809 established the California Education Learning Lab (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, 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.

Unlike other grant programs that support the development of online courses, course improvement, or supplemental programs dedicated to closing equity gaps, 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 education theory and practice for the benefit of all students.

As Learning Lab enters its fourth year of operation, the program continues to grow its community, pursue improvements to grant offerings, and expand its reach.
Our Team

Learning Lab is run by a small team of driven, adaptable, individuals that are committed to improving equity and achievement across California’s public higher education segments. Learning Lab operates in consultation with the Director and Chief Deputy Director of OPR, and an eight-member advisory council. Learning Lab is additionally supported by both OPR and Foundation staff.

Our Mission

Learning Lab’s mission is simple: improve learning outcomes and close equity gaps to increase student success in California public higher education. Learning Lab operates on the premise that all students are capable learners with potential for success given the right conditions, supports, and motivations, and that faculty are our greatest resource in helping students meet their goals—and that innovation begins with them.

For that reason, Learning Lab aims to leverage faculty innovation, the science of human learning, and robust technology tools to achieve success at scale, which will result in a new generation of graduates that are ready to tackle big problems, respond to the state’s evolving workforce needs, and, ultimately, pave the way for a stronger and more equitable California.

Our Theory of Change

Learning Lab works across 5 areas to create a virtuous cycle to move public higher education.

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

**THEORY AND RESEARCH**
Contribute to the field of human learning through funded projects and disseminate findings to faculty and other stakeholders.

**COMMUNITY**
Foster collaboration across public higher education institutions and build community of practice among faculty.

**EDUCATIONAL PRACTICE**
Collect and promote best teaching and learning practices (e.g., inclusive, culturally relevant pedagogy).

**EDUCATIONAL POLICY**
Leverage findings/evidence from Learning Lab projects to influence California educational policy.

Learning Lab seeks to achieve its mission by driving the feedback loop between educational research, practice, and policy to “turn the wheel” of the large public higher education ecosystem.
Our History

In 2020-21, Learning Lab achieved the following:

- Launched the very first Learning Lab Grand Challenge.
- Awarded an additional $6.2 million to 9 project teams.
- Awarded the very first Cohort Facilitator for Calculus Grand Challenge grantees to build community and share resources.
- Launched a new enhanced website, including a grantee portal, and established Learning Lab’s presence on social media channels (Slack, YouTube, LinkedIn, Twitter).
- Published a companion research report, in collaboration with Just Equations, to support a new grant opportunity (Seeding Strategies).
- Grew Learning Lab’s grant community by 50 percent, from 150+ to 225+ faculty and key personnel involved in Learning Lab projects.

Partnership with the Foundation for California Community Colleges

In August 2020, the Governor’s Office of Planning and Research entered into a partnership agreement with the Foundation for California Community Colleges, 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 the Foundation’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.
Learning Lab kicked off the 2020-2021 grant year with a new cohort of advisors. Selected for their experience across the California Community Colleges, California State University, and University of California systems, and higher education broadly, Learning Lab’s 2020-21 advisors brought deep expertise in the science of human learning, institutional change, racial and gender equity, and 21st century education technologies. Learning Lab worked in partnership with the following advisors to guide the development of the 2020-21 grant opportunity and Learning Lab’s activities for the year.

2020-2021 Advisory Council
For more information about Learning Lab’s 2020-2021 advisors, click on their names below.
2020-2021 Grand Challenge

The 2020-2021 grant year saw several changes to the grant model. Drawing on expert advice from its Advisory Council, Learning Lab devoted significant time homing in on a single STEM area on which to focus, and also pursued innovative aspects from other successful grant programs, such as the Howard Hughes Medical Institute’s Inclusive Excellence awards.

In November 2020, Learning Lab announced its 2020-21 grant opportunity, Grand Challenge: Overcoming the Calculus Barrier to STEM Success. Learning Lab chose the introductory calculus sequence as its first Grand Challenge because calculus is considered to be foundational to many STEM fields, and the sequence of courses currently poses considerable barriers for prospective students, with retention gaps especially prevalent for Black/African American, Latinx, Native American, and Pacific Islander students. Through this RFP, faculty teams across California’s public higher education segments were encouraged to reconceptualize the role of and approach to calculus in introductory-level STEM disciplines.

As a new programmatic approach, Learning Lab designed the funding opportunity around a cohort model, where awardees would form the Grand Challenge Cohort to share ideas, approaches, findings, data, and outcomes throughout the award duration. The Grand Challenge also tasked the cohort with developing model curricula, pedagogical approaches, and professional development components by the end of the three-year grant period, in addition to executing on respective project deliverables. A companion funding opportunity was announced for a Cohort Facilitator to foster collaboration among awardees and shepherd the final cohort deliverables.

Grand Challenge applicants were required to include the following components that uniquely reflect Learning Lab’s approach to improving student outcomes and closing equity gaps and also meet the core requirements of the Learning Lab program outlined in Assembly Bill 1809 (Chapter 33, Statutes of 2018):

- Consist of an intersegmental team: Applicant teams were required to include PIs and/or co-PIs from at least two institutions within the CCC, CSU and UC segments to draw from diverse faculty experiences and enable more widespread adoption of innovative solutions.

- Impact the intersection of calculus and the STEM first-year introductory experience: Projects were to focus on students’ first year experience, broadly defined as the time leading up to college all the way through the end of the first academic year, and address either the calculus sequence directly or reimagine the role of calculus in STEM majors where calculus is a prerequisite.

- Work to improve learning outcomes and close racial and gender equity gaps in STEM: Teams were to provide data regarding existing equity gaps on their campuses and show potential to improve learning outcomes and close equity gaps for undergraduate STEM students. Projects were also required to meet statutory criteria by incorporating the science of human learning and aspects of adaptive learning, and improving online or hybrid course environments, broadly defined.

- Support and endorsement from leadership: Applicants were required to include the endorsement of the host institution’s president, chancellor, vice chancellor/vice president of instruction, or provost or equivalent, as well as the endorsement of partnering institutions.

2020-2021 RFP Enhancements

- Requirement to attend Learning Lab sponsored webinar on equity in higher education

- Requirement to provide self-assessment on preparedness to undertake the Grand Challenge

- Introduction of Cohort Facilitator model and additional deliverables

- Technical assistance webinars and assistance finding potential partners

- Detailed written feedback from Selection Committee for funded and non-funded proposals
Additionally, as part of the application process a PI or co-PI was required to participate in at least one webinar sponsored by Learning Lab on racial and gender equity (see Equity Webinar Series). Eligible applicants could apply for funding between $1 million to $1.5 million over three years. For the Cohort Facilitator award, eligible applicants could apply for a $500,000 grant award over three years.

