CALIFORNIA EDUCATION

A NECESSARY EMBRACE OF DESIGN AND INNOVATION FOR EQUITY AND THE PUBLIC GOOD

WORKING PAPER:
An In-Depth Analysis of the Facts, Origins and Trends of Education in California

VISION & STRATEGY FOR THE NEXT CENTURY
ABOUT CALIFORNIA 100

The California 100 Initiative envisions a future that is innovative, sustainable, and equitable for all. Our mission is to strengthen California’s ability to collectively solve problems and shape our long-term future over the next 100 years.

California 100 is organized around 15 policy domains and driven by interrelated stages of work: research, policy innovation and engagement with Californians. California 100’s work is guided by an expert and intergenerational Commission. Through various projects and activities, California 100 seeks to move California towards an aspirational vision—changing policies and practices, attitudes and mindsets, to inspire a more vibrant future.

This California 100 Report on Policies and Future Scenarios was produced as part of California 100’s research stream of work, in partnership with 20 research institutions across the state. California 100 sponsored grants for data-driven and future-oriented research focused on understanding today and planning for tomorrow. This research, anchored in California 100’s 15 core policy domains, forms the foundation for the initiative’s subsequent work by considering how California has gotten to where it is and by exploring scenarios and policy alternatives for what California can become over the next 100 years.

The California 100 initiative is incubated through the University of California and Stanford.

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For additional background information, read the related Facts-Origins-Trends report at California100.org. The Facts-Origins-Trends report contains all of the references and citations to support the content of this report.

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THE FUTURE OF EDUCATION

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CALIFORNIA 100
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The Berkeley Institute for Young Americans is a research center affiliated with the Goldman School of Public Policy at UC Berkeley. Our mission is to lead a fact-based, non-partisan discussion about how public policy can invest in future generations. The Institute aims to develop research-driven policy proposals to equip policymakers, advocates, and young leaders with the solutions needed to ensure the long-term security and success of the next generation.

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“As California Goes, So Goes the Nation, Alas.” That was a headline from a Los Angeles Times opinion column on April 30, 1989, which noted that, even though “Californians have long considered their state the cutting edge of social and political change… [it] no longer seems the vanguard of political innovation. Other states rarely look to California for policy initiatives.”

Fast-forward to 2022, and few would proclaim that California lacks in policy innovation. Quite the contrary. The state has enacted a variety of policies ranging from expansions in immigrant rights and voting rights to health care and higher education, and from large-scale experiments in guaranteed income to ambitious moves towards net-zero emissions in a variety of sectors. And despite the periodic waves of “doom and gloom” reporting about the state, California’s economic output over the last 25 years has grown faster than the national average, and on par with GDP growth for the state of Texas.

Even so, much remains to be done. The California Dream has always been marred by a high degree of racial exclusion, and it remains out of reach for millions in the state—whether measured by health outcomes, unaffordable housing, or massive disparities in income and wealth. California also recognizes that future progress depends on recognizing and correcting historical wrongs. Its Truth and Healing Council, for example, will provide recommendations aimed at prevention, restoration, and reparation involving California Native Americans and the State. If California’s racial diversity represents America’s demographic reality by 2100, our work is essential—not only for the long-term success of the state, but also for our country’s innovative and equitable future.

This future-focused work is especially pressing today. The COVID-19 pandemic has scrambled a state and nation already undergoing significant changes in economics, politics, and society. The harmful consequences of climate change are at our doorstep,
with forest fires and droughts that grow in frequency and intensity each year. The weakening of local media and the growth of disinformation threaten both our civic health and our public health. And staggering inequities in income and wealth, home-ownership and health, threaten the state’s reputation as a haven for migrants, domestic and international alike.

In addition to immediate threats that affect our long-term future, we also see plenty of opportunity. Record increases in federal and state spending mean that billions of additional dollars are flowing to state, local, and tribal governments in California. Many jurisdictions are looking to invest in infrastructure that meets the long-term needs of their communities. Philanthropic institutions and individual donors are also looking to make transformative investments that have enduring impact. We have an opportunity to inform and enrich all of these plans and conversations.

Most institutions and organizations in California are focused on immediate challenges, and don’t have the luxury of time, dedicated talent, and resources to focus on long-term futures. California 100 is grateful for the opportunity to provide added value at this critical time, with actionable research, demonstration projects, and compelling scenarios that help Californians—government agencies, stakeholder groups, and residents alike—to envision, strategize, and act collectively to build a more innovative and equitable future.

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Core to the modern American Dream is the belief that education attainment is the doorway to equal opportunity and social mobility in U.S. society. However, this belief has been challenged in recent decades as a growing body of evidence has brought to light large differences in academic achievement, college access and attainment, and life-long outcomes based on students’ socioeconomic backgrounds or their race and ethnicity (Duncan & Murnane, 2011; Reardon et al., 2018).

For several decades, state and federal lawmakers have acknowledged these inequalities and have attempted to ‘level the playing field’ by designing policies to intervene in the education system to help students reach broader economic and democratic goals and make the American Dream a reality. Throughout the mid-20th century, federal and state governments focused on ‘input-oriented’ policies that injected new resources into early childhood programs, K-12 schools, and higher education. More recently, federal and state policymakers have changed course, experimenting instead with ‘output-oriented’ policies such as accountability and standards-based reforms that attempt to raise expectations and move the needle on student academic achievement. Alternatively, policymakers have attempted to alter the configuration of the public education sector altogether by encouraging third-party vendors to operate public schools in a marketplace setting; for example, by encouraging the growth of charter schools. In California, lawmakers have led a national policy movement to implement a ‘continuous improvement’ logic to improve education quality by investing new resources and capacity building into both organizational and structural features of the entire early care and education (ECE) and K-16 systems.

While this menu of policy changes has attempted to improve the nation’s public education system, serious challenges remain, especially in California, a state that serves far more disadvantaged students than the national average. For example, the state’s ECE system has insufficient childcare slots to serve the number of low-income children eligible for subsidized programs, and the quality of programs varies greatly. Reading and math achievement in K-12 falls far behind national averages, and little progress has been made to improve test scores over time, especially for minority and low-income students. Teacher shortages were already in motion before the pandemic began but have worsened in recent years, putting into question the long-term success of the state’s investment in building and sustaining infrastructure for high quality teaching and learning. And in higher education, state lawmakers continue to put pressure on the CSUs and UCs to enroll more students but these institutions have limited capacity to do so.
Such challenges are also taking root amidst the backdrop of a transforming economy and labor market that will inevitably have profound, long-term effects on the design and function of the public education system. Automation, artificial intelligence, and other advanced technological changes are beginning to take root across a range of industries in the U.S. and internationally. Education stakeholders in California must consider whether the structure and design of our current education system can prepare all students to be 21st century life-long learners that the new economy requires, or whether the system has become outdated.

This paper reviews the evolution of California’s education policy landscape and asks the following questions: What students are currently served in California’s education system? How are the major sectors organized and governed? How have lawmakers defined the goals for California’s ECE, K-12, and higher education segments and how have they defined problems within each sector that need solving? What strategies have state lawmakers used in an attempt to remedy existing deficiencies across the education system? What are the origins of modern education policy, and lastly, what trends are evolving that may shape California’s education policy landscape in the years and decades to come?

This paper attempts to answer these questions to provide readers with a foundation for understanding the state’s current education policy landscape and indicators of its future evolution. The paper first reviews the ‘facts’ of California’s education system. We review descriptive trends and describe the governing system for early care and education, K-12, and higher education. The facts section also analyzes state legal frameworks that set goals for the ECE and K-16 system before moving on to a review of two major ‘policy logics’ used in California policymaking circles to reform and improve the education sector. We then go on to describe the ‘origins’ of modern education policy, tracing the history of federal policymaking over the last several decades. Lastly, we review emerging trends in the education policymaking landscape that could transform the education system as we know it in the decades ahead.

California finds itself at a critical pivotal point where lawmakers, educators, interest groups, researchers, and the general public need to think carefully about the future of the state’s ECE, K-12, and higher education systems as each system is being stress-tested by the pandemic and broader changes taking root in the economy. The time is ripe to assess whether the current education ecosystem is sustainable, equitable, and aligned with California’s core values. We leave it up to readers to dissect the facts, origins, and trends to start thoughtful conversations about whether the state’s education sectors are headed in the right direction, or whether changes must be made to create a brighter future for all students.
FACTS

Below, we walk readers through the ‘facts’ of California’s education policy landscape as it exists today. In Section I, we first lay out the descriptive characteristics of the early care and education (ECE) system, the K-12 system, and higher education system to get a sense of the students and organizations that are part of California’s education landscape. The section also reviews the governing structure of each of the three systems to understand how the state infrastructure is organized to manage and implement laws and policies enacted by state policymakers.

Sections II, III, and IV use a ‘policy design’ framework to review the goals of ECE, K-12, and higher education established by lawmakers, the problems that have been defined across the education system that need solving, and the different policy instruments that policymakers have used in recent years to improve the conditions and overall quality of the state’s education sector. Section IV narrows in on two policy ‘logics’ that have been in play to improve the education system for the state’s diverse student population—a ‘market logic’ and a ‘continuous improvement’ logic.

Section I. Descriptive Characteristics

Student Characteristics

*Student enrollment* - California’s education system serves the largest student population in the country. The [K-12 system](#) provides educational services for more than 6 million students, while the [early care and education system](#) serves over 445,000 children annually according to the latest available data.\(^1\) The state’s higher education system is equally astounding in its size: the California Community Colleges (CCC)--the largest higher education system in the nation--serves over 2 million students each year and one out of four community college students nationwide. The California State University (CSU) is the largest four-year public university and enrolls nearly half a million students; and the University of California (UC) educates roughly 280,000 undergraduates and graduates annually (Johnson & Mejia, 2019). While the state also has hundreds of private, for-profit or nonprofit colleges, and a range of technical and vocational schools, eight out of every ten college students in California enrolls in a public institution, with more than half enrolled in the community college system (Johnson & Mejia, 2019). Likewise, despite a recent trend toward homeschooling and private school enrollment, the state’s public K-12 system serves 93 percent of all students.

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\(^1\) Does not include enrollment in federal Head Start programs or enrollment in the state Transitional Kindergarten program.
Student demographics - Altogether, the state’s early childhood and K-16 public education system serves nearly 9 million students from very diverse backgrounds. California’s ECE system serves many more non-native English speaking children under the age of 5 who are first- or second-generation immigrants than the national average, and also serves many low-income children who live in families at or near the poverty level (Stipek, 2018).

The K-12 system educates far more students of color and low-income students than national averages. As shown in Figure 1 below (which shows enrollment for K-12 students in California versus the US), in California over half of all students are Latino, about 22 percent are white, about 12 percent are Asian, about 5 percent are Black, and the remainder identify as other races/ethnicities. Given the diversity of students from different cultural backgrounds, California serves nearly double the percentage of students with Limited English Proficiency (LEP) than the national average\(^2\), and at least 60 languages are spoken in California schools (Hill, 2012). An astounding 60 percent of California students are eligible for free and reduced-price lunches, a proxy for low-income status. In raw counts, this means that the state serves the highest number of poor students of any state in the country. California’s student population is also unique in that there has been an uptick in special education enrollment--in 2017-18, one in eight students was enrolled in special education (about 12.5 percent), an increase of about two percent from the early 2000s, with disproportionate enrollment of low-income and Black students (Anderson & Li, 2019).

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\(^2\) LEP was calculated using methods identified via https://www.lep.gov/source-and-methodology
All three segments of the state’s higher education system serve a majority of students who graduated from the California K-12 system, providing meaningful access to public higher education institutions for those who reside in the state. The higher education system reflects the broader state population, with a highly diverse and low-income student body:

- **CCCs** – The U.S. Department of Education considers several of the CCCs to be Minority Serving Institutions. In 2017-18, about every three in four students across CCC campuses were students of color. The CCC system serves about 43 percent of first-generation students, and the majority of students are California residents. Moreover, CCCs are unique in that many of their students are ‘nontraditional’; only 27 percent enroll full-time and students tend to be much older than students on the UC or CSU campuses—roughly half of all CCC students are 25-years-old or older, with about one in six students over the age of 40. CCC’s also serve many inmates in the state’s prison system. In 2014, CCCs extended in-person classes that lead to degree programs and certificates for inmates after lawmakers passed SB 1391. By 2017, 22 community colleges were offering instruction to 7,000 inmates across the state’s 35 prisons.

- **CSUs** - The CSU system also serves a large population of students of color, with 45 percent of Latino students, 4 percent Black, 16 percent Asian, about 13 percent other, and 22 percent white (California State University, 2021). The US Department of
Education has recognized 21 of the 23 CSU campuses as Hispanic Serving Institutions. At CSUs, about one third of students are first generation, and roughly 95 percent of all students are California residents (California State University, 2021).

- **UCs** - The UC system enrolls a slightly different composition of students, with 22 percent Latino, 31 percent Asian American, 4 percent Black, and 23 percent white (the remainder are international students or identify as ‘other’). The UC system serves about 40 percent of students who are first generation, and about 35 percent of students are eligible for the federal Pell grant. UC’s serve a blend of in-state and out-of-state students: In 2021, about 83 percent of students were California residents, and 17 percent were nonresidents.³ About 30 percent of students enrolled at the UC system are community college transfer students.

Organizational characteristics of the Early Childhood and K-16 system

Below, we review the organizational characteristics and governing structures of the early childhood, K-12, and higher education systems.