Grand Challenge applicants were required to file a Statement of Intent and participate in a two-stage competitive proposal process. Meanwhile, Cohort Facilitator applicants were required to file a Statement of Intent and submit a Cohort Facilitator Application and Follow-Up Questionnaire. Learning Lab formed a Selection Committee, comprised of field experts with aligned experience (see Selection Committee below), who were responsible for assessing proposals according to published rubrics, deliberating as a group, and making funding recommendations to the Director of OPR.

### 2020-2021 Selection Committee Members

For this grant opportunity, Learning Lab recruited a seven-member selection committee with knowledge of and experience with contemporary calculus and STEM curricular reform efforts, as well as STEM faculty professional development, in addition to having a demonstrable commitment to diversity, equity, inclusion, and student success. The empaneled Selection Committee collectively represented the University of California, California State University, California Community Colleges, and a national higher education organization committed to excellence in undergraduate STEM education. The Selection Committee represented current math teaching faculty, math department leaders, math education leaders, educational equity experts, and faculty with related expertise in STEM fields that rely on calculus or often include calculus as a prerequisite for degree attainment in that field. Selection Committee members included:

**STEVE BENNOUN**  
Lecturer, Department of Psychology, UCLA  
Expertise includes redesigning mathematics courses to establish consistent use of active learning; assessing the impact of curricular changes; teaching strategies that improve student learning in college math and science courses; assessing the impact of curriculum reforms; faculty development programs; and evidence-based teaching.

**JANET BOWERS**  
Emeritus, San Diego State University  
Expertise includes redesigning precalculus and calculus curricula to incorporate input from content discipline partners; creating new pathways for students in STEM disciplines to consider teaching as a career; students’ development of mathematical understandings supported through advanced technologies; and students’ development of deeper conceptual understandings of lower division math concepts.

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

**JEFFREY STOPPLE**  
Associate Vice Chancellor for Undergraduate Education and Professor of Mathematics  
Expertise includes Analytic Number Theory, which uses calculus and complex numbers to study the distribution of the primes; mathematics of computation; and undergraduate education/math education.
GANESH RAMAN  
**Assistant Vice Chancellor for Research, CSU Chancellor’s Office of Research**  
Expertise includes aeroacoustics and flow control; mentoring faculty in writing competitive proposals; streamlining research data; research, education, accreditation, and philanthropy; leadership in multidisciplinary education and research; and mechanical and aerospace engineering.

SATHYA NARAYANAN  
**Professor of Computer Science, CSU Monterey Bay**  
Expertise includes building actionable pathways that enable students from low-income communities to earn a quality computer science education and compete for opportunities in the tech industry; development of a cohort-based model in computer science that has increased retention, transfer, graduation, and job placement for first-generation, low-income, and underrepresented minority students.

KELLY MACK  
**Vice President, Undergraduate STEM Education & Director of Project Kaleidoscope, AAC&U**  
Expertise includes training and education of STEM students; inclusion and excellence in STEM education; implementation of culturally relevant pedagogies; national STEM reform efforts; STEM faculty leadership development; institutional transformation initiatives; professional development; mindfulness and STEM faculty self-efficacy; physical and virtual learning platforms; physiology; endocrinology; and cancer research.

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**Grand Challenge Awards**

For this grant opportunity, 14 project teams (representing 36 institutions) submitted proposals at the concept stage (out of 18 teams that submitted Statements of Intent). Nine projects were recommended to move to the full proposal stage, representing 23 institutions of public higher education. Unique institutions included 11 CCCs, 8 CSUs, and 4 UC campuses. All 9 projects submitted full proposals reviewed by Selection Committee members, resulting in a recommendation for 4 full awards, which were presented to and approved by the Director of OPR in May 2021. The 4 awarded projects represent 10 institutions of public higher education, including 4 CCCs, 3 CSUs, 3 UC campuses.

**A New Math Gateway**

**Award: $1,275,000 | Partners: UC Riverside, Saddleback College, Yuba College**

This project reconceptualizes how calculus is taught and aims to provide a wide and inclusive STEM gateway for a diverse future generation of engineers, mathematical scientists, physical and biological scientists, and medical scientists. The project’s goal is to help students understand the mathematical principles fundamental to Calculus so that they have a strong intuitive grasp of the mathematical theory, and so that they can solve STEM problems involving continuously varying quantities. This project will develop an e-Book to implement a novel series of principle-based calculus concepts with revised content, video tutorials, and active learning pedagogy to meet these educational goals.

**BioCalc PEA Preparation, Engagement, and Application**

**Award: $1,400,000 | Partners: UC Irvine, CSU Fresno, CSU Fullerton**

Designed to bridge the disconnect between existing Calculus for Life Sciences courses and biology coursework, the BioCalc PEA program will develop a three-pronged curricular framework, which will include first-year experiences (FYE’s) and summer academies for bioscience students; a revamped BioCalculus curriculum, crafted to meaningfully include active learning techniques and genuine biological modelling; and Calculus-based mathematical modeling and computation into several upper-division bioscience courses at the three universities. A major deliverable will be a full BioCalculus course package (complete with videos, notes, active learning worksheets, online assessments, and projects) that will replace the traditional textbooks and be adopted as the BioCalculus “textbook,” and be made freely available to students.
Equitable Calculus for Life Sciences

Award: $1,250,000 | Partners: CSU Northridge, LA Mission & LA Valley Colleges

Existing Calculus courses often overlook applications, the relation of material to students’ future careers, and the impact of knowledge on local and global communities. This project will develop a new Calculus for Life Sciences course that incorporates culturally responsive pedagogy, contextualization of mathematical content, active and adaptive learning, gamification, and utility value (UV) interventions. The project will foster underrepresented students’ motivation and STEM identities. A near-peer mentorship program will be developed to build student communities and to strengthen the STEM transfer pipeline. Professional development resources will be designed to train faculty members in equitable and inclusive teaching, active and adaptive learning, and in using UV strategies to ensure student success.

“Why, What and How” Calculus

Award: $1,400,000 | Partners: UC Merced, CSU Fresno

This project will redesign introductory Calculus courses to focus on conceptual understanding and problem-solving skills by incorporating active learning strategies, collaborative problem-solving activities, applications-oriented content that enables students to easily transfer acquired knowledge and skills to subsequent STEM courses, and culturally responsive instruction, support systems, and learning environment to reduce math anxiety and promote sense of belonging, math interest, self-efficacy, and STEM identity. The project will also develop training and support systems to transform instructors’ and overall departmental culture to embrace innovative teaching methodologies and research-based learning strategies and to promote a growth mindset, equity-based grading practices, and teaching across cultural strengths.