**Early care and education (ECE)**

A fragmented group of state and federal agencies governs a variety of Early Care and Education (ECE) programs (Melnick et al., 2017). Most programs typically have a local agency in charge of administering services, like a local school district or a county agency, and there is usually a provider (such as a community-based organization, public school, or childcare provider) in charge of delivering actual services. These federal, state, and local agencies may oversee program quality, set regulations, and allocate resources; they may or may not provide program funding. The complex system of governance for the state’s ECE programs has important implications for the providers of these programs. In some cases, providers may be accountable to more than one agency and have multiple sets of administrative and reporting requirements, which can be burdensome for providers with limited resources (Melnick et al., 2017). Some argue that the lack of coordinated administration over the state’s ECE programs has resulted in a lack of coherent strategy for systemic improvement (Melnick et al., 2017; Stipek, 2018).

Given the number of ECE programs and the complexity of the administration and oversight of

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³ This proportion varies by campus, with some campuses like Berkeley, UCLA, and San Diego enrolling about a quarter of their students from out-of-state. Enrolling more out-of-state students was a revenue strategy following the Great Recession budget cuts, since the UC’s can charge about $20k more in supplemental tuition per student. In the 2021-22 budget, California lawmakers [reduced the number of seats](#) available to out-of-state and international students to allow more California residents to enroll.
these programs, we focus here on the largest ECE programs for the state, summarized in Table 1 below. (For a full review of ECE programs, see Melnick et al., 2017 or Stipek, 2018.)

**Table 1. Major ECE Programs in California**

<table>
<thead>
<tr>
<th>ECE Program</th>
<th>Description</th>
<th>Program Characteristics</th>
<th>Governance</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>California State Preschool Program</em> (CSPP)</td>
<td>CSPP is the largest state-funded ECE program in California and provides both full- and part-day preschool for 3-4 year-olds from low-income families at or below 70% of the state median income. CSPP was formed in 2008 with the passage of AB 2759, which consolidated the funding for State Preschool, Prekindergarten and Family Literacy, and General Child Care center-based programs.</td>
<td>CSPP is now the largest state preschool system in the country, enrolling over 136,000 children. Programs are delivered at licensed centers across the state. On average, the centers have a staff-to-child ratio of 1:8. About 70% of the State Preschool Program is part-day preschool and the remaining 30% is full-day preschool.</td>
<td>CSPP is primarily managed by the California Department of Education and coordinated at the local level by County Welfare Agencies and School Districts. These agencies partner with licensed childcare centers and public schools to deliver services.</td>
</tr>
<tr>
<td><em>Head Start California</em></td>
<td>Head Start is a federally-funded program that enrolls children ages 3-5 from low-income families, including children with disabilities. To qualify, children must either come from families with income below the federal poverty level, from families eligible for public assistance (like TANF or SSI), or the child must be in the foster system or homeless.</td>
<td>The program enrolls about 82,000 children statewide, with 23% of children in full-day programs, 71% in part-day programs, and 6% receiving weekly home visits. The majority of Head Start programs are delivered at centers, but a few are delivered at the family’s home, in family child care homes, or through a combination of a center and home visitation. Programs for 4-year-olds have a ratio of 1:10 and programs for 3-year-olds have a ratio of 1:9.</td>
<td>The federal Office of Head Start within the Department of Health and Human Services administers Head Start in California. This federal agency works directly with local providers, including both public and private local childcare centers, licensed family homes, and home visitors.</td>
</tr>
<tr>
<td><em>Transitional Kindergarten</em></td>
<td>In California, school districts are required to offer Transitional Kindergarten (TK), which is a program for children born just after birthday cutoffs for kindergarten. To be eligible, students must turn 5</td>
<td>The program enrolls approximately 77,000 children between the ages of 4 and 5. Programs are delivered within public schools, with 63% of participants attending full-day transitional kindergarten and 38%</td>
<td>The state’s Transitional Kindergarten (TK) program is managed by CDE and is overseen by school districts at the local level; TK</td>
</tr>
</tbody>
</table>

4 For full-day preschool, the parents need to be employed, looking for work, or in some kind of vocational training program; children may also be eligible if parents are homeless or incapacitated.

5 Early Head Start is also part of Head Start and specifically targets low-income, pregnant women, infants, and toddlers. The program enrolls an additional 16,000 children and 600 pregnant women. The income eligibility requirements are similar to those of the main Head Start program. Staff-to-child ratios for Early Head Start centers is 1:4, while family child care home ratios vary based on the number of caretakers and the mix of the children’s ages who are served by the program. For more information, see Melnick et al., 2017.
between September 2 and December 2. There are no income eligibility requirements to participate in the program.

attending part-day programs. There are no requirements for staff-to-child ratios, but as with kindergarten classrooms, there is a maximum of 31 students per class.  

programs are provided directly by public schools.

K-12 education

K-12 organizational characteristics - There are over 10,000 K-12 public schools in California that are organized into over 1,000 districts with some districts serving only elementary grades, others serving only high school grades, and unified districts that serve students in the K-12 grade span. District size varies greatly, with some districts enrolling fewer than 250 students and others like Los Angeles Unified enrolling hundreds of thousands of students (Legislative Analyst’s Office, 2019).

Within traditional public districts are a variety of school types, and a growing and active charter school sector that now enrolls about 11 percent of all K-12 students. Private schools are also part of the K-12 education landscape--there are now roughly 2,600 private schools serving about 471,000 students in 2020-21. Within the public K-12 sector, the state currently oversees several virtual charter and virtual public schools, with students across the traditional K-12 public school system enrolling in about 600,000 online courses in the 2015-16 year alone (Evergreen Education Group, 2015). The state has the largest teaching force in the country, employing nearly 320,000 teachers in 2019-20. Like other states, the majority of teachers in California are white and female; about 21 percent of the teaching force is Latino and just 4 percent is Black and 6 percent Asian.

California’s K-12 organizational resources--such as class sizes and student supports--tend to lag compared to national averages. A recent report from Policy Analysis for California Education (PACE) found that the student-to-teacher ratio in 2020 was 22:1 compared to a national average of 16:1; the report also found that California schools employ fewer guidance counselors or librarians than national averages (Hahnel, Hough, & Willis, 2020). However, these organizational conditions have been found to improve over the years since the state began allocating more resources to low-income students with the landmark Local Control Funding Formula (Chen & Hahnel, 2017).

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6 Classrooms are regulated just as public kindergarten classrooms are. Programs use a modified kindergarten curriculum appropriate for slightly younger-aged children.

7 Charter schools are publicly funded schools operated by third parties rather than the state, and function within a marketplace environment where parents and students can choose where to enroll.
Teacher salaries in California, on the other hand, are among the highest in the nation at $84,531 in 2019-20, which puts the state second in a recent ranking of education salaries across the 50 states. While this may seem like California is ahead of the curve in funding teacher salaries, an analysis of teacher compensation across the U.S. found that there are significant “teaching penalties” across all states for people who choose to enter the profession (Baker, Di Carlo, & Weber, 2019). In California, teachers make an average of 22-25 percent less than those employed in comparable non-teacher professional positions (depending on age). See the Finance paper for more information on this topic.

**Governing the K-12 system** - The state’s infrastructure for governing the K-12 system is complex. At the state level, the California Department of Education (CDE) is the central organizing body for K-12 and oversees the diverse public elementary, secondary, and adult education school systems across the state. Together with the State Superintendent for Public Instruction, the CDE is responsible for enforcing education laws and regulations, and for improving and reforming public education to meet the state’s broader K-12 education goals. The 11-member State Board of Education operates separately from the CDE and is responsible for establishing statewide policies for academic standards, curriculum, instructional materials, assessments and accountability.

There is also a California Commission on Teacher Credentials, which is a commission part of the executive branch of the California State Government that sets statewide standards for teachers, such as teacher licensing, credentialing, and permit requirements; the commission also plays an important role in the accreditation of teacher training programs offered at higher education institutions across the state. The commission also enforces professional practices of educators and manages the discipline of credential holders when necessary. The Office of Public School Construction is part of the state Department of General Services and administers funding for the construction of the state’s public schools.

At the county level, 58 County Offices of Education (COEs) manage districts, with one statewide organization managing all the county offices, the California County Superintendents Educational Services Association (CCSESA). COEs are responsible for approving district budgets, providing technical assistance, and provide a range of other services to students and teachers in the county. Drilling down to the district level, local school boards are responsible for governing public school districts.

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8 CDE also oversees some preschool and childcare programs.
9 Note that California’s school boards have a long history of local control, and the state typically has limited authority to stimulate deep implementation of statewide policies at the local level. The state’s limited authority is also compounded by the fact that the K-12 system is the largest in the nation, with a complex network of over 1,000 school districts serving over 10,000 schools, making it difficult for centralized policies to systematically take root.
Higher education

The higher education system is organized into three public ‘segments’, each with a different purpose established by the 1960 California Master Plan for Higher Education. This includes the University of California system, the California State University system, and the California Community College system.\textsuperscript{10} The Master Plan was significant for many reasons; namely, it created distinct functions for each of the three segments and promised universal access to higher education for any student who desired to enroll. It also established goals to keep higher education affordable and tuition free for California students, and to provide quality teaching and learning across the three segments.\textsuperscript{11} Table 2 below describes the function and admissions criteria for each segment, along with other descriptions of each segment’s infrastructure and organizational characteristics.

It is important to note that lawmakers have considered revising the Master Plan several times since it has become unable to adapt to changing enrollment patterns, student and faculty needs across three segments, institutional changes, and broader workforce demands in a changing economy. To see a summary of the latest 2018 legislative review, see Berman et al. (2018). Several researchers have also undertaken their own independent review of the Master Plan, and have identified ways the Master Plan could be rewritten to alter the structures, goals, and financing of higher education to better meet the demands of the 21\textsuperscript{st} century (College Futures Foundation, 2017; California Competes, 2017; Finney, Riso, Orosz, & Boland, 2014; Governor’s Office of Planning and Research, 2018; Johnson, 2010; Shulock, Moore & Tan, 2014).

Table 2. Organization and mission of California’s three higher education segments

<table>
<thead>
<tr>
<th>Segment</th>
<th>Mission</th>
<th>Infrastructure</th>
<th>Organizational features</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of California</td>
<td>The UC system is the state’s primary academic research institution and provides undergraduate, graduate, and professional degree programs. The UC system has more than 160 academic disciplines, offers more than 850 degree programs, and awards 23</td>
<td>UC has ten major campuses, six medical centers, and three national laboratories, which makes the UC system the state’s third largest employer with about 228,000 faculty and staff (PPIC, 2019). Seven of the campuses—Berkeley, Davis, Irvine, Los Angeles, San Diego, Santa Barbara, and Santa Cruz—are</td>
<td>Faculty hiring—both ladder-rank and lecturers—has increased over the last decade to accommodate the growing student enrollment on UC campuses, and the faculty to student ratio across the UC has risen in recent years, and is about</td>
</tr>
</tbody>
</table>

\textsuperscript{10} The Master Plan also included governance structures for independent institutions in the state.

\textsuperscript{11} As of 2019-20, there were 151 public institutions in California, and also 115 private for-profit and 145 private nonprofit colleges and universities. For-profit universities award a large share of certificates to students in California (Johnson & Mejia, 2019). California is also home to a range of vocational and trade schools that award vocational certificates and associate’s degrees, and residents have access to a range of for-profit and nonprofit national online institutions, such as the University of Phoenix or Liberty University.
| California State University | CSUs provide undergraduate and graduate education through the master’s degree level, including professional and teacher education. In recent years, the CSU awards doctoral degrees in the professional fields of Audiology, Education, Nursing, Philosophy, and Physical Therapy\(^\text{12}\), and currently serves about 2,300 doctoral students. The top third of California’s high school graduates are eligible for admission at CSUs. | CSU has 23 campuses that employ about 56,000 faculty and staff. CSU awards about half of California’s bachelor’s degrees, and graduates of CSU account for about one in ten of the state’s workers; CSUs also provide more than half of the degrees earned by the state’s Latino, Black, and Native American students. CSU plays an important role in training a majority of the state’s K–12 teachers, and operates 23 teacher preparation programs approved by the California Commission on Teaching Credentialing. | About 80 percent of faculty are ladder-rank and roughly 20 percent are lecturers, and about half of all instructional faculty are part-time and half are full-time (California State University, 2021). CSU offers a broad array of online courses and degree programs, and nearly a third of all students enroll online, either full-time or in a hybrid format. |
| California Community Colleges | CCCs are “open access” institutions that admit any student capable of benefiting from instruction. Their mission is to provide lower division academic and vocational instruction, designed with the intention that many students would later transfer to UCs and CCCs. | The CCC operates 116 colleges that are organized into 73 districts, and recently added a community college that is strictly online, Calbright College.\(^\text{15}\) CCCs train much of the state’s workforce for positions in public law enforcement and the medical industry, and are the nation’s | At CCCs, the majority of faculty teach part-time or are adjunct faculty. CCCs operate several courses and degree programs online to accommodate nontraditional students (Johnson, Cuellar Mejia, & Cook, 2015). |

\(^{12}\) It is noteworthy that the state legislature authorized the CSUs to create many of these programs, not their governing board (for more information, see Legislative Analyst’s Office, 2017).

\(^{15}\) After just one year of operation, Calbright faced a state audit, which found that the online college was not delivering on its mission to provide educational opportunities for nontraditional students unable to attend traditional brick-and-mortar institutions. The state has given Calbright until the end of 2022 to turnaround its performance or it will close its doors.
CSUs to earn Bachelor’s degrees. CCCs also provide remedial or ‘basic skills’ instruction, English as a Second Language courses, adult education programs, community service courses, and workforce training services. Leading provider of workforce training.