Grand Challenge Cohort Facilitator Award

For the Cohort Facilitator funding opportunity, Learning Lab received 6 applications (out of 8 Statements of Intent filed), 3 of which were recommended to the next stage. The team selected as the Cohort Facilitator is led by the University of California Office of the President with UC Santa Cruz, CSU Monterey Bay, and Lake Tahoe Community College as partners.

Unique to the Grand Challenge, the Cohort Facilitator award presents strategic opportunities for the 3 segments of California higher education to work together. Under the banner of “Convene, Connect, Collaborate” or “C3,” the team is poised to share collective knowledge, skills and experience to support student success, particularly for women and minoritized students, in STEM courses, majors and careers. The C3 team of 5 principal and co-principal investigators brings together mathematicians, learning theorists, instructional design experts, policy advocates, and nationally recognized leaders in Diversity, Equity and Inclusion (DEI), all with extensive experience in higher education. The overarching goal of the C3 team is to help Grand Challenge cohort teams reconceptualize the role of and approach to calculus in students’ first year introductory STEM experience, as well as to support new, innovative ways to teach calculus, or reimagine the role of calculus in STEM majors where calculus is a prerequisite. The C3 team will use a variety of strategies to accomplish these goals over the cohort period, with planned opportunities to receive feedback from cohort teams about what are most effective tools for collaboration and forums for convenings.
Grand Challenge Prototype Awards

To encourage applicant teams that submitted promising proposals (i.e., projects that advanced to the second, full proposal stage but did not receive a full award), Learning Lab invited the submission of a revamped, condensed proposal to develop a prototype of their project for which they could receive up to $100,000 over one year. Of the 5 teams invited, 4 accepted, resulting in a quartet of Grand Challenge prototype awards that will contribute important knowledge and understanding of how to support student success in the Calculus course sequence for STEM majors. (See table below for details.)

<table>
<thead>
<tr>
<th>Name of Project</th>
<th>Institutions</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calc-Boost</td>
<td>CSU San Marcos (host), MiraCosta College</td>
<td>Calc-Boost will leverage the support of trained peer educators, personalized study modules, and active learning sessions in inter-semester programming to boost success for students transitioning from Calculus I to Calculus II.</td>
</tr>
<tr>
<td>Grading for Growth in Calculus</td>
<td>CSU Monterey Bay (host), Hartnell College</td>
<td>This project will implement standards-based grading in multiple sections of Calculus I at California State University, Monterey Bay and at Hartnell College.</td>
</tr>
<tr>
<td>Access for Equity: Reimagining Calculus Education through Mobile-Friendly Course Design</td>
<td>Bakersfield College (host), CSU Sacramento, UC Riverside</td>
<td>This project will develop a mobile-first online Calculus course shell that will be made freely available on Canvas Commons.</td>
</tr>
<tr>
<td>Expanding Students’ Affect, Understandings, and Perceptions of Relevance through Realistic Tasks in Calculus</td>
<td>CSU Long Beach</td>
<td>The focus of this project will be on developing realistic (context-driven) curricular innovations to transform students’ experience of Calculus I at CSULB.</td>
</tr>
</tbody>
</table>
Summary of All Grant Projects

With the addition of Grand Challenge projects and prototype projects, Learning Lab’s total number of active grants under management grew to 39.

Table 1: Comparison of Learning Lab’s Grant Opportunities

<table>
<thead>
<tr>
<th>Award Year</th>
<th>Grant Opportunity</th>
<th>Award Amount</th>
<th>Duration</th>
<th>Applied</th>
<th>Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018-2019</td>
<td>Innovation grants</td>
<td>$1,000,000 to $1,300,000</td>
<td>3 years</td>
<td>42</td>
<td>6</td>
</tr>
<tr>
<td>2018-2019</td>
<td>Proof-of-Concept grants</td>
<td>$500,000</td>
<td>3 years</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>2019-2020</td>
<td>Innovation grants</td>
<td>$1,000,000</td>
<td>3 years</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>2019-2020</td>
<td>Professional Development grants</td>
<td>$200,000</td>
<td>2 years</td>
<td>16</td>
<td>5</td>
</tr>
<tr>
<td>2019-2020</td>
<td>Seed grants</td>
<td>$100,000</td>
<td>2 years</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>2019-2020</td>
<td>Institutional Change grants</td>
<td>$500,000 to $650,000</td>
<td>2-3 years</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>2020-2021</td>
<td>Grand Challenge grants</td>
<td>$1,250,000 to $1,400,000</td>
<td>3 years</td>
<td>14</td>
<td>4</td>
</tr>
<tr>
<td>2020-2021</td>
<td>Grand Challenge Cohort Facilitator grant</td>
<td>$500,000</td>
<td>3 years</td>
<td>6 teams</td>
<td>1 team</td>
</tr>
<tr>
<td>2020-2021</td>
<td>Grand Challenge Prototype grants</td>
<td>$100,000</td>
<td>1 year</td>
<td>5 projects invited</td>
<td>4 projects</td>
</tr>
</tbody>
</table>

**Innovation grants** support projects that develop curricular and pedagogical innovations aimed directly at students in lower-division STEM courses. In 2019-2020, innovation grant eligibility was expanded to projects that lead to curricular and pedagogical change through the creation of innovative, large-scale faculty professional development programs.

**Proof-of-Concept** projects applied under Innovation grants, but received a lesser award based on their perceived state of readiness.

**Professional Development grants** support the creation, refinement, or expansion of faculty professional development programs that aim to improve learning outcomes and close equity gaps in undergraduate STEM courses.

**Seed grants** support project teams that are in the early stages of project design. Examples of concrete deliverables from these grants include, but are not limited to, proof-of-concept testing, data collection and analysis, or development of pedagogical/curricular resources.

**Institutional Change grants** support efforts that reduce institutional barriers and/or foster institutional contexts to advance undergraduate STEM success, improve online and hybrid course environments, and close equity gaps for students.
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**

For the first 3 years of operation, Learning Lab targeted funding specifically toward STEM disciplines, which the program defined as all physical and biological sciences (including earth and environmental science) as well as computer/data science and math/statistics. To date, the program is well balanced across disciplines, apart from an overconcentration in mathematics, which is the result of the focus on Calculus in this year’s grantmaking. (See graphic below.) Additionally, several of the currently funded projects work across multiple STEM disciplines: 6 teams span 2 STEM fields, and 6 project teams span 3 or more STEM fields, which are labeled as interdisciplinary. (Note: projects spanning more than 1 discipline are counted in both fields.)