The unique role of CCCs – Providing Transfer Pathways

The CCCs play a unique and very important role in providing transfer pathways for students to attend a UC or CSU campus, especially first-generation students, low-income students, and students from underrepresented groups who are more likely to start their higher education journey in the CCC system. Transfer rates at CCCs have historically been low, but increased significantly after the state legislature established the Associates Degree for Transfer (ADT) program in 2010, which set clear course pathways in certain majors and guarantees that students can transfer to a UC or CSU in their major. At the same time, the CCCs also implemented the Guided Pathways model, which sets clear course-taking patterns and provides students support services to meet their goals (Johnson & Cuellar Mejilla, 2020b). In 2019-20, the CCC transferred about 132,000 students in total, of which about 91,000 transferred to the UC and CSU systems. Transfer students boost overall graduation rates at UCs and CSUs: 29 percent of UC graduates and 51 percent of CSU graduates started at a CCC.

Governance of the three higher education segments

The higher education system in California has an odd governing structure. Unlike the majority of other states, where there is a single, statewide coordinating board or agency, California’s three segments of higher education are governed by the state legislature and governor, three separate segmental governing boards, and a range of smaller statewide commissions that take on specific functions of managing the higher education system.

Traditionally (as was defined in the original Master Plan), the legislature’s role has been to set the mission of the three segments, determine eligibility pools, provide funding and set expectations, hold segments accountable, and foster effective governance and coordination, especially between the K-12 and higher education system (Legislative Analyst’s Office, 2017). The legislature has delegated substantial governing control to the three segmental governing

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13 However, there is a movement led by legislature and advocates to consider whether CCCs should also provide Bachelor’s degrees. In 2015, SB 850 authorized up to 15 pilot bachelor’s programs at CCCs in areas not offered by the CSU system.

14 Remedial courses are non-credit bearing coursework that students must complete before completing courses that count towards their degrees. In 2017, state lawmakers voted to eliminate the use of skills-placement tests in higher education (by passing AB 705), and instead, rely on high school coursework, grades, and GPAs to determine whether students require remediation.
boards, including the responsibilities of managing enrollment, allocating funding, determining staffing levels, setting compensation policies, overseeing building projects, and for the UC and CSU, determining tuition and fee policies (Legislative Analyst’s Office, 2017). However, both the governor and members of the legislature sit on each of the three independent governing boards and have a vote. The three segmental governing boards are organized as follows:

- A 26-member Board of Regents, the UC Office of the President, and administrators at the 10 individual campuses govern the UC system. It is important to note that the Board of Regents has constitutional authority to make decisions about its future that the CSU and CCC boards do not have, giving it full authority to decide about issues such as enrollment, tuition, or admissions policies.

- A 25-member Board of Trustees, the Office of the Chancellor, and administrators at the 23 campuses govern the CSU system.

- A 17-member Board of Governors governs the CCC system; a locally elected Board of Trustees appoints college presidents and oversees the operation and budgets of the 115 campus system.

At the state level, there used to be a California Postsecondary Education Planning Commission that coordinated across the tripartite system (CPEC, originally established in 1973), but it was defunded in 2011 since it had very little scope and influence (the commission still technically exists in statute). Some argue that the lack of coordinated administration over the state’s higher education systems has resulted in a lack of vision and coherent strategy for systemic improvement (Berman et al., 2018; Warren, 2019). Abolishing the CPEC has also created a new tension between the legislature and the three segmental governing boards, since the state legislature sometimes makes important higher education policy decisions that trump local authority and the expertise of the segmental governing boards. (For more information about the governing structure of higher education and other parts of the education system, see Appendix Table 1.)

A few groups meet to create coherence among the three segments. This includes the California Education Roundtable, which includes the K-12 State Superintendent and a voluntary group of executives from each of the three segments, and the Intersegmental Coordinating Committee, a branch of the California Education Roundtable that seeks to foster collaboration across the higher education system. A little known committee, the Intersegmental Committee of the Academic Senates, is a voluntary group of academic senate members across the three segments that periodically meets primarily to discuss student transfer policies. Several smaller state-level departments regulate higher education policy, including:
California Student Aid Commission - the primary state agency responsible for administering all state-funded financial aid programs for students attending any higher education institution, whether public or private colleges and universities or vocational schools.

The California Bureau for Private Postsecondary and Vocational Education - state consumer protection agency that provides oversight of California’s private postsecondary institutions.

Council for Postsecondary Education - the Newsom Administration created this advisory group with the purpose to create an integrated system for postsecondary education and to provide the governor with consultation regarding the economic and social impact of higher education in the state. The Council includes members spanning both the K-12 and higher education sectors.

Section II. Educational Goals

Having laid out the descriptive characteristics of California’s education system, we now turn to an analysis of how the state has defined education goals across the early childhood education system and K-16. Goals are important to understand because they can set clear objectives and provide a guiding orientation to educators and administrators across the system about expectations. Goals can be short-term and focus on issues like student achievement and graduation rates, or they can be long-term and address loftier goals such as democratic citizenship and social mobility. Below, we review the goals of education as defined by the education code or by leading statewide organizations in preschool, K-12, and higher education.

California’s ECE, K-12 and higher education goals

Article 9 of California’s constitution establishes the foundation for California’s education system, which broadly defines the purpose of education for the “general diffusion of knowledge and intelligence” and the promotion of “intellectual, scientific, moral, and agricultural improvement”. Beyond these brief descriptions, the constitution is silent on collective goals to guide the state’s education system. However, further definitions of California’s educational goals are either defined in the state’s education code, or developed by leading statewide organizations such as the State Board of Education, the California Department of Education, or the governing bodies for the higher education segments.

Early childhood education - While both the general education code provisions and the elementary and secondary education code outlines in great detail the structure, funding streams, and categorical programs intended for early childhood education, no explicit statewide goals are listed for early childhood education. Rather, the California Department of Education has developed Preschool Learning Foundations that outline the knowledge and skills
young children are expected to learn in three volumes (published in 2008, 2010, and 2012). These volumes include the following goals: the development of democratic competencies, personal autonomy, the development of healthy personal relationships, and skills acquisition. One must search for these goals within the text, however, because they are not explicitly stated. Beyond the goals outlined in the Preschool Learning Foundations, no explicit goals exist for infant and toddler care, leading some researchers to call for stronger alignment between the ECE programs and the first years of elementary education (Koppich & Stipek, 2020).

K-12 - K-12 is also an area where the education code does not explicitly outline the goals or purposes of education. However, the California State Board of Education defines the vision for K-12 on their website: “All California students of the 21st century will attain the highest level of academic knowledge, applied learning and performance skills to ensure fulfilling personal lives and careers and contribute to civic and economic progress in our diverse and changing democratic society”. The Board also details three specific goals for the education system: 1) to adopt and support rigorous academic content and performance standards in the four major topic areas across K-12; 2) to ensure that all students are performing at grade level at the end of each academic year, and to advocate for students that are not performing at grade level; and 3) to maintain policies that assure all students receive the same nationally-normed and standards-based assessments in grades 2-11. While the vision statement focuses on purposes like 21st century skills, personal fulfillment, and democratic citizenship, the goals narrowly focus on skills acquisition alone.

Arguably, the statewide goals for K-12 education extend beyond the SBE website into the state’s accountability system and dashboard, which includes goals like parent and family engagement, school climate, and student engagement alongside student academic achievement. Educational goals in K-12 education are also set locally by local school boards, especially with the introduction of the Local Control Accountability Plans that are integrated into the state accountability system.

Higher education - In 2013, the following goals for the state’s higher education system were added into the education code by SB 195: 1) to improve student success and access, especially for low-income students; 2) to better align degrees and credentials with the state’s economic, workforce, and civic needs; and 3) to ensure the effective and efficient use of resources to improve outcomes and maintain affordability. This is the most explicit goal definition for any part of the education system documented in the education code. Yet the goals are framed with

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16 The first volume focuses on socio-emotional development, language and literacy, English-language development, and mathematics. The second volume focuses on visual and performing arts, physical development and health for 3-year-olds, and the last volume reviews expectations for history, social science, and science to be taught to 4-year-olds.
short-term gains, with a narrow focus on completing a higher education degree for the purpose of labor market outcomes.

There are two major findings of this analysis: educational goals for the early childhood and K-12 education system are not explicitly established in the state education code. Second, the goals that are defined by the education code or by statewide organizations tend to list short-term outcomes for the education system rather than long-term goals.

**Potential long-term goals of the education system**

Stanford Professor David Labaree argues that three main purposes or goals of education have been at play since the nation’s origins and are in constant tension with one another: democratic equality, social efficiency, and social mobility (Labaree, 1997). Since these goals are not explicitly held as guiding ‘north stars’ in California’s education code or state constitution, they may get lost in conversations about school governance and may lead to fragmented policy designs with competing interpretations that take root further on down the education system (Brighouse, Ladd, Loeb, & Swift, 2018). Below, we give a brief description of each of these long-term goals to provide food for thought about how such goals may (or may not) play out across the education system.

*Democratic equality* - The educational goal of democratic equality is expressed in the quality of a citizen’s life including civic and political engagement, and also in the quality of shared community relationships, and in the rights of every student to access an education system and receive a high quality education at any level. This goal is often integrated in a strong liberal arts education, with exposure to a variety of disciplines that encourage the development of a ‘holistic self’ and exposure to a variety of cultures and social meanings (Woods, 2011).

*Social efficiency* - The social efficiency goals of an education system are to prepare students to participate in the labor market and enhance productivity to create economic growth. This goal has prevailed in education policy making in recent years in the form of an increased focus on ‘skill and drill’ instruction and testing, high school and college graduation rates, labor market earnings and job placement, alongside a narrowing of school curriculum to emphasize the importance of programs like STEM (science, technology, engineering, and mathematics) that encourage economic growth (Jacobsen & Rothstein, 2015).

*Social mobility* - Social mobility emphasizes that the education system should prepare students with equal opportunities for labor market success and personal advancement in the social structure. There is arguably a 21st century twist on this definition: To experience social mobility in the 21st century economy, some researchers argue that education systems must help students develop critical thinking, problem solving, communication, collaboration, and creativity rather than the narrow cognitive and occupations skills that have been emphasized in education over the last century (Brynjolfsson & McAfee, 2016). Rather than simply focus on topic areas like math and English, the 21st century students will need to be ‘holistic learners’ that can think abstractly across a wide range of disciplines, such as the arts and humanities, science and mathematics, and social sciences.
Section III. Problem Definition

This section narrows in on prevailing policy problems identified in K-12 and higher education. We do not review policy problems at the ECE level since the state does not focus on student outcomes at that level but rather on expanding access and funding, which is reviewed in the Education Finance paper.

K-12: Academic outcomes, the achievement gap, and college and career readiness

For decades, lawmakers in California have identified a clear policy problem in K-12 education: student achievement on standardized English and math tests is lagging in comparison to national averages, and there is an unacceptable achievement gap on standardized exams between white, Asian, Black, Latino, and low-income students. This has become a concerning problem for policymakers since academic achievement is an indication of educational opportunities that shape an individual’s life trajectory. Success in the K-12 system has been correlated with later life outcomes such as college attainment, adult income and employment, physical and mental health, and whether or not an individual engages with the criminal justice system (Heckman, Stixrud, & Urzua, 2006; Greenstone et al., 2012). Discrepancies in student achievement by race/ethnicity and income are especially concerning since they often represent broader inequalities found in society; education policy intends to design education systems that can provide equal educational opportunities for students regardless of identity, ability, or socioeconomic background.

Academic outcomes

To get a sense of the scope of California’s student academic achievement problem, we narrow in on California’s K-12 student performance in comparison to other states using data from The Educational Opportunity Project at Stanford University, which reconciles differences in interstate testing regimens. In Figures 2 and 3, we plot the distribution of state achievement scores from the Stanford Education Data Archive (SEDA) for 2009 and 2018 for math and reading among fourth graders. Despite making marginal gains in both subjects between the two time periods, the data shows that California ranks near the bottom of all states for fourth graders in both subject areas in 2018: fifth from the bottom for reading and third from the bottom for math. Furthermore, since 2009, California has only made marginal progress on reading scores compared to other states -- moving from second from the bottom to fifth from the bottom. Conversely, since 2009, California’s ranking in math actually fell: it moved from sixth from the bottom to third from the bottom.
Achievement Methodology

The Stanford Education Data Archive (SEDA) publishes data containing what is perhaps the best apples-to-apples comparison of achievement data in the U.S. Researchers undertake a number of statistical procedures to make inter-state data comparable, which is otherwise essentially incompatible due to differences in state-based achievement tests and state-based achievement scales. This includes using mean outcomes from the National Assessment of Education Progress (NAEP) test, which randomly selects a sample of students in each state who take the test in a given year, to rescale all state-based achievement data based on the same test/grading metric. The result of their systematic methodology for comparing student learning outcomes across the U.S. is a unified metric indicating the extent to which students score at/below/above the national average for their grade level. For instance, a score of 4.0 on the SEDA metric shows that students are scoring at the national average for fourth graders (math or reading). This scale applies to all grades -- meaning it could indicate, for example, third graders or eighth graders scoring at a fourth grade reading level. In other words, the scale offers a measure of how far ahead or behind students are in a particular state (or other geographic area) relative to the national average. (It is important to note that this scale is not an absolute measure of academic performance but a relative one.)

Figure 2

National Rankings for State Reading Achievement for 4th Grade

2009 to 2018 Difference in Reading Achievement (Ranked by 2018 Achievement)

Source: Stanford Education Data Archive (Version 4.1).
Notes: An achievement score of 4.0 is equal to the national NAEP average for 4th grade. A one unit increase in the achievement metric is equivalent to the mean per-grade increase in achievement between 4th and 8th grade.
In Appendix Figures A1 and A2 we show the same SEDA achievement data but for sixth graders in 2009 and 2018. Overall, California sixth graders perform better in math and reading than their fourth grade counterparts relative to the grade- and subject-specific national average. This data alone does not necessarily mean that the California school system performs better as students reach higher grades, since the data does not follow the same students over time. However, the SEDA data provides at least descriptive evidence that suggests the California school system, for grades four through six, is providing relatively better outcomes for students as they age when compared to the nation as a whole (older students are performing better than younger students). California students may start lower in the state distribution on average as fourth graders, but they generally move up the state-by-state rankings between fourth and sixth grades.\footnote{For instance, CA and DC had similar fourth grade achievement scores for math in 2018 according to the SEDA data, with DC one rank ahead of CA in that year. Sixth graders in 2018 in California, however, outranked the equivalent math cohort in DC. Again, this analysis does not follow the same students over time so it is not definitively suggesting that either school system provides better outcomes. However, this finding aligns with the Reardon et al., 2018 \textit{Getting Down to Facts} report.}
Achievement gap by race/ethnicity and socioeconomic status

Sean Reardon, a professor at Stanford University, and colleagues have undertaken a deep dive of the SEDA data (among other datasets) to report academic achievement by race/ethnicity and socioeconomic status over time in a statewide Getting Down to Facts report (Reardon et al., 2018); we briefly review their main findings here. The researchers find large disparities between academic achievement in California versus the US when broken down by district socioeconomic status. Students located in high-income districts in California are roughly on par with the national average for reading and math scores; however, students in low- and moderate-income districts in the state fall nearly a full grade level behind their national counterparts. The researchers find a similar pattern when comparing academic performance within each racial/ethnic group: the White-Black and White-Hispanic achievement gaps are about a half grade level larger in California than the national average. However, when breaking down the achievement gap by both race and SES, the researchers found that California is about on par with the national average. Importantly, the Stanford group found that gaps in student achievement by SES and race appear before students even enter kindergarten. In 2010, the researchers found that students in low-income districts lag about a half standard deviation behind the US average in both reading and math achievement, suggesting that inequalities in academic achievement evolve before children reach the door to elementary and middle schools.

In Figures 4 & 5 below, we analyzed the latest SEDA data to look at 4th grade reading and math achievement for only California students over time, broken down by race and socioeconomic status. As shown in Figure 4, fourth grade reading scores have generally improved from 2009 to 2018 for all students, with the largest gains made by Hispanic, economically disadvantaged, and non-economically advantaged students, and the least progress was made by Black and Native American students. However, only four of the groups shown on Figure 4 meet or exceed national NAEP average test scores in 2018—white, Asian, female, and non-economically disadvantaged students. Figure 5 shows achievement progress made in fourth grade math over time, which was not as significant as the reading gains. As seen, non-economically advantaged students made the largest gains from 2009 to 2018, and incremental progress was made for Asian, Hispanic, white, female, male, and economically disadvantaged students. Progress was actually lost between the two periods shown for Black and Native American students. Similar to the reading scores, only Asian, white, and non-economically disadvantaged students meet or exceed national NAEP average math test scores.

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18 The researchers also analyzed student performance by ELL status and urbanicity; for more information, see the Getting Down to Facts report (Reardon et al., 2018).
Figure 4

CA Achievement Rankings in Reading for 4th Grade

Average Achievement Score (4.0 = Average for 4th Grade)

- Asian Students
- Black Students
- Hispanic Students
- Native American Students
- White Students
- Female Students
- Male Students
- Econ. Disadvantaged Students
- Non-Econ. Disadvantaged Students

Source: Stanford Education Data Archive (Version 4.1).
Notes: An achievement score of 4.0 is equal to the national NAEP average for 4th grade. A one unit increase in the achievement metric is equivalent to the mean per-grade increase in achievement between 4th and 8th grade.

Figure 5

CA Achievement Rankings in Math for 4th Grade

Average Achievement Score (4.0 = Average for 4th Grade)

- Asian Students
- Black Students
- Hispanic Students
- Native American Students
- White Students
- Female Students
- Male Students
- Econ. Disadvantaged Students
- Non-Econ. Disadvantaged Students

Source: Stanford Education Data Archive (Version 4.1).
Notes: An achievement score of 4.0 is equal to the national NAEP average for 4th grade. A one unit increase in the achievement metric is equivalent to the mean per-grade increase in achievement between 4th and 8th grade.
In recent years, policymakers have turned to focus on indicators of ‘college readiness’ in the K-12 environment to strengthen the cradle to career pipeline and prepare more students with skills and degrees to meet the demands of California’s “skills gap”, the difference between the number of people with degrees and labor market demand (Hanak & Baldassare, 2005). The good news is that California has seen improvements in high school attainment and other key indicators of college readiness such as A-G course completion. As shown in Figure 6 below, California’s rates of high school attainment have greatly improved since the 1960s, and in recent years has steadily climbed to reach 85 percent of all adults holding a high school degree in 2019. The national average has increased over time as well, and began outpacing the California rate beginning in 1990 – reaching an attainment rate in 2019 of 89 percent. Despite this progress, all states have made progress to improve high school attainment rates, and California actually ranks last among all other states in improvements made to high school attainment from 1960 to 2019 (see Appendix Figure A3).

Of special note: High school dropout rates are also concerning when compared to a national average. In the latest year of data available (2020), California had a statewide dropout rate of 8.9 percent, compared to a national average of 5.1 percent. Dropout rates are considerably higher in California for Black and Latino students and students who are economically disadvantaged, such as homeless and foster youth.

It is important to note that there are discrepancies in comparing rates of high school attainment across states, due to different state graduation requirements. For example, California requires two years of math instruction, three years of English, and two years of Science, whereas other states typically require more courses in each subject (Gao, Lopes & Lee, 2017). For several years, California also required a high school exit exam that was eliminated in 2017, with retroactive diplomas awarded to any student who met all other graduation requirements after the test became mandatory in 2004.

There are also different ways of measuring high school graduation. In Figure 6, we are showing the fraction of the overall adult population with a high school degree in a given year. An alternative measure of high school graduation—the adjusted cohort graduation rate—shows the fraction of each senior high school cohort that graduates within a given year. To see how California compares to other states in 2018-19 on this alternative measure, see the National Center for Education Statistics website.

19 It is important to note that there are discrepancies in comparing rates of high school attainment across states, due to different state graduation requirements. For example, California requires two years of math instruction, three years of English, and two years of Science, whereas other states typically require more courses in each subject (Gao, Lopes & Lee, 2017). For several years, California also required a high school exit exam that was eliminated in 2017, with retroactive diplomas awarded to any student who met all other graduation requirements after the test became mandatory in 2004.
In Appendix Figure A4, we show the breakdown of high school attainment rates by race, over time. As shown, in 2019 there were some major discrepancies by race/ethnicity. White students had the highest attainment rates at roughly 95 percent, while Latino students lagged about 25 percentage points behind, and Black, other, and Asian students hovered around 90 percent attainment rates. On a bright note, attainment rates have improved for all race/ethnicities since 2010, with the largest gains made by Latino students.

**College readiness - A-G course requirements**

College readiness has also improved in the proportion of students in California who have completed their A-G coursework, which are requirements for admittance to the UC and CSU systems. The A-G requirements are a set of courses in seven topic areas offered across California schools that have been approved as college preparatory courses by the UC system;
students must complete yearlong courses in English, mathematics, laboratory science, world language, visual and performing arts, and college-preparatory electives.\textsuperscript{20}

An analysis of A-G courses from the Public Policy Institute of California (PPIC) found that in 2015, 43 percent of high school graduates had completed the requirements, a modest increase from rates seen in the early 2000s (Gao, 2021). However, the report also found that there are large differences in the demographics of students who complete the requirements, with Asian and white students completing at much higher rates than minority or economically disadvantaged students. PPIC has also found that A-G completion varies greatly by geographic region--overall, districts in urban and suburban areas have higher A-G course completion rates than districts in rural areas and small towns. Although California does not require these courses in order to graduate, some districts such as Los Angeles Unified, San Jose Unified, Oakland Unified, San Diego Unified, and San Francisco Unified are beginning to include them as part of their graduation requirements, but with mixed results for college preparedness (Betts, Zau, Bachofer, 2013).\textsuperscript{21}

### Alternative pathways to college readiness

The state offers a variety of programs students can take advantage of while still in high school to make progress toward a college degree:

- **Dual enrollment** allows high school students to take college courses, and experienced growth during the pandemic. In 2016, the legislature passed AB 288, the College and Career Access Pathways partnership, which expands access to dual enrollment for students from historically underrepresented groups.

- **Early-college high schools** allow students to take courses to earn both a high school diploma and an associate’s degree.

- **Middle-college high schools** allow students to earn up to 60 college credits while also earning a high school diploma. The program is targeted to students who are not on track to college but show promising potential.

- **Career and Technical Education (CTE)** offers another alternative pathway for high school students. Students enrolled in these pathways can prepare for careers after high school or continue their CTE pathway at a community college. In the 2016-17 year, about 45 percent of high school students enrolled in a CTE, and 35 percent of CCC students.

\textsuperscript{20} Students may also meet UC/CSU requirements by completing college courses in programs such as dual enrollment, or by earning qualifying scores on Advanced Placement exams.

\textsuperscript{21} It is also somewhat concerning that the UC system has been given authority to determine which courses across the K-12 system qualify as an A-G course since the K-12 and higher education segments have mutually exclusive governing systems. Moreover, UC makes A-G course requirement decisions without approval from the CSUs, when CSUs also use A-G as a signal of college preparedness.
Higher education: College access, barriers to completion, and degree attainment

In recent years, lawmakers have reoriented their focus from K-12 to outcomes in higher education, narrowing in on indicators of college access, rates of degree completion, college affordability, and labor market outcomes. In part, this reorientation was triggered by a 2005 report from the Public Policy Institute of California that identified a ‘skills gap’ highlighting the difference between the level of education the future California population was likely to possess versus the level of education demanded in the state’s future economy (Hanak & Baldassare, 2005). Indeed, a mismatch persists even today between the demand for those with college degrees and the current supply (McConville, Bohn, Brooks & Dadgar, 2021), driven to some degree by a complex web of structural and organization factors within the state’s public higher education environment. Below, we describe the major issues California faces in access to higher education, the barriers students face to completion—including the growing problem of college affordability--and inequalities in college completion rates.

College access

A higher education degree has several direct benefits, namely, college graduates today experience large wage gains—Winters (2020) finds that California college graduates earn on average about double that of high school graduates. Beyond earnings, college graduates generally have higher levels of employment, greater coverage in employer retirement plans, civic engagement, and better voter turnout (Ma, Pender, & Welch, 2019). There are health benefits too--researchers have found that higher education improves health outcomes and life expectancy, and leads to more individuals having health insurance.

Many California high school students have aspirations to attain a college degree (Baldassare, et al., 2020), but only about a third of all 9th graders actually make it to and through college and low-income, Latino, and Black students are less than half as likely to earn a college degree as their peers (Johnson & Cuellar Mejia, 2020a). California ranks 4th in the nation for the number of high school graduates that enroll in a two-year higher education segment, but the state is toward the bottom of state rankings for the number of students that enroll in 4-year colleges and universities. In part, this was by design since the Master Plan intended to ration limited seats in the UCs and CSUs to the state’s top high school graduates, and to use CCCs as an entry-point into higher education for the majority of students.

What is concerning is that this rationing mechanism appears to be associated with patterns of enrollment by race and income-level. Many low-income and minority high school graduates enroll in the state’s CCCs rather than a UC, CSU, or other 4-year institution, and many never transfer to earn a 4-year degree. Just 22 percent of low-income students enroll directly as a freshman at a 4-year college (Johnson & Cuellar Mejia, 2020a), and just 28 percent of Latino students and about 36 percent of Black students (California Competes, 2018). Of special
A significant concern is the fact that the majority of Black students attending a 4-year college enroll in private, for-profit institutions that charge higher tuition and often leave students with much higher student debt levels (California Competes, 2018).

**Structural barriers to college access**

Differences in college access by race/ethnicity and income level may be explained by *structural* factors, meaning that broader social, economic, and political forces are at play. For example, low-income students are more likely to attend high schools with high concentrations of poverty and fewer financial resources that influence education quality (EdBuild, 2019). Many low-income schools employ fewer highly qualified and credentialed teachers than schools located in wealthier districts (Carver-Thomas, Kini, & Burns, 2020; Darling-Hammond, Goldhaber, Strunk, & Sutcher, 2018; Goldhaber, Strunk, Brown, Naito, & Wolff, 2020). Students at low-income schools have access to fewer college preparatory courses that put students on pathways to higher education attainment, and low-income schools offer limited access to resources to help students navigate transition pathways to higher education, such as access to counselors or academic advisors (Children Now, 2019; Johnson & Cuellar Mejia, 2020b).

There are structural barriers at the higher education level as well. As seen in Figure 7 below, in an attempt to expand college access, California’s higher education segments have been enrolling many more students over time but are running out of capacity. The CSU, in particular, has reached its enrollment limits, and is rejecting thousands of qualified freshman applicants each year, many of whom are disadvantaged students (Cook & Mehlotra, 2020). This has led the CSU to engage in a process referred to as “impaction”, which raises admission requirements when they cannot accommodate the number of applicants; CSUs are also redirecting applicants to campuses where there is enrollment space, rather than to the applicants’ first choice college (Cook & Mehlotra, 2020). UCs have been responding to new enrollment increases by increasing class sizes, increasing faculty to student ratios, and neglecting investment in facility maintenance and growth, decisions that have potential to influence education quality (Douglass & Bleemer, 2018).
Given the limited space within California’s public higher education system, it may come as no surprise that more and more high school graduates are leaving the state altogether to attend college. The Public Policy Institute of California (2019) found that this number doubled from 2004 to 2017, with over 36,100 students exiting the state, of which half enrolled at out-of-state public universities. The latest data from the CCC Chancellor’s Office also shows that while CCCs have been successful in transferring more students to the UC and CSU system over the past five years, many more students are also transferring to out-of-state or private in-state colleges and universities (California Community Colleges, 2021).