Given the Grand Challenge’s focus on transforming either the Calculus sequence directly or reimagining the role of Calculus in STEM majors where Calculus is a prerequisite, there was an increase of 8 projects in math and statistics and 2 additional projects in biology, from the previous year’s totals.

**Geographic and Segmental Distribution**

Eighty institutions across and beyond California are currently partnering in 39 projects funded by Learning Lab, a 14 percent increase in the number of institutions over the previous year. These include all 9 undergraduate UC campuses, 20 of the 23 CSU campuses, and 43 of the 116 CCCs. Notably, during the 2020-2021 grant cycle, the UC Office of the President became a Learning Lab awardee and joined 2 other statewide institutions participating in Learning Lab projects—the Academic Senate for California Community Colleges and the CSU Chancellor’s Office (participating in multiple projects). In addition to CCCs/CSUs/UCs, project partners include Oregon State University, University of Virginia, Carnegie Mellon University, and Stanford University, as well as one public high school (University High School).

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**Figure 2: California Public Higher Education Institutions Participating in Current Learning Lab Projects**

(View a zoom-enabled version of this map).

**Interactive Dashboard**

Learning Lab developed an interactive dashboard in Tableau that geographically locates partnering institutions across current projects, including search functions by funding year, segment, project affiliation, region, and discipline. The dashboard is accessible through the Learning Lab website.
Geographically, Learning Lab’s awarded institutions largely track California’s population, as shown in Table 2. For more information regarding geographic and segmental distribution, refer to Figure 2 and the interactive dashboard on the previous page.

Table 2: California Public Higher Education Institutions Participating in Learning Lab Projects by Region

<table>
<thead>
<tr>
<th>Region</th>
<th>Number of partner institution</th>
<th>Number of unique partner institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Los Angeles</td>
<td>24</td>
<td>15</td>
</tr>
<tr>
<td>Orange</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>San Diego</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Bay Area</td>
<td>30</td>
<td>19</td>
</tr>
<tr>
<td>Central Coast</td>
<td>11</td>
<td>6</td>
</tr>
<tr>
<td>Central Valley</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>Inland Empire</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>North San Joaquin Valley</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Sacramento</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>North Coast</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Statewide Entities*</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>134</strong></td>
<td><strong>75</strong></td>
</tr>
</tbody>
</table>

* A Statewide Entity is considered a UC, CSU, or CCC office that serves the entire segment and so cannot be attributed to a region per se.
Funding Distribution

Learning Lab’s annual budget of $10 million in 2018-19 and 2019-20 primarily funded grant awards (minus program administrative costs). Learning Lab awarded approximately $9 million in the 2018-19 fiscal year and $9.5 million during the 2019-2020 fiscal year. For fiscal year 2020-21, Learning Lab reduced its grantmaking in order to meet the administrative directive to reduce state agency expenditures during the pandemic and awarded roughly $6.2 million, bringing total committed funding to date to $24.7 million.

Funding by Segment

Across the segments, UC and CSU received a significantly larger share of Learning Lab funding in the 2020-21 award cycle (see Figure 3), with 52% and 31% awarded to these segments, respectively, while only 18% went to CCCs. Cumulative distribution across 3 grant years shows UCs with 35% of all committed funds, CSUs with 34% of all committed funds, and CCCs with 27% of committed funds. The remaining funds went to other project partners, including other university systems and nonprofits.

Regarding the lower proportion of funding that has been awarded to community colleges over both the last grant cycle and cumulative 3 years, Learning Lab believes CCCs’ lack of administrative capacity has constrained its ability to apply as host institutions and also competitively apply for funding. Host institutions generally receive more funding to cover costs such as convenings and distribution of faculty participant stipends.

As a point of comparison, 61% of grant funding is awarded to host institutions while 39% is distributed as subawards. Currently, 7 projects are hosted by CCCs, 16 by CSUs and 16 by UCs. This is a significant proportional change from the first year, where 3 CCCs, 4 CSUs, and 2 UCs served as host institutions. It is worth noting that of the 7 projects hosted by CCCs, 4 are hosted by different community college districts and the remaining 3 projects are hosted by 2 community college campuses. (A single campus is the host for 2 different projects.)

To remedy this disparity, Learning Lab is actively seeking to help community colleges increase its grants capacity, and is also tailoring the Seeding Strategies grant opportunity to fund a large number of CCCs. (See Looking Ahead.)

1A host institution is a college or university that serves as the grantee and fiscal intermediary for purposes of grant administration.
Funding by Category
Learning Lab grants primarily support personnel (71%) and consultant (10%) costs as shown in Figure 4. Due to COVID-19, project travel budgets were reduced significantly, only allowing for trips deemed essential to project success. Two percent of grant funds are currently allocated to travel for the purposes of project dissemination, such as at major conferences, or in the context of smaller convenings or workshops.

Figure 5: Grant Allocation by Budget Category

- Personnel, 71%
- Consultants, 10%
- Other Direct Cost, 8%
- Indirect Cost, 7%
- Material Supplies, and Equipment, 2%
- Travel, 2%

Funding by Discipline
Currently, 40% of the project funding is allocated to support initiatives that span 2 or more fields. Projects focusing on multiple disciplines were awarded as part of the Innovation, Institutional Change, and Professional Development grant opportunities, whereas Seed grant funding largely supported single-discipline projects focused on computer/data science, biology, and math/statistics. Grand Challenge grant funding supported projects in math/statistics and biology.

Figure 5: Distribution of Awarded Grant Funds by Discipline

- Math & Statistics: 23%
- Chemistry: 14%
- Biology: 4%
- Interdisciplinary: 16%
- Two Fields: 24%
- Physics & Engineering: 11%
- Computer & Data Science: 8%
- Chemistry + Biology 4%
- Biology + Math & Statistics 11%
- Chemistry + Physics & Engineering 4%
- Math & Statistics + Computer & Data Science 5%
Grantee Highlights

Highlights of Awarded Projects

Every 6 months, Learning Lab checks in with project teams to discuss overall progress, successes to date, unanticipated barriers, necessary pivots, and new opportunities. In February and September of 2021, Learning Lab conducted project check-ins with 30 grant teams (minus Grand Challenge and prototype awardees, who began their projects on July 1, 2021). For the most recent reporting period (annual reports submitted in Summer 2021), several Learning Lab funded projects reached major milestones in their project’s development and were able to demonstrate early signs of impact. While COVID-19 forced almost all faculty teams to adjust some aspects of their projects (see Project Barriers section), all teams were able to forge ahead. The following is a high-level summary of project gains in teaching and learning, success in deploying educational technologies, and new opportunities for broader impact.