The domino effect of these enrollment pressures has meant that the three segments--in particular the CCCs and CSUs--are pushing far more students online, where quality and outcomes are difficult to monitor and regulate.\(^\text{22}\) Success in online courses also have mixed results for higher education students, especially those from disadvantaged backgrounds.

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\(^{22}\) There has been institutional resistance from faculty in higher education to adopt technology, especially as online learning was initially emerging. This culture did not shift until the COVID-19 pandemic when adopting technology became a necessity.
Organizational barriers to completion – Remediation and transfers

Once students gain access to college, there is no guarantee that they will complete their degree or certificate programs. Some of the major issues preventing students from completing their higher education programs have been identified as organizational in nature, meaning that the higher education segments have unique conditions that prevent students from staying enrolled and graduating. Two key examples are requirements for ‘remediation’ (Rodriguez, Jackson, & Cuellar Mejia, 2017) and a ‘transfer maze’ found in the CCC system (The Campaign for College Opportunity, 2017) that has historically been difficult for community college students to navigate.

Remediation - For decades, the three higher education segments used proprietary tests to measure students’ preparedness to enroll in credit-bearing courses that would count toward degrees. It was common for students to not pass these tests and instead place into ‘remedial’ courses, which do not count for college credit and intended to teach basic skills and bring students up to speed in college-level coursework (Rodriguez, Jackson, & Cuellar Mejia, 2017). Student placement in remedial courses was common across all three segments, but was much more common at CCCs, with eight in ten students requiring some form of remediation. Across all three segments, remedial placement was frequent for Latino, Black, and low-income students who were placed at higher rates than white and Asian students, and who were also allocated into lower levels of remediation. Many students who started their college journey in remediation dropped out before they ever had a chance to enroll in credit-bearing courses that would lead to degrees and transfer pathways.

Transfers - Historically, about 80 percent of students who start at a community college wish to transfer later to a 4-year institution, but very few actually do; the problem is exacerbated for

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23 There were typically three levels of remediation that each required semester-long coursework to advance to the next level, causing concerns that students would either drop out of the developmental sequence or spend several years in remediation before advancing to credit-bearing courses that would count towards degrees and college transfers, which could also become a financially costly endeavor.

24 The state legislature recently mandated the higher education system to re-evaluate the ways college readiness is determined by eliminating remedial placement exams and instead use performance from high school coursework to evaluate whether the student requires basic skills training. Researchers at PPIC have found that this policy change has led to far more students starting their CCC journey in transfer-level English and math courses, with strong student success rates. Notably, transfer-level course completion rates improved significantly for Latino and Black students, although progress has not been made evenly across the CCC system, with some campuses improving transfer-course placement at a quicker and more expansive rate than others (Cuellar Mejia, Rodriguez, & Johnson, 2019).
low-income and minority students who are less likely to transfer than their high-income or white and Asian peers (Johnson & Cuellar Mejilla, 2020b). In fact, only 4 percent of students transfer after two-years of enrollment, 25 percent after four years, and 38 percent after six years (The Campaign for College Opportunity, 2017). Of the students who do transfer, only about a quarter receive their Associate’s degree or a certificate prior to transferring (Campaign for College Opportunity, 2017).

One major barrier to students’ transfer progress is the remedial issue discussed above; however, students also face the difficulty of figuring out which credit-bearing courses are eligible for transfer to either a UC or CSU, while also navigating necessary coursework to complete AA degrees and certificates. Often, students navigate this process on their own since community colleges lack adequate advising services to help students navigate the transfer process. This confusing ‘transfer maze’ can lead to excess course taking, longer time to degrees, and can become a financial burden to students--The Campaign for College Opportunity (2017) found that it can cost students an additional $36k-38k to earn a bachelor’s degree because of the delays they face in CCC transfers.\textsuperscript{25}

\textit{Structural barriers to completion: College affordability and student debt}

Other barriers to college completion are structural in nature, meaning that broader economic, legal, and political forces are at play. The funding composition of the higher education segments is a key structural barrier, which places much of the cost burden of a higher education on students in the form of higher tuition, especially at 4-year colleges and universities (for a review of why this is the case, see the Finance paper). This has led to problems of college affordability and student debt, especially since the cost of 4-year college tuition has risen dramatically for California students over the past four decades.

According to the California Budget & Policy Center, real average annual tuition/fees at the CSUs increased from $500 in 1979 to $7,300 in 2018. Large increases also occurred in the UC system, with tuition/fees rising from $2,200 to $14,400 between 1979 and 2018. On a bright note, a report from the Public Policy Institute of California (2020) found that higher education is generally more affordable here than other states. The UC system is slightly more expensive

\begin{footnote}
\textsuperscript{25}The transfer rate from CCCs to CSUs improved significantly after the state legislature established the Associates Degree for Transfer (ADT) program in 2010, which sets clear course pathways in certain majors and guarantees that students can transfer to a CSU in their major. Also in 2021, Governor Newsom signed the Student Transfer Achievement Reform Act that simplified the ADT program and requires course numbering and course requirements for transfer to be streamlined between the higher education segments.
\end{footnote
than other comparable research institutions in the U.S., while CSU is slightly less expensive, and the CCC system is the most affordable in the nation (Jackson & Warren, 2018).  

Despite the relative affordability of California’s public colleges and universities compared to other states, the general upward trend of rising college tuition has been further stressed by other costs of attending college. The cost of books and supplies, housing, transportation, and childcare are especially high in California, making it difficult for many students to afford even basic needs. In fact, researchers from the Public Policy Institute of California estimate that when taking into account these other costs, the total cost of attending one of the UCs is closer to $32,000, with tuition and fees accounting for just 42 percent of the overall price tag. At CSUs, they estimate the total cost to be just under $15,000, with tuition and fees representing just a third of the total cost; and while community colleges have very low tuition, tuition is just 12 percent of total costs, which PPIC researchers estimate to be over $10,000 (Jackson & Warren, 2018).

The true cost of college attendance has put pressure on students to take out loans to finance their education. Nationwide, student loan debt has increased substantially over the past decades. As shown in Appendix Figure A5, the average new student debt in the U.S. grew from about $1,300 in 1971 to a peak of about $7,900 in 2010 at the height of the Great Recession, and has since declined to approximately $6,100 in 2019. Over the course of college enrollment, the annual loans can add up for individual students. The Institute for College Access and Success (TICAS) reports that the average undergraduate debt load for the class of 2019 is $28,950. In total, the Federal Reserve reports that outstanding student loan liability in the U.S. increased from $260 billion in 2004 to over $1.5 trillion in 2021.

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26 This resonates with findings from the College Board, which collates higher education data from a variety of sources (Ma et al., 2020). Furthermore, CCC tuition/fees have actually dropped by 8% in the last five years according to the College Board.

27 These figures are calculated by taking total student loans distributed in each academic year and dividing by the total number of student FTE’s; therefore, the average student loan liability in each year exclusively among students with any loans is larger.
College attainment rates

There is promising news in California’s college attainment rates: overall, more Californians than ever before now have at least a Bachelor’s degree. In Figure 8, we show that, over the past sixty years, college attainment rates in California have risen dramatically — ranging from just 3.9 percent of the adult population with a college degree in 1960 to about a third of the population in 2019. College attainment rates in California and the rest of the U.S. have closely tracked each other; however, California has consistently outranked the rest of the U.S. by several percentage points. In fact, when ranked against other states, California falls in roughly the top third of states that have improved college attainment rates the most over the last several decades (see Appendix Figure A7). Some of the fastest growth in the fraction of the adult population with college degrees occurred in 1980 to 1990 when the percentage of the population with a college

Details about student loan debt

Generally speaking, student debt either originates as a public or private loan, meaning that there is an expectation that the loan principal provided by the lender to the student will be paid back with interest. Today, public loans are offered by the Department of Education (ED) and fall into three primary categories:

- Direct Subsidized Loans - eligible to undergraduate students with financial need)
- Direct Unsubsidized Loans - eligible to undergraduate and graduate students)
  and
- Direct PLUS Loans – eligible to graduate students or parents of undergraduate students)

An undergraduate’s year in school and dependency status determines the maximum they are allowed to borrow but ranges between $5,500 and $12,500. Graduate students are eligible for $20,500 per year of Direct Unsubsidized Loan and no limit on Direct PLUS Loans. Today, interest rates on ED loans are 3.73% for undergraduate students, 5.28% for Direct Unsubsidized Loans for graduate students, and 6.28% for Direct PLUS Loans for graduate students and parents. These values have been set based on a formula that uses the 10-year Treasury Note plus a fixed amount that is dependent on the loan program, including a 8.25 percent cap (Congressional Budget Office, 2020). Historically, interest rates for public student loans have reached as high as over 8%.

While federally subsidized and unsubsidized loans make up the crux of the student loan system in the U.S., private loans generally backfill student needs where federal loans, public grants/aid, and scholarships are insufficient for the cost of attendance. Nationally, nonfederal loans make up about 14% of student loans distributed (Ma et al., 2020). These loans generally come with fewer consumer protections (e.g., deferment) and can come with higher and more variable interest rates than federal loans (The Institute for College Access & Success, 2019). According to The Institute for College Access & Success (TICAS), 14% of student loan debt of college graduates in California was from private loans (The Institute for College Access & Success, 2019). During the COVID-19 pandemic, the federal government placed a freeze on federal student loan repayments and interest accumulation until May 2022, which has been extended to September 2022.
degree in California more than doubled. The past ten years also saw relatively strong growth in college completion, with the rate of population-wide Bachelor’s degrees growing from 27.2 percent in 2010 to about 32.5 percent in 2019.

**Figure 8**

![Trends in Rates of College Attainment](image)

However, in Appendix Figures A8 & A9, we plot the same college attainment measure, break it down by race/ethnicity and age group, and find that California has a long way to go in boosting college attainment rates for all racial and ethnic groups. As shown in Figure A8, since 1960, college attainment rates by race/ethnicity in California have become more unequal, with the college attainment rates of Asian/Pacific Islander and white adults rising faster than the rates for Latino, Black, or those who fall into “other.” As of 2019, college completion rates for Latino adults lagged significantly behind other groups, with 13 percent of Latino adults in 2019 having completed college. Among Californians 25-34-years-old, the picture is slightly rosier in the latest year of data. Figure A9 shows that college attainment rates for each race/ethnicity in 2019 is about 5-15 percentage points higher among the younger cohort. For a look at how graduation rates vary by higher education institution in California, see Figure A10 in the Appendix.
Section IV. Strategies for System Improvement

Given the concerning status of California’s student performance in comparison to other states, alongside the state’s ambitions for students to meet a variety of educational goals, there has been a strident call from statewide actors to improve the quality of education across the education pipeline, as well as a movement to improve educational opportunities for students from disadvantaged backgrounds. How should policymakers go about the process to put ECE, K-12 schools and higher education institutions on track for improvement? Two competing policy ‘logics’ are currently at play in the U.S. context, but especially so in California’s education reform environment. The two logics— a market-based approach and a continuous improvement approach—use very different policy instruments to address school improvement; below we briefly review the competing logics and tools used for school improvement in California.

Market logics

Education policy rooted in ‘market logic’ has evolved over the last several decades and leverages a variety of policy instruments. Most notably, market logic has fostered ‘educational choice’, especially in K-12 education. The theory of action behind the educational choice approach to school improvement is straightforward: Education organizations would improve if they existed in a marketplace setting where the forces of competition would make schools more efficient and effective. In this setting, students and families would be better off if they...
could access a variety of educational options to find a school provider that meets the unique needs of students (Chubb & Moe, 1990). Over the last few decades, states have engaged in a variety of ‘public-private partnerships’ that enable a broader set of school choice options funded by public dollars. In K-12, this has primarily meant the expansion of charter schools, which operate privately but are publicly funded. In ECE, California has experienced growth of a variety of private providers that parents can choose from for childcare, special education, and preschool services, often subsidized with public dollars. In higher education, the state has seen the rise of a variety of private nonprofit and for-profit postsecondary entities that operate independently from the state but are subsidized via state student financial aid programs.

Alternatively, market logics have been applied to policy designs that are implemented directly in traditional public school environments. For example, accountability policies, teacher evaluations, financial incentive programs, or ‘turnaround strategies’ for school improvement are rooted in policy design principles that focus on the outputs of public policy rather than the inputs. In other words, such policies try to motivate changes to the behavior of educators by orienting them toward outcomes such as student achievement, often with the coercive forces of sanctions rather than financial or technical support (Mintrop, 2018).

Below, we provide a brief review of market-based policies at play in California education policy.

**Education Choice in ECE and K-12**

Over the last several decades, policymakers, activists, and parents alike have encouraged the development of marketplace alternatives in K-12 schools to provide an array of choices of where to send children to school. Across the U.S., states have experimented with different policy instruments to expand school choice to parents and students in both private and public school settings. Policies that promote private school choice include education savings accounts, school vouchers, and tax credits. Public school choice programs include enrollment at charter and magnet schools, inter/intra-district public school ‘open enrollment’ programs, and different forms of homeschooling and online learning. Below, we narrow in on two major choice programs leveraged in California’s ECE and K-12 sectors—vouchers and charter schools.