Teaching and Learning

Student success and addressing the affective domain

A number of funded projects are aiming to improve student success by addressing the affective domain—that is, the feelings, emotions, and attitudes that students have related to their experiences in STEM. Projects have taken a variety of approaches to improve students’ sense of belonging and interest in STEM courses and are seeing some success.

In one project (A Hybrid Approach), a team of faculty redesigning biology lab courses have reported significant increases in students’ connection to their classmates, ability to do research independently, and ability to identify scientists with whom they relate. Meanwhile, faculty developing a “Coding Community” (an online platform where underrepresented minority students in computing can share examples of how coding fundamentals can be demonstrated in contexts relevant to their own lives) featuring brief video demonstrations by Black, Indigenous, and People of Color (BIPOC) and female students—have demonstrated greater improvements in students’ affective outcomes in a course offering with these learning.

In similar recognition that equity gaps are pronounced in computer and data science, one faculty team is Creating New Pathways to Computing by launching new courses centered on project-based learning, with a focus on student diversity and integrating other academic domains. Preliminary findings suggest that this redesigned introduction to computer programming and data science is rating higher in inclusivity, student sense of competence, and engagement.

Attending to faculty professional development

While many projects are focused on testing student interventions, others have focused on the role of faculty as important agents of change in need of new knowledge and skills to better support student success. Driven by the desire to support and attend to STEM faculty experiences, projects like the Humanizing STEM Academy have taken faculty through intensive trainings to help faculty build positive instructor-student relationships, integrate kindness cues of social inclusion, validate students, and then leverage these positive relationships to hold all students to a high standard and empower learners to achieve their full potential. Faculty who participated in these trainings have described it as the best professional development they have ever received, with some experienced educators stating they realized they were “missing big pieces about equity, engagement, and empathy in my instruction.”
Two projects have been successful in building communities of STEM faculty who seek to close equity gaps by engaging STEM students in deeper active learning (Deeper Math Learning and Equity in STEM). Faculty are supported to think through and plan for how to explicitly teach students how to read and problem solve in context. They are provided time and space to redesign lessons and gain experience using digital instructional tools and are encouraged to adopt culturally relevant and high-intensity active learning techniques in online and remote environments.

Through their project, the team has curated text-based activity plans, authored by CCC and CSU instructors, and organized them in an online repository, which should equip instructors with easy-to-access tools to help students gain confidence and independence as they grapple with disciplinary texts that will help them better learn important disciplinary concepts in STEM.

Educational Technologies

Prioritizing student success through new or improved educational technologies has been the approach of many Learning Lab grant projects, and, again, teams are demonstrating significant progress in developing and deploying these technologies with positive effects.
Faculty and students on Learning Lab project teams have generated thousands of questions to be used in adaptive learning platforms that have been either developed or improved upon through Learning Lab funding. As a result, students across California’s public higher education systems should have increased access to better technology tools and platforms that promote mastery learning in STEM courses.

Courses that use these new technology platforms to reorient homework and tests have had positive impacts on students. The following commentary from students affiliated with one Learning Lab project, (Reorienting Assessments toward Mastery Learning) implementation demonstrates that when high-stakes, high-stress environments are minimized, students feel like their own learning is prioritized.

In addition to the direct impact on students, projects focusing on educational technologies are also on track to produce high-value, open-access resources for faculty. Two projects in particular provide examples of the types of faculty-oriented resources that are emerging from Learning Lab projects. One project, (Implementing and Testing Adaptive Learning) has developed an open-access alternative to a high-cost textbook and homework system that allows faculty to access indexed libraries of questions and solutions so instructors can choose appropriate problems and generate online assignments for their students. The combination of the open-source textbook and problem set libraries with online solutions and grading provide a low-cost alternative to the publisher packages for introductory physics that typically cost hundreds of dollars per student and limit flexibility for faculty to customize their instruction and assignments.

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"For once, I felt like an exam actually helped me understand everything better and tested me on that, rather than testing my ability to cram."

"[PrairieLearn] allows you to be able to see the concepts in different problems, where you may not see it in one question, you can see it in another then apply it to ones you may have missed."

- Students using PrairieLearn

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2Adaptive learning is defined by statute to mean “a technology-mediated environment in which the learner’s experience is adapted to learner behavior and responses.” Learning Lab uses this term broadly to describe deploying technology to better understand learner experience/learner gaps and assets, and to modify learning environments, pedagogical approaches and/or available resources to produce better learning outcomes across the broad range of students.
Another project, (ADAPT + LibreTexts) has taken a pre-existing open-source textbook platform called LibreTexts and built a complementary open-access adaptive learning platform that allows editing by instructors to meet the unique needs of their students and classrooms. One of the encouraging features of this project is that LibreTexts is already California’s most popular resource for students accessing chemistry content (anticipated to reach 1 billion visitors in the near future), so the complementary adaptive learning homework system provides faculty with a well-established and highly functional platform to reach many thousands of students.

Broader Impacts

In addition to the achievements and benefits connected to the core goals of the funded projects, some unique indirect benefits have emerged from the work of Learning Lab projects. Some projects have observed students uniquely benefiting from the intersegmental nature of Learning Lab projects, like the students at El Camino College, Cal State Long Beach, and UC Berkeley who are supporting the development of paradigm-based question generators for computer science courses, (Reorienting Assessments toward Mastery Learning). The project leadership noted that the opportunity for community college students to work on an innovative research project was not only a novel experience for many of them, but an exciting and inspiring one.

Another project has seen the relevance of their work extend beyond their original expectations. CourseKata’s online interactive textbook for introductory statistics is designed as a modern approach to statistics that incorporates data science. Built to support higher education faculty at the UCs, CSUs, and CCCs, the response from CCC faculty has been especially robust based on the impact of AB 705 and the growth of student enrollment in statistics courses—and now K-12 teachers and administrators are also showing interest in using CourseKata in high schools.

“I’ve learned I’m capable of more than I think, and that I want my future in computer science. Math is my first love, but computer science is a beautiful way to express it.”

“This internship has been such a beneficial experience for me. The work is intuitive, challenging, and fun to do. All my peers are some of the brightest and kindest people I have met ever and all the professors are super supportive and work hard behind the scenes to make this the best possible experience. Overall, I feel I have gained skills in teamwork, coding, organization, and problem-solving that will benefit me throughout college and beyond.”

- Students from El Camino College
**Project Barriers**

Despite the impressive progress many projects have shown, project teams have not had an easy path to success. While COVID-19 was and continues to be a source of disruption, many barriers exist that are unrelated to the challenges that the pandemic introduced. In Learning Lab’s project check-ins, candid conversations revealed substantial roadblocks that faculty teams have had to overcome or are still working to overcome in some cases. These insights into barriers, coupled with the stories of success, have helped inform Learning Lab’s understanding of the conditions for successful project implementation. They also serve as a testament to faculty adaptability and persistence and a guidepost for Learning Lab’s current and future grantee community.

Three themes emerged regarding the types of challenges that project teams have faced over the past year: continued impact of the coronavirus pandemic, institutional limitations, and the complexities of developing adaptive learning technologies.

**Impact of Coronavirus Pandemic**

Ongoing challenges with engaging students in online instruction and group activities originally planned for in-class instruction continued for many projects over the 2020-21 academic year. In Fall 2021, some institutions began shifting courses to in-person instruction which raised new challenges. For example, a project designed to improve outcomes in discrete mathematics called for developing and implementing innovative and research-based, active learning and group-based approaches, and adaptive learning technology, for in-person courses. The project’s pilot phase included “alpha testing” in Spring 2021. Due to the pandemic, the team had to quickly develop all materials for use in a live online setting and gain skills in technological tools such as Google Drive, Jamboard, and other cloud-based technology for the Spring pilot. After the term, the team proceeded to improve these materials with feedback that was collected in the alpha phase, while also needing to pivot again to redesign materials for face-to-face instruction to accommodate the planned transition back to in-person instruction in Fall 2021.

The decline in student enrollment in 2020-21, pronounced in the community college system, prominently impacted those projects for which entire courses were canceled and with little notice, resulting in reduced sample size for data collection or delays in project rollout. This impact varied by project and region. Additionally, several projects had to modify their research design as a result of transitions caused by the pandemic, either needing to change assessment protocols or eliminating control groups as initially planned.

Difficulty recruiting students and faculty was a recurring theme among institutions from all 3 public higher education segments. Teams struggled with recruiting students to participate as project staff or to engage in surveys. Project teams pointed to student burnout, stress, and balancing work, school, and family obligations. For a team developing adaptive learning technology and incorporating active learning in introductory engineering courses, the most significant challenge was retaining student personnel. Even where project teams were successful recruiting students, being limited to online interactions oftentimes made it more difficult to ensure students clearly understood project goals.
**Institutional Limitations**

Other challenges teams encountered revolved around administrative hurdles or difficulties working across institutions. For example, among community colleges, differences in whether a college will allow faculty to be compensated for program participation posed unexpected hurdles. Even differing schedules, such as if team members were on quarter versus semester systems, at times posed unexpected difficulties in project implementation.

Lack of supportive infrastructure, such as a dedicated grants officer to provide grant support, was highlighted by many community colleges. Not only did this result in added administrative burden for some PIs, but the whole project at times was impacted. CCCs have pointed to the general lack of incentives at community colleges, which are not research institutions, to conduct and participate in educational research.

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**“California aims to reduce equity gaps in our higher education outcomes. However, the institutions with the most diverse student populations, our community colleges, are not properly equipped to be leaders within the research efforts targeted at generating lasting intersegmental change. Faculty have an important role in this effort and must involve our students to ensure their experiences are represented in the data—whether our institutions are ready to support us or not.”**

- Shannamar Dewey, Biology Faculty, Butte College

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But even at a UC, despite having a research department, major delays in hiring, stipend distribution, and receiving budget updates took its toll on projects—possibly owing to the lack of experience of grants administrative staff may have in supporting pedagogical research specifically. Several projects that included a professional development component reported difficulties with issuing stipends to faculty. Projects paying faculty across institutions faced an additional layer of administrative burden, leading to delays or needing to rethink project approaches to faculty incentives/recruitment. Differences among institutions in the way that faculty were allowed to be compensated, if at all, for program participation were often uncovered after project launch. For example, a UC-hosted project with a CCC partner, designed to improve learning in online STEM courses, had initially planned to provide faculty stipends for program participation but later discovered that the particular CCC’s policy required faculty to be paid through unit relief, not by a stipend. The team reframed their recruitment approach by inviting faculty to bring existing online instruction materials to work on during program sessions; emphasized the value of the training opportunity to improve student retention and success in online courses; and encouraged faculty to request guarantees from their deans that they would be able to teach the courses that faculty were working to improve through the program.
Complexities of Developing Adaptive Learning Technologies

The third theme is specific to projects developing adaptive learning technologies, which reflects the complexities and novelty of such innovations. Most project teams have had to conduct extensive research to identify technologies that have appropriate capabilities and flexibility to implement learning and user/instructor feedback goals, in addition to effectively integrating such tools. For example, software may be needed to store user interactions and separate products may be needed to serve as a database for such interactions, provide database storage, and route information to various web servers. Allowing for instructor authorship and adaptation of resources may require additional tools that will integrate with learning management systems. Teams were not always able to anticipate software limitations before content development or higher-level functioning and integration were underway. Additionally, while free and open-source products that make it easy for users to create, share and reuse interactive content exist, these may be more easily hacked into, raising security issues.

A few projects reported that developing content, such as writing questions and developing knowledge maps and test banks, was more time-consuming than expected. Additionally, some noted that the nature of complex STEM content requires the use of texts, images, graphs, and equations which, for online course development, requires software that can effectively integrate multiple tools. Security, accessibility, and accommodating a growing base of users were all challenges that teams with strong technology components highlighted.

As indicated in this section and the Highlights section of this report, project teams have iterated upon their original project designs and implementation plans, stretching beyond barriers to successfully improve teaching and learning on behalf of students. As projects completed either their first or second years by Summer 2021, teams were able to report early implementation results, with several teams having presented or announced plans to present at national meetings and conferences, including the American Chemical Society, AAC&U STEM Virtual Conference 2021, POD Network Conference 2021, and SIGSE Technical Symposium 2022. A recurring positive message was how much teams were learning through intersegmental collaboration and execution of their projects, despite these difficulties. Developing a deeper understanding of other institutions’ practices and policies resulted in a better understanding not only of their faculty colleagues, but of the learning environments of students across institutions and public higher education segments.

Learning Lab Highlights

New Website

Given the evolution of the grant projects and recognizing an opportunity to better promote existing and soon-to-be developed resources, Learning Lab partnered with the Foundation for California Community Colleges communications team to develop a new website. The overarching goal of the website development project was to produce a website that was easy to navigate, increased transparency about Learning Lab grantmaking, improved access to information about funded projects and funding opportunities, and promoted engagement with Learning Lab resources. The revamped website with its new address (calearninglab.org) launched in March 2021 and has since been visited by approximately 3,500 users who have viewed the website more than 22,000 times.