**Vouchers**—In the case of California, lawmakers have leveraged vouchers for some early care programs, which are cash transfers typically designed to support low-income working parents or parents enrolled in school. California provides vouchers for families to obtain access to

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28 Much of the advances in such policy designs stem from public choice and principal-agent theories developed in the field of economics (Tolofari, 2005), which is why this set of policies is referred to as ‘market logics’.
childcare vendors through the Alternative Payment program. Families can use the voucher to select from a variety of privately or publicly operated child care programs.

Charter schools - Lawmakers in California have primarily facilitated the growth of educational choice programs by supporting charter schools, which shift the institutional conditions of K-12 schools to a marketplace environment where schools compete for students and act within a deregulated environment (Chubb & Moe, 1990). In this setting, charters are publicly funded but are operated by third-party vendors rather than public employees that in theory gives charters more flexibility to create unique organizational conditions to facilitate innovation in teaching and student learning (Lubienski, 2003) while also responding to competitive market forces that improve school efficiency and effectiveness (Chubb & Moe, 1990).

California has a robust and growing charter sector that currently enrolls about 11 percent of all K-12 students, with about 1,300 charter schools and seven all-charter school districts located in 54 of the state’s 58 counties. Charter schools operate independently from a public school district (even if they are considered part of the district) and the relationship is established with a contract between the county or district. In some cases, the State Board of Education approves and oversees charters instead of the district. According to the state’s education code, charters cannot charge fees for admission or discriminate against enrolling students based on race/ethnicity, religion, nationality, disability or other characteristics; charters must also admit all students who wish to attend the school, but if the school is at capacity, charters hold lotteries for admittance (CSBA, 2020).

California’s charter school environment
There are a wide range of charter schools--the majority are new ‘start-ups’ initiated by parents, activists, educators, or other stakeholders, and about 15 percent are conversions of pre-existing public schools. About 75 percent of charters operate in traditional brick and mortar settings, and the remainder are either partially or fully online, virtual, or a form of independent study. Some charters are single ‘stand-alone’ schools and others belong to networks of ‘charter management organizations’ operating throughout the state and/or nationally; for example, the Knowledge is Power Program or Aspire Public Schools.

There are a vast array of charter schools in the state designed to meet students’ unique learning needs. Some charters focus on foreign languages, STEM, the environment, or the arts, while others connect students to apprenticeship programs or local community colleges. Charters commonly experiment with different organizational forms, such as Montessori models, non-classroom-based instruction, or integrate technology into the classroom as a primary learning modality.

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29 The majority of voucher recipients in the Alternative Payment program are also enrolled in the state’s welfare program, CalWORKS (California Work Opportunity and Responsibility to Kids).
There are three main ways that charters are different from traditional public schools: 1) charters typically have their own operating boards, 2) charters can choose to receive funding through local county offices of education or through their local authorizer, and 3) charter schools are free from many of the state statutes and regulations that apply to school districts (CSBA, 2020). However, charter schools must comply with state standards and assessments, accountability policies, and all charter school teachers must have a Commission on Teacher Credentialing certificate.

As a whole, California lawmakers have generally been friendly to charter school growth, which is reflected in a generous cap of allowed charters in the state (currently at 2,250—the state is nowhere close to meeting this threshold), and the cap grows by 100 schools each year. The state also has more charter schools and more students enrolled in charters than any other state. There is a powerful school choice advocacy network and Charter School Association that champions the growth of charters statewide. For the most part, charters maintain the autonomy established in their founding contract and self-regulate through their governing boards. However, over the last few years, there has been a movement in the state legislature to revamp the state’s charter school laws to improve transparency, public accountability, and school quality among the autonomous organizations. In 2019, leaders of the state’s public school system in partnership with the California Charter School Association established landmark legislation:

- **AB 1505** - The law revamps laws covering approvals, renewals, and appeals of charter school denials, and more tightly regulates teaching credentials for charter school teachers. The bill also permits school boards and county offices of education to consider the financial impact of charter schools as a factor in whether or not to establish a new charter school, and placed a two-year moratorium on the spread of non-classroom based charter schools.

- **AB 1507** – The law removes exemptions that charter schools must operate within the geographic boundaries of their authorizing district.

- **SB 126** – The law increases transparency of charter schools by requiring them to public records and open meeting laws.
Concerns for the K-12 school choice movement

The school choice movement in California has broadened consumer choice and has been very successful at creating innovative models of schooling that may otherwise be difficult to create within the confines of traditional public school rules and regulations. However, research on charter schools’ effectiveness at raising student test scores is mixed (Cohodes & Parham, 2021), especially by type of charter school organization—whether brick-and-mortar or online (Fitzpatrick, Berends, Ferrare, & Waddington, 2020), whether charters use strict ‘no excuses’ policies or not (Cheng, Hitt, Kisida, & Mills, 2017), or whether charters operate within charter management organizations or as standalone organizations (Gleason, Tuttle, Gill, Nichols-Barrer, & Bing-ru Teh, 2014; Dobbie, & Fryer, 2011). Beyond test scores, decades of research have drawn out equity (Miron et al., 2010; Scott et al., 2017) and quality concerns (Cohodes & Parham, 2021) of the internal teaching and learning practices that can manifest in organizations that operate autonomously from the public domain.

The rapid spread of charter schools have also led to fears that charter school proliferation may affect district budgets by shifting funding away from traditional public schools (Blume, 2016). In a study of California charter school finance, Paul Bruno (2019) found that charter enrollment is associated with lower per pupil spending in traditional public schools and reduced fiscal health, although the effects were smaller than what has been reported in other states, likely due to California’s unique school funding rules. Research in other states has found that public school districts may struggle financially in response to charter competition to reduce their fixed costs, such as closing schools or selling off land and buildings, or they may face challenges to reduce overall expenditures at the same rate revenue is reduced due to declining enrollment (Ladd & Singleton, 2017; Arsen & Ni, 2012).

Other K-12 policies using market logics

Accountability policy - As early as the 1990s, several states—including California—began experimenting with standards-based accountability policies for schools. Accountability is a policy tool to hold schools responsible to a governing body, often with the use of sanctions or rewards to motivate behavioral changes (Figlio & Loeb, 2011). In California, lawmakers passed the Public Schools Accountability Act in 1999, which established an ‘Academic Performance Index’ that was used to rate the performance of the state’s schools using student performance on the state’s basic skills testing program, and to identify high-performing schools with rewards and underperforming schools in need of intervention.

This state law was trumped in 2002, when the federal government passed the No Child Left Behind (NCLB) act, a national school accountability policy that extended the federal government’s reach to all public schools in the country. Among the law’s requirements, NCLB specified that all states were required to test students in reading and mathematics in grades 3-8 and once in high school, set ambitious goals for all students to reach 100 percent proficiency by

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30 California’s experimentation with different forms of accountability (aside from standards-based accountability) date back even further to the 1970s. For a review, see Kirst, 1990.
31 NCLB reauthorized the Elementary and Secondary Education Act (ESEA) originally enacted in 1965.
2014, and set in place consequences for schools that did not improve over time (Figlio & Loeb, 2011). For several years following the passage of NCLB, evidence surfaced that the policy design had unintended consequences for school professionals and student learning (for example, see Au, 2007; Darling-Hammond, 2007; Mintrop & Sunderman, 2013).

In response, in December 2015, Congress and then President Obama implemented a more flexible accountability policy design by passing the Every Student Succeeds Act (ESSA). Under ESSA, states are still required to test students, set centralized goals for student achievement, and intervene in the lowest performing schools, but states have much more flexibility to select policy designs and tools to achieve these aims. The new accountability system includes measures for chronic absenteeism, student suspension and graduation rates, college and career readiness, as well as performance in math and English.  

Financial incentives, teacher evaluations, and turnaround strategies - Other market-based policy instruments that have been in use throughout California’s K-12 schools include the use of financial incentives, teacher evaluations, and turnaround strategies to improve school and student performance. Over the last decade, the federal government has incentivized many of these policy instruments at the state-level through federal grants, such as the Race to the Top grant, Investing in Innovation (i3) grants, and the Teacher Incentive Fund. In order to receive funding for these programs, school districts and state agencies in California submitted competitive applications to the federal Department of Education.

Big data - Lastly, the origins of market-based policy instruments lead back to technology developments that offered lawmakers the ability to manage and store ‘big data’ on public programs including education (Tolofari, 2005). Data systems have been used in state accountability policies, and have provided a tool for lawmakers to monitor school performance and intervene if necessary. California lawmakers continue to invest in recent advances in data software and data management capabilities. In 2019, the legislature passed a bill to establish a ‘Cradle-to-Career’ data system that would collect data on education, workforce, financial aid,

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32 The direction California has taken with ESSA was built on the accountability component of the Local Control Funding Formula (LCFF) passed by lawmakers in 2013, which required a new statewide accountability system based on ten priority areas rather than a single index or test score. For more information, see the ‘continuous improvement’ logic below.

33 For a review of these strategies and their effectiveness, see Trujillo & Renee (2012); Sunderman, Coghlan, & Mintrop (2017); Chiang et al. (2017).

34 California lawmakers have been hesitant to implement these market-based reforms at the state-level and instead, consistently show preference to use policy instruments from the continuous improvement logic (described below). There is also strong resistance from the state’s California Teachers Association to implement statewide teacher evaluations since they argue that the teaching profession should be internally regulated rather than monitored by external actors.
and social service information to be shared with lawmakers, educators, researchers, and the general public, and the system was funded in the 2021-22 budget package.

**Market logics in higher education**

Much like in the K-12 system, accountability policy has been used in California’s higher education system as well, and is the primary ‘market logic’ tool lawmakers use to govern the higher education system. One popular accountability reform across many states is to use ‘performance-based budgeting’ in higher education, which ties state dollars to measurable outcomes and goals, for example, graduation rates or time to degree (Murphy, Cook, Johnson, & Weston, 2014). There is good reason for lawmakers to consider this model, namely, that public institutions should be able to demonstrate how resources are used effectively to serve students and broader policy goals, and policies like performance-based budgeting provide transparency for how public resources get used. On the other hand, the effectiveness of performance-based budgeting is debated since there are often unintended consequences of the policy’s design and it is unclear whether the policy actually improves student outcomes (Dougherty et al., 2014).

Performance-based budgeting was **adopted at the CCCs** in 2017 and ties 60 percent of the institution's funding to enrollment, 20 percent is linked to equity factors, and 20 percent is linked to measurable outcomes for student success, such as graduation rates and the time to degree completion. Typically, the state granted the three higher education segments funding based on student enrollment alone, but there was political momentum to change the funding formula for CCCs to incentivize the segment to align with state goals to produce more college graduates, close equity gaps, and reduce time to degree completion and transfers. **Equity-oriented organizations** were strongly in support of the new funding formula since they saw it as a way to motivate CCCs to prioritize student outcomes and reduce inequalities for low-income and minority students.

However, there are ongoing concerns about using this model in a CCC setting, since some worry that the formula can be used as an excuse to **cut additional funding** from an institution that already struggles financially. Others have **concerns** about grade inflation or CCCs using gaming strategies to increase the selectivity of students to improve the amount of funding they receive from the legislature. Reasons such as these are why the funding formula has not been fully implemented at the CCCs, and why the UC and CSU systems widely oppose performance-based budgeting and have so far convinced lawmakers to stop short of implementing the policy at 4-year institutions. The state legislature has, however, mandated that the UCs and CSUs report performance measures annually that are then used in budget decisions. For further information, see the following legislation:
• **SB 195** (2013) called for the adoption of performance measures that reflect the distinct missions of each higher education segment.

• **AB 94** (2013) required the UC and CSU to report eight specific performance measures to “inform budget and policy decisions and promote the effective and efficient use of available resources.”

• **SB 85** (2017) required the UC and CSU to establish annual performance targets as an ongoing requirement.

Other market-based policy ideas leveraged in California higher education policymaking are education savings accounts and tax credits. California lawmakers established college savings accounts in the 2020-21 budget. The accounts provide seed funding for students from low-income families, ELL students, and foster youth to attend a college of their choice after graduating high school. California also offers a **College Access Tax Credit Program** to taxpayers and businesses who contribute to Cal Grants, the state’s largest source of financial aid for students in higher education. For those who participate, they receive a tax credit of 50 percent of their contribution.

‘Continuous improvement’ logics

Continuous improvement is the idea that schools can improve when they become learning organizations. In a **continuous improvement** environment teachers and school leaders continuously innovate and evaluate school improvement efforts to improve desired outcomes (Bryk, 2021; Darling-Hammond & Plank, 2015; Furger, Hernandez & Darling-Hammond, 2019; Loeb & Plank, 2008; Plank, O’Day, & Cottingham, 2018). Continuous improvement has origins in other industries such as health care, business, and manufacturing, but was adapted and integrated in the field of education over the last several decades (Park, Hironaka, Carver, & Nordstrum, 2013). In a nutshell, the theory of action guiding the continuous improvement logic is that student learning outcomes improve when education organizations have a foundation of adequate resources and when educators and administrators are adequately supported with professional capacity building; when these conditions are met, educators and administrators can then develop professional learning networks to improve instruction and student learning.

Public policy has an important role to play, but the state role is one that helps education organizations improve performance instead of taking on a top-down compliance or disciplinary role (Plank, O’Day & Cottingham, 2018). State departments and governing organizations can help illuminate problems in education organizations (often in the form of data systems and accountability), but allow relevant local actors space to reflect on the inner-workings of education environments and collaborate on problem solving. Once problems are identified in schools and districts, state lawmakers can provide important financial support by investing in
high-quality professional development and technical assistance capacity with the longer-term aim to foster professional and networked improvement communities (Mehta, Schwartz, & Hess, 2012).

The model is not unique to California and has been leveraged over time in international education contexts (Hopkins, Hargreaves, Lieberman, & Fullan, 2005; Darling-Hammond, 2010; Hatch, 2021). It is important to note that the continuous improvement logic is not exclusive to traditional public education settings; for example, the California Charter School Association is a member of the state Alliance for Continuous Improvement.

**California’s unique K-12 public education innovation environment**

Many of California’s public K-12 districts have become national leaders of the continuous improvement movement, and have created vast networks of collaborative, professional organizations of teachers, school leaders, education researchers, and other stakeholders that innovate to improve the education system. The state’s K-12 school districts have experimented with continuous improvement in the following ways:

California has a network of eight innovative ‘CORE districts’ located in urban areas across both northern and southern California that collaborate to improve student achievement across districts. District leaders, alongside teachers, school employees, and researchers work together to identify promising school improvement practices that can be shared and scaled among the 8-district network that serves more than 1,800 schools and over one million students.

State lawmakers established its first ever Collaborative for Educational Excellence (CCEE), a statewide agency that works with county offices of education, district offices, schools, and teachers to deliver technical assistance and professional development; they serve as a strategic thought partner across districts to work toward school improvement.

California is also home to many innovative reforms that are taking root throughout the state and nationally. For example, Community schools are a holistic approach to meeting students’ whole needs, and provide an array of academic and basic needs programs and services for students and their families. Research-practice partnerships have also become a popular way for educators, school leaders, and researchers to collaborate over time on school improvement—see for example this partnership established between Stanford researchers and nine local school districts. Lastly, more school leaders are using advances in design theory for school improvement, which is a disciplined process that helps practitioners identify, test, and refine solutions to pressing problems.

**Continuous improvement in ECE and K-12 education**

Below, we briefly review three strategies used by California legislators in recent years to implement the continuous improvement logic in the state’s ECE and K-12 system as a strategy to improve student achievement for all students. The strategies include: 1) Investing in high quality teachers; 2) Investing financially in the education system and offering more spending
flexibility at the local level; and 3) leveraging needs-based accountability policy to monitor school conditions and student outcomes, and to provide targeted, needs-based support.

**Strategy #1: Invest in high-quality educators** - Decades of research has shown that high quality teachers are essential to improving student achievement (Goldhaber & Hansen, 2013; Kane & Staiger, 2008; Rockoff, 2004). Teachers can also impact socioemotional outcomes in the classroom that facilitate students’ growth-mindset and self-efficacy (Loeb et al., 2018; Ruzek, Domina, Conley, Duncan, & Karabenick, 2015), and high quality teachers have also been shown to have an impact on students’ long-term outcomes like lifelong earnings, college-going rates, and retirement savings (Chetty, Friedman, & Rockoff, 2014). High quality teachers, alongside school leaders and other school staff, are essential to creating the environment and conditions necessary for improved learning outcomes (Darling-Hammond, Goldhaber, Strunk, & Sutcher, 2018). California lawmakers have acknowledged the importance of teachers and teacher quality, and in recent years the legislature has made significant investments to improve the human capital pipeline of teacher recruitment, training, professional development, and retention in both ECE and K-12. For example:

- **Strengthening teacher recruitment, retention, and quality** -- The last few budget cycles have seen immense support to improve teacher quality. State lawmakers provided wage rate reform for ECE providers, and in K-12, the 2021-22 budget alone allocated nearly $3 billion in funding for programs to support teachers. This included a $1.5 billion investment in the Educator Effective Block Grant for teacher professional development, a half billion dollar investment in the Golden State Teacher Grant program to incentivize teachers to teach at low-income schools, and new investments in the state’s Teacher Residency Grant Program, which pair new teachers with experienced mentor teachers. In the past, the legislature has dedicated funding to addressing the state’s teaching shortage, and in the upcoming years, legislators are considering providing funding to recruit more male teachers of color and diversify the teaching force.

- **Strengthening teacher credentialing** - In 2014, the California Commission on Teacher Credentialing created a strategic plan to overhaul its standards for teachers and administrators, which was again revised in 2020. The strategic plan shows the state’s commitment to educator quality, and desires to prepare teachers to teach higher-order thinking and 21st century skills. However, implementing these plans have been complicated by the state’s ongoing teacher shortage and the COVID-19 pandemic.

- **Investing in teaching practices** - In the latest budget, the legislature earmarked funding to improve integrated teaching practices that focus on socio-emotional learning as well as academic and behavioral skills; state funding has also been allocated to programs to provide cultural competency training for teachers and school staff, and for school
climate surveys. These investments are intended to facilitate healthy and safe learning environments for the state’s diverse students.

Strategy #2: Financial investments and financial flexibility - Following the Great Recession, California’s economy has performed very well and produced strong tax returns to the state General Fund, which has given state lawmakers opportunities to invest financially in continuous improvement strategies. Below, we review the major ways legislators have financially invested in ECE and K-12.

Early care and education (ECE) - Historically, California’s ECE system has been vastly underfunded, with high quality childcare out of reach for many in the state (Gould, Whitebook, Mokhiber, & Austin, 2019). Yet in the latest 2021-22 budget package, legislators made major progress to extend ECE to all 4-year-olds by passing SB 130, a $2.7 billion investment in universal transitional kindergarten over the next 5 years. This will give all of the state’s 4-year-olds universal access to TK by 2025-26, while also providing access to more basic needs services and extending after-school programs for those enrolled in TK programs. This state action also provided funding to improve the quality of TK by reducing class sizes and cutting adult-to-child ratios in half. California also made a historic investment in child nutrition programs by creating a universal school meals program, providing free breakfast and lunch to the state’s 6.1 million students, including those in Kindergarten. Lastly, state lawmakers provided new funding to expand access for low-income children to enroll in childcare programs and provided funding for children requiring special education in ECE programs.

New equity funding formula for K-12 - In recent years, California lawmakers created a landmark Local Control Funding Formula with an equity component that recognizes that districts servicing students from different socioeconomic backgrounds have different financial needs. Prior to the LCFF, each school district was funded based on a unique revenue limit determined by a complex formula and multiplied by the district’s average daily attendance (ADA); districts also received categorical (restricted) funding for over 50 programs targeted to special programs and services. LCFF eliminated the revenue limit formula and most of the categorical programs, and replaced it with base funding dependent on ADA and four student grade-levels, plus extra

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35 The bill also provides parents the option to pursue an alternative ECE program if they prefer not to enroll their child in TK. This decision was in part a nod to the ECE provider community that had concerns the new TK program would put many private providers out of business.

36 While this is an important step to increase overall quality of TK programs, ensuring that students have equal access to high quality TK programs will be an essential student equity issue to watch in the coming years. Researchers of New York City’s universal pre-kindergarten program have found large disparities in the average quality of providers experienced by black and white students (Latham et al., 2020). There are also concerns for additional teacher recruitment and training that will be required among ECE teacher shortages--especially during the COVID-19 pandemic--and concerns for the cost of expanding TK facilities to meet new demand. These concerns are in part addressed by additional funding included in SB 130 for teacher recruitment, training, and facilities.

37 For research on this topic, see Jackson (2020).
supplemental and concentration grants for districts serving high-need populations, including low-income students, English Language Learners (ELL), homeless and foster care youth.\textsuperscript{38} Initially, districts received an additional 20 percent of the base rate for each high-needs student served (a ‘supplemental’ grant), and an additional ‘concentration’ grant at 50 percent of the base rate was allocated to districts serving more than 55 percent of high-needs students (Baumgardner, Frank, Willis & Berg-Jacobson, 2018). In the latest 2021-22 budget, lawmakers approved an increase of the concentration grant from 50 percent of the base grant to 65 percent.\textsuperscript{39} Importantly, LCFF did away with several “categorical” funding programs, which gave district leaders more autonomy to manage budgets and make spending decisions (Baumgardner, Frank, Willis, & Berg-Jacobson, 2018). For more information on this topic, see the Finance paper.

Other K-12 investments - The state has made other investments in K-12 education that work toward the continuous improvement logic. In the 2021-22 budget, lawmakers secured nearly $3 billion to enable 1,000 schools to transition to a community school model through partnerships with nonprofits and community organizations. Community schools address poverty by providing wraparound services to students and their families, which research reveals can lead to better academic outcomes for students once their basic needs are met (Maler, Danlel, Oakes, & Lam, 2017). The state provided enough funding so that every high-poverty school in California (schools serving 80 percent or more students eligible for free and reduced price meals) to become a community school in the next five years. In addition, the latest state budget also provided funding for student mental health, socio-emotional teaching and learning, trauma-informed instruction, and increased funding for special education students (California Department of Finance, 2021).

Strategy #3: Needs-based accountability - Alongside teacher quality initiatives and strong financial investments to improve the school learning environment for all students, the continuous improvement movement includes a unique accountability component for K-12. Like other states in the US, California was required to comply with accountability policies under the federal No Child Left Behind Act (NCLB) from the early 2000s until 2015 when federal lawmaker’s replaced NCLB with the Every Student Succeeds Act (ESSA). Leading up to the passage of ESSA, California had already transitioned to a more decentralized education decision-making model in 2013 by passing the LCFF. The LCFF included its own accountability mechanism in the form of a Local Control and Accountability Plan (LCAP), which provided a tool for local districts to determine how to best invest resources across the district’s schools with buy-in from communities. The LCAP included a local accountability component with multiple

\textsuperscript{38} This formula is used to fund students at both traditional public schools and charter schools.

\textsuperscript{39} The new 15 percent increase comes with a spending restriction: districts must use the money to fund new staff expenditures that provide direct services to students and reduce adult-to-student ratios.
measures of school performance that the state also monitored. Accountability measures included not only test scores, but also measures such as student engagement, school climate, and parent involvement. State lawmakers later revised the accountability model to meet federal compliance with the federal Every Student Succeeds Act, and now the state’s accountability system measures chronic absenteeism, student suspension and graduation rates, college and career readiness, as well as performance in Math and English.40

The intent of the new accountability model is to provide more nuance to teachers, administrators, local communities, and state actors about the internal conditions of schools, and to provide information about additional resources the school or district might need. Importantly, the new accountability model is not sanctions-based (as was the design under the previous No Child Left Behind Act); instead, California’s accountability is intended to provide school districts with support based on their specific needs. For example, one way this is accomplished is by assigning the state California Collaborative for Educational Excellence (CCEE) to districts in need of improvement; the organization offers technical support and professional development to districts across the state.

The design of LCFF, the LCAPs, and the new accountability model is not without its critics. There have been growing concerns that LCPAs are too cumbersome and fail to hold districts accountable to their goals. There is also growing concern that new LCFF funds have been spent on cost pressures in district budgets—such as pensions, retiree health care, or special education enrollment increases—instead of spending the funds directly to improve services and learning outcomes for high-needs students (Alejandre & Massaro, 2016; Chen & Hahnel, 2017; Hill & Ugo, 2015; Roza, Coughlin & Anderson, 2017). This concern even percolated to a state audit of LCFF, which found that the state’s approach to monitoring LCFF has not ensured that funding is benefiting students as intended (California State Auditor, 2019). For more information, see the Finance paper.

Continuous Improvement in Higher Education

While many of the state’s education leaders have focused on a continuous improvement model primarily for K-12 education, the logic has arguably been applied to higher education as well. In recent years, major policy reforms have come out of the state legislature to meet the state’s goals of improving college access, retention, and completion rates. The legislature has focused on three main strategies: 1) tightening up the education pipeline by improving college and career readiness, 2) broadening student financial aid, and 3) improving transfer pathways and reducing barriers to degree completion.

40 See school and district-level results on the state’s performance dashboard.
Strategy #1: Addressing college access by improving the transition from K-12 to higher education via dual enrollment, A-G courses, and career and technical education

Dual enrollment - Dual enrollment programs are one way for high school students to access and earn college credits while still in high school. Students who enroll in such programs are more likely to graduate from high school (Berger et al., 2013), are more likely to enroll, persist, and earn a college degree in a shorter amount of time (An, 2013), and are more likely to outperform other students academically in a higher education setting (Struhl & Vargas, 2012). The latest data available show that about 13 percent of California high school students were enrolled in some form of dual enrollment courses (Friedmann, Kurlander, Li & Rumberger, 2020). However, the vast majority of California high schools do not have a formal dual enrollment program, and there are wide disparities in who enrolls in dual enrollment, with far more White, Asian, and high-income students taking advantage of the program than low-income and minority students.

To address these inequalities, in 2016, the legislature passed AB 288, the College and Career Access Pathways Partnership Act, which expands access to dual enrollment for students from historically underrepresented groups by enabling high school students to take college courses, taught by college professors, at their high school campus. The program systematized enrollment through formal partnerships between high schools and colleges and encouraged the expansion of dual enrollment across the state. (For a recent evaluation of the program's effectiveness, see California Community Colleges Chancellor’s Office, 2021.)

Improve access to A-G courses - Another route to college access is for students to complete A-G courses while in high school. In the most recent budget, the legislature made significant investments in A-G courses by appropriating over a half billion dollars to local education agencies to expand A-G courses to low-income and disadvantaged youth. A new report issued by a task force assembled by Governor Newsom’s postsecondary advisory council has several other ideas to strengthen the K-12 to higher education pathway that lawmakers may consider implementing in the upcoming years (California Governor’s Council for Postsecondary Education, 2021), including the idea to create one common application for students to apply to all of the three higher education segments.