Grantee Portal Page

Providing the public better access to the resources emerging from the Learning Lab is important, but equally important is providing Learning Lab grantees with resources to help them maximize their impact. With that in mind, a “Grantee Portal” was developed to serve as a hub to support various aspects of the funded projects, including budgeting and invoicing, reporting and evaluation, communications guidance, and grantee-focused webinars. Currently, the Grantee Portal page provides project teams around-the-clock access to essential Learning Lab documents, and on-demand access to tutorial videos and recordings of grantee events.
New Resources

In addition to Learning Lab’s new website and the wealth of resources created by grantees, key partners during the year generated valuable resources for the Learning Lab community, including Estela Bensimon and Lindsay Malcom Piquéux, who provided examples of how to integrate equitable practices into the classroom, and Daniel Reinholz who provided research on theories of change, systems change, and a framework for instituting change. Additionally, the team at Just Equations (Pam Burdman, Melodie Baker, and Francesca Henderson) provided more than 200 sources that formed the research base for the co-published report, “Charting a New Path: Investigating Barriers on the Calculus Pathway to STEM” and is an independent trove of information related to STEM equity that lives on Learning Lab’s website.

Charting a New Course: Investigating Barriers on the Calculus Pathway to STEM

College Calculus serves as a cornerstone to a degree in STEM (science, technology, engineering, and mathematics). At the same time, Calculus courses and requirements can function as barriers to STEM majors and careers, with significant proportions of students leaving a STEM path after taking Calculus. This pattern is most pronounced among Black and Latinx students and others who are historically underrepresented in college.

A robust and diverse STEM pipeline is central to ensuring equitable opportunities for the next generation of Californians as well as a thriving economy. To explore the reasons students leave Calculus sequences and STEM majors, and shed light on strategies for addressing those barriers, the California Education Learning Lab commissioned Just Equations to synthesize existing knowledge from California and beyond.

This report was commissioned in conjunction with Learning Lab’s Grand Challenge: Overcoming the Calculus Barrier to STEM Success—which is supporting multiple projects spearheaded by intersegmental faculty teams to reconceptualize the role of and approach to Calculus in students’ first-year introductory STEM experiences—as well as a new funding opportunity, Seeding Strategies to Close the Calculus Equity Gap. The intention in disseminating this report is to inform those efforts and others around the state to strengthen undergraduate Calculus pathways and ensure that they enhance access to STEM majors and careers, particularly for populations that have traditionally been excluded from STEM. The report consists of two parts:

PART ONE. An overview of research from across the country on factors influencing Calculus outcomes at two- and four-year postsecondary institutions. Written by Just Equations, the narrative is based on a synthesis of roughly 200 sources (including books, book chapters, journal articles, research reports, and other online and print sources) and interviews with 13 experts inside and outside of California.

PART TWO. An analysis of data provided to Learning Lab by California’s three public higher education systems. The analysis focuses on six-year outcomes of students starting at the California Community Colleges, the California State University, and the University of California systems in the 2014–15 academic year, as well as Calculus enrollment and success patterns for fall 2019 (see Technical Appendix for further details about the data and methodology). Institutional researchers with the three systems, as well as researchers at the California Policy Lab and the Foundation for California Community Colleges, performed the statistical analyses, and the Just Equations team synthesized the data.
The Meaning of Racial Equity
- Estela Bensimon

Dr. Estela Mara Bensimon is the founding director of the Center for Urban Education at the Rossier School of Education at the University of Southern California and a Dean's Professor in Educational Equity. Dr. Bensimon is one of the nation’s leading scholars on racial equity, organizational learning, and practitioner inquiry and change. She received the 2017 Social Justice in Education Award from the American Educational Research Association and the Harold W. McGraw Jr. Prize in Education in 2020. She is the co-author of the book, From Equity Talk to Equity Walk: Expanding Practitioner Knowledge for Racial Justice in Higher Education. Dr. Bensimon is an elected member of the National Academy of Education and advises organizations and institutions nationally.

Understanding Data as an Equity Practice
- Lindsey Malcom-Piqueux

In seeking to create more equitable classrooms, what data should we care about and why? Join Lindsey Malcom-Piqueux, as she discusses why understanding and communicating data are critical equity practices. Dr. Malcom-Piqueux discusses the different types of data that matter and how faculty can use data to improve the classroom experience and academic success of racially minoritized students in higher education. Dr. Malcom-Piqueux is Chief Institutional Research Officer at the California Institute of Technology. She is a co-author of the recently published book, From Equity Talk to Equity Walk: Expanding Practitioner Knowledge for Racial Justice in Higher Education.

Faculty Perspectives on Race and Gender Equity
- California’s Systemwide Senate Leaders

Academic senate leaders discuss their views on racial equity for students in public higher education, and the role that faculty and others can play in advancing racial and gender equity. Dr. Davison is a Professor of History and Women’s Studies at Foothill College and President of the Academic Senate for the California Community Colleges. Dr. Collins, a four-field trained anthropologist, is Associate Professor of American Indian Studies at San Francisco State University and Chair of the Academic Senate of the California State University. Dr. Gauvain is Distinguished Professor of Psychology at the University of California, Riverside, and the Chair of the Academic Senate of the University of California.
The Syllabus as an Equity Practice
— Estela Bensimon

A syllabus is much more than a contract. It is an artifact through which classroom culture can be deciphered, and which can help students feel welcome, represented, and valued. A syllabus reflects how a faculty member views students as learners and the efforts that the faculty member will make to support their success. In this session with Dr. Estela Bensimon, founding director of the Center for Urban Education, you will learn six features of equity-minded syllabi: Welcoming, Creating a Partnership, Representing, Deconstructing, Demystifying, and Validating.

Building Our Grantee Community

Between 2019-2020 and 2020-21 Learning Lab’s grant community grew by roughly 75 faculty, representing a 50 percent increase from the prior year. The number is expected to grow each year as each project develops and expands its reach.

Though Learning Lab was not able to convene grantees in person during 2020 or 2021 due to continued caution amidst the COVID-19 pandemic, Learning Lab made strides in developing a virtual community through a holiday social, webinars, Slack channel, and online fall grantee convening. Learning Lab also established a social media presence on Twitter, LinkedIn and YouTube.

During this period, Learning Lab also created more avenues for grant team-to-grant team interaction. In order to foster greater learning between project teams, Learning Lab invited team members to join other project teams’ bi-annual Zoom progress updates. Learning Lab also launched topic-specific mini-convenings, such as a series on adaptive learning platforms and a webinar on Course-ID Numbering 101.

Fall 2021 Grantee Convening

The Learning Lab convened grantees over Zoom for a half-day interactive virtual meeting focused on systemic change and team dynamics, topics of relevance to projects seeking to scale their effort or work more effectively together. More than 120 faculty members involved in Learning Lab-funded projects attended “The Art & Science of Transformation.”

Keynote speaker Daniel Reinholz, Ph.D., Associate Professor at San Diego State University who studies how and why systemic change occurs in STEM higher education, presented how a theory of change can guide scaling sustainable change initiatives. Reinholz shared original research drawn from a review of over 400 published articles about education systems change and also introduced the four frames theory of change, which views systems change through four lenses: structure, symbols, people, and power. Reinholz’ scholarship provided grantees with a new perspective from which to consider scaling their work and also influenced the current Seeding Strategies RFP.

The second half of the convening was a workshop on team dynamics covering common pitfalls of low-performing teams and the inverse strengths of high-functioning teams. Strategies were shared about how teams can foster greater trust, create environments conducive for an open exchange of ideas, remain committed to a clear purpose, hold each other accountable, and pay attention to results. Grantees also experimented with an interactive virtual platform and discussed a case study created through a composite of anecdotes and experiences gathered from grantees.
**Impact on Faculty Teams**

To date Learning Lab’s grantees have had several opportunities to interact with both program staff and with other grantees in both formal settings described above and informal settings. In fact, several teams have convened on their own to explore potential mutually beneficial efforts. As a result, chemistry teams have shared outcomes framework for use in establishing learning analytics with each other. Projects with adaptive learning components have also shared questions and problem sets for use by students, as well as knowledge about and approaches to accessibility. Teams have discussed everything from longer term ideas for sustainability with each other, as well as worked on integrations of code.

While for many, the project learning curve was steep and unanticipated challenges caused difficulties, grantees have reported an overall positive experience implementing their projects and with the opportunities presented to them as part of the Learning Lab community.

*With the open-ended nature of Learning Lab RFPs (request for proposals), we community college faculty not only had a competitive chance at getting our project funded, but we could actually help shape the conversation around the grant team goals and deliverables. The team we built has driven creativity and cross-pollination of ideas that will impact each of our campuses beyond the life cycle of our grant. Receiving a CELL grant has ultimately accelerated our ability to positively impact the STEM trajectories of students at our campuses!*

— Paul Daubenmire, Professor of Chemistry, College of Marin

*Developing Student Identity Project*

*My Learning Lab (LL) grant experience for The Better Book Project has been extremely positive! I consider the folks at LL to be partners I can collaborate with on many projects. It is absolutely worth applying for LL funding opportunities. The process and follow-up alone make you revisit your why as an educator, while the support you receive from the team will help you not only improve your project but create for permanent change within your area/department!*

— Eddie Tchertchian, Chair, Department of Mathematics, LA Pierce College

*The Better Book Project (aka, CourseKata)*

*The high level of collaboration required and supported by our Learning Lab Grant has expanded my understanding of educational experiences and systems statewide and nurtured invaluable and hopefully enduring intersegmental and interdisciplinary connections. This process has been a learning experience from day zero and a great way to push myself to advance my own pedagogical approach while increasing my awareness of recent discipline based educational research.*

— Shannamar Dewey, Biology Faculty, Butte College

*STEM Success with Interactive Adaptable Learning Science Videos Project*

*The faculty participating in the Bay Area Math Collaborative Project have worked together for about five years on a number of projects. Our current grant from the CA Education Learning Lab has given us the opportunity to continue our partnership and to develop a project that builds on our previous collaboration and that will provide measurable benefits to our students. Furthermore, the Learning Lab Community has provided numerous opportunities for interacting with other faculty and projects across the state to learn from their ideas and build new relationships that can lead to future collaboration.*

— Bruce Simon, Director, Institute for STEM Education, CSU East Bay

*Bay Area Math Collaborative, or BAM-C Project*
Looking Ahead

2021-2022 Grant Year

In December 2021, Learning Lab published two new grant opportunities for the 2021-2022 grant year, which included Scaling Success to Expand Impact in STEM and Seeding Strategies to Close the Calculus Equity Gap. Scaling Success is an invitation-only grant opportunity designed to build upon the momentum of project accomplishments of existing faculty teams and provide funding to scale successful projects to expand positive impacts on STEM in public higher education. Through this RFP, Learning Lab intends to award 5-7 grants of $500,000 to $700,000 each over two years. Eligible applicants include intersegmental faculty teams from the California Community Colleges, and the California State University and University of California campuses that launched by July 1, 2020, and are expected to close by Summer of 2022.

Building on the momentum of Learning Lab’s Calculus Grand Challenge and co-publication of “Charting a New Path,” Seeding Strategies is designed as a department-level funding opportunity to encourage the implementation of select promising curricular and pedagogical strategies detailed in that report to close equity gaps in calculus course sequences. Through this RFP, Learning Lab intends to award 30-35 grants of up to $100,000 per awardee for up to two years. Up to 25 grants will be awarded to California Community Colleges, and up to 10 grants, combined, will be awarded to California State University and University of California campuses.
1. **Focus on Grantee Success.** Promote projects that have potential for large-scale meaningful impact on faculty and student success through follow-on grants, partnerships or other resources. Provide targeted support to faculty grantees in areas of need, stimulate cross-project collaboration, and execute programs that advance equity and innovation.

2. **Leverage Data-driven Insights for Systemic Change.** Promote adoption of evidence-based, faculty-created resources, including pedagogical, curricular, and educational technology tools. Add to the body of research and data to improve STEM learning outcomes and close equity gaps in higher education. Provide high-impact, equity-driven programming that supports the professional development of faculty and the broader higher education community.

3. **Expand Networks and Partnerships.** Develop and expand faculty networks across the California Community Colleges, California State University and University of California systems. Forge strategic connections with key stakeholders such as policymakers, education and research nonprofits, philanthropy and Industry.

**Preparing for Project and Program Evaluation**

As Learning Lab heads into its fourth full year of operation, plans are underway to obtain a third-party external evaluation of the Learning Lab program. Additionally, many of Learning Lab’s funded projects will conclude in the summer and fall of 2022, with individual project evaluations due within 180 days of project closure. A project evaluation template has been provided to project teams in preparation for meeting the final evaluation deliverable, which will include information on approach and accomplishments, collaboration and organizational change, impacts and scaling, dissemination and products created, and overall lessons learned. Learning Lab will also conduct close out Zoom interviews with all project teams and anticipates providing summary information of all project evaluations in the next annual report.