Career and Technical Education - The legislature has also strengthened pathways to career and technical education (CTE) for high school students. In California, about one-third of new jobs will require some training beyond high school but less than a four-year degree, and both high schools and the state’s CCC’s offer CTE pathways that can prepare students for these types of industry positions (Bohn, Gao & McConville, 2018). In 2015, lawmakers passed several one-time funding for programs to improve CTE across the state, including the CTE Incentive Grants program, apprenticeship opportunities, and other adult education programs. California
policymakers also established the California Career Pathways Trust in 2013, which provided one-time grants to award regional and local grants to foster career pathway programs for high school and community college students. (For a final evaluation of the program after its implementation period, see McLaughlin, Groves, & Lundy-Wagner, 2018). In 2016, lawmakers established the Strong Workforce Program, which provides over $200 million annually to expand and improve CTE programs at CCCs at to build regional collaboratives; the legislature later expanded the program with annual funding to the K-12 system in 2018 (CCCs track progress of the Strong Workforce Program on their website). In the most recent budget, the legislature increased funding for the state’s Career Technical Education Incentive Grant to encourage K-12 schools to prepare students with the knowledge and skills necessary to transition to employment and postsecondary education.\(^{41}\)

**Strategy #2: Strengthen financial aid to improve retention and completion**

Tuition at California’s three higher education segments is at an all-time high, but the good news is that about half of students across the segments--especially low-income students--pay no tuition, thanks to the state’s generous student aid programs (Public Policy Institute of California, 2019). The majority of grant aid comes from federal Pell grants as well as the state’s Cal Grants and the California Community College Promise fee waivers. While federal Pell grants are significant, a 2019 study found that state aid in California outpaces federal Pell grant aid; the state spends more than $4,000 per low-income student on financial aid, making California one of the country’s most generous states for student financial aid (Eaton et al., 2019). In recent years, state lawmakers have expanded existing aid programs or in some cases created new aid programs to support students in their higher education journey.\(^{42}\) According to The Institute for College Access and Success, in 2018, about half of all California college graduates held student debt, with an average of $21,500, placing California as the **fourth lowest** state for overall student debt.

**Expanding existing aid programs** - Legislators determine the Cal Grant amount each year in the state budget act, and in recent years, have committed large increases to each of the three available grants (The Campaign for College Opportunity, 2020). The 2021-22 budget also intended to expand Cal Grant eligibility to at least **133,000 more community college students** while also expanding the total award amounts. However, the governor vetoed this legislation, but advocates and some lawmakers hope to reintroduce the bill. Another example of financial aid expansion took place earlier in 2010 when lawmakers passed the California Dream Act, which extended in-state tuition to undocumented students who traditionally had paid out-of-

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\(^{41}\) The state has also been funding California Partnership Academies in the state’s high schools for several decades, which are themed courses that connect students to employer internships and other opportunities to learn outside the classroom.

\(^{42}\) For a full list of state-funded financial aid programs, see the California Student Aid Commission.
state tuition, and also made them eligible to receive state financial aid. Previous budgets have also expanded access to financial aid for students with dependent children, for example by provided supplemental grant funding to student parents enrolled in higher education institutions.

Creating new programs - In 2013, the legislature created the Middle Class Scholarship program to help offset the cost of college to students from families with less than $177k in income and assets; the program covers up to 40 percent of student tuition and fees at CSUs and UCs. Several new grants have been established to encourage students to reduce students’ time to degrees at community colleges, including the Full-Time Student Success Grant (established in 2015) to encourage students to pursue two-year degrees full-time and to encourage students to obtain short-term career technical degrees, and the Community College Completion Grant Program, which encourages students to complete their degrees. The 2021-22 budget included historic new funding for higher education, and notably established the Golden State Education and Training Program, a half billion dollar program to award grants to displaced workers in the pandemic seeking to attend one of the three higher education segments (for a more complete list of the state’s financial aid programs, see Appendix Table 2).

The 2021-22 budget also funded programs to help offset the high costs of living while attending college, and put more funding toward food, housing, and other basic need programs across college campuses. Lastly, state legislators have made policy changes to encourage more students to access financial aid, such as requiring students to complete a Federal Application for Student Aid (FAFSA) before graduating high school.

To illustrate California’s commitment to student aid, in Figure 9, we show how various indicators of college affordability have changed over more than a decade at California’s three systems of public colleges among first time, full-time students who received grant/scholarship aid (see graph notes for details on how these measures were calculated). These indicators of affordability are important because they move beyond the simple sticker price of colleges’ posted tuition/fees and more directly measure what students are paying on average (their net price).

As shown, the average cost of attendance at the UCs is highest of the three segments and has generally risen over time, but the average grant students receive is also the highest of any of the segments, bringing the average net price for attending a UC down to $15,600 in 2020. The same pattern follows for the CSUs and CCCs: while the average cost of attendance is high across both segments, the average grant available to first-time, full-time students cuts down the cost by nearly half for students enrolled at the CSUs and by more than a third for students at the CCCs. Notably, on an inflation-adjusted basis, average student loan debt (inclusive of federal

43 The continuous series for IPEDS net price data is only available starting in 2009 and later.
and other loans) is remarkably consistent across the three segments with slight declines between 2008 and 2020. It is possible that students taking out loans to address the high costs of living while enrolled in college (see Appendix Figure A6 for illustration) are driving the similarities in average debt load.

**Figure 9**

**Affordability of Public Colleges in California**

Average Size of Affordability Category for Full-time First-time Students (2020 Dollars)

<table>
<thead>
<tr>
<th>University of California</th>
<th>California State Universities</th>
<th>California Community Colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Cost of Attendance</td>
<td>Average Net Price</td>
<td>Average Grant</td>
</tr>
<tr>
<td>$40k</td>
<td>$30k</td>
<td>$20k</td>
</tr>
</tbody>
</table>

Fiscal Year

Source: IPEDS. Sample: Net price, average grant, and average cost of attendance are based on first-time full-time students paying in-state tuition/fees who received grant/scholarship aid. Due to data limitations, average student debt includes all first-time full-time students with debt. Notes: Values for each affordability indicator show the weighted average across all schools in each system.

**Strategy #3: Improving transfer pathways and reducing barriers to degree completion**

To reduce barriers to degree completion, the California Assembly and Senate have narrowed in on the problem of college remediation. Lawmakers addressed this problem by passing AB 705, which was fully implemented in 2018 and eliminated the use of college placement exams to determine entry into college-level math and English. The legislation required all community colleges to use high school transcripts instead of placement exams to determine whether students need to be placed in remedial courses (Cuellar Mejilla, Rodriguez, and Johnson, 2019), which has increased the number of students taking credit-bearing courses during their freshman year. Colleges were given a two-year window to innovate with their remedial courses, but this inadvertently created a gray area where many students are still taking unnecessary coursework that can set them back years in meeting their long-term degree goals.
On a bright note, a 2018 report found that more students were enrolling directly into transfer-level math and English courses as AB 705 began to take effect, with a significant increase in the number of Black and Latino students enrolling in and passing these courses (RP Group, 2019). Some advocates posit that the state should go further by completely eliminating remedial coursework altogether and replacing them with ‘gateway’ courses that provide more holistic support to students while still earning credit-bearing courses. Legislators also funded the Basic Skills and Student Outcomes Transformation Program, which redesigned the way some CCCs deliver remedial education for students who need it by providing students with more support while taking the courses and to more quickly get them on track to credit-bearing courses.

Lawmakers began to address the problem with community college transfers by passing SB 1440 in 2010, which made it possible for students to more easily transfer to a CSU with an Associate Degree for Transfer (ATD), which aligned transfer requirements of the CSU with those from an Associate’s degree from a CCC. In other words, all the courses taken in the CCC to earn an AA degree were directly applied to the first two-years of coursework required by the CSU in the same 4-year degree program. AB 2302 also passed in 2010, which required a similar pathway to the UC system; however, the UC rejected the ATD and instead created their own transfer pathways in 2015. The UC pathways do not guarantee admission like the ATD, nor do they incentivize the completion of an AA degree (The Campaign for College Opportunity, 2017).
ORIGINS

A Brief History of Modern Education Policy

We now have a sense for the two main logics that guide school improvement approaches, but how did these logics come about? Market logic, in particular, has a very long history that stems from the federal policy environment. Below, we briefly review how the federal government has been at the forefront of defining major education policy reforms across two eras with drastically different problem definitions: The 1950s and 60s era of financial equity, and an era of market-based logic that took off in the 1980s and that remains in place today. We also briefly review how California has come to embrace the continuous improvement logic as a strategy forward to improve the state’s education system.

Throughout the mid-20th century, the Civil Rights movement and Lyndon Johnson’s War on Poverty narrowed in a central problem with the education system, in that educational inequality was the result of structural constraints that produced racial segregation and poverty (Kantor & Lowe, 2006). To address the problem, the federal government focused on addressing such inequalities with equity-oriented funding programs. For example, the federal government funded programs like Head Start to provide early childhood education and health and nutritional services for young and economically disadvantaged children, and Title I of the Elementary and Secondary Education Act provided compensatory education funding to districts serving low-income students. The federal government also passed the Higher Education Act, which provided access and funding to student aid programs (Gordon, 2015).

Congress’ strategy to focus on the ‘inputs’ of schooling via federal funding was interrupted in 1980, when a landmark report, A Nation at Risk, was released and catalyzed a national debate on school reform. The report framed a new problem in education: Schools were not adequately preparing students for the challenges of the 21st century economy, were inefficient, underperforming, and in need of reform, especially if the US was to remain economically competitive in a globalized economy. The report assigned blame for the problem to school leaders and teachers, asserting that it was schools that were responsible for the academic outcomes of students rather than social forces such as poverty, a narrative that had previously dominated throughout much of the mid-20th century (Kantor & Lowe, 2006). This narrative shifted lawmakers’ focus on the inputs of education (such as school resources) to the outputs of education, such as student test scores. Such reframing was successful at laying the groundwork for a nationwide school reform movement that led states to experiment with state standards and testing regimes to lift student and school performance, which grew throughout the 1980s (Mehta, 2013).
The next few decades laid the foundation for a new ‘market logics’ approach to education policy making that were part of a larger ‘neoliberal’ movement to reform the function and role of the state to ‘do more with less’ (Mintrop, 2018). The 1990s saw major changes in state-level policy, with several states, including California, experimenting with standards-based reforms and first generation accountability systems (McDermott, 2003; Mintrop & Papazian, 2003). Other education reforms rooted in market-based logics were taking off at this time as well, including charter schools and vouchers. By the mid-1990s, the federal government further encouraged states to develop accountability models by providing seed money for learning standards aligned to student standardized tests and evaluation systems (Forte, 2010; Mehta, 2013).

These efforts resulted in a cultural shift sweeping across policymaking circles, which laid the groundwork for a national market-based policy model to take root. In 2001, federal lawmakers from across the ideological spectrum, civil rights groups, members of the business community, and other powerful interest groups successfully passed the federal No Child Left Behind (NCLB) Act, a national accountability model for the nation’s schools (DeBray-Pelot & McGuinn, 2009; Mehta, 2013; Rhodes, 2011). With NCLB, the design of accountability coalesced into a centralized model governed by the federal government and extended to all public schools, with national mandates for standards, testing, sanctions, incentives, and school choice (Forte, 2010). NCLB established market logic—and accountability policy, in particular—as a ‘paradigm’ in education policymaking that continues to maintain its foothold in the U.S. and internationally as well (Mehta, 2013; Verger et al., 2019).

In the years since passage of NCLB, the federal government has continued to encourage market logic in school reform. For example, the Obama administration funded programs such as the Race to the Top grant, Investing in Innovation (i3) grants, School Improvement Grants (SIG), and the Teacher Incentive Fund. In order to receive funding for these programs, school districts and state agencies submitted competitive applications to the federal Department of Education. Recipients were often encouraged to leverage reforms for school improvement rooted in the market logics paradigm. For example, the School Improvement Grants encouraged school districts to use ‘turnaround’ strategies to life school improvement where districts could choose from a menu of options including firing and replacing school leadership and teachers, replacing public schools with charter school operators, or simply closing low-performing schools altogether.

State lawmakers, educators, education advocates, parents, and other stakeholders often have competing perspectives of market logics in education, and market-based reforms have become one of the most contentious issues in modern day education policy. California educators and lawmakers, in particular, have often taken issue with the market logic policy agenda for its lack of capacity building and technical assistance, especially for low-income schools that needed
more financial resources in order to improve achievement for disadvantaged students, and for its strong top-down and disciplinary federal control (Fusarelli, 2004; Sunderman, Kim, & Orfield, 2005). Moreover, several decades of research on market logic policies such as NCLB accountability revealed mixed evidence that the policy was able to move needle on student performance (Lee & Orfield, 2006; Lee, 2008; Mathis & Trujillo, 2016a). There have also been growing concerns that such policies can have harmful unintended consequences for the disadvantaged students such policies are designed to serve (Mathis & Trujillo, 2016b).

In 2015, the federal government replaced NCLB with a more flexible accountability system under the Every Student Succeeds Act (ESSA) that gave states more leeway in designing policy strategies to meet school improvement goals. Leading up to the passage of ESSA, California had already moved to a more decentralized accountability model in 2013 by passing the state’s Local Control Funding Formula (LCFF), an equity-based formula that allocated additional revenue to school districts serving disadvantaged students while also giving local actors more autonomy over how to spend resources with ‘local control’ (Cabral & Chu, 2013). Through the LCFF, the state’s top policy actors laid the groundwork for a more decentralized, professional model of school improvement under the federal ESSA law, following suit with the state’s long tradition of direct democracy and former Governor Jerry Brown’s call for ‘subsidiarity’. This also provided the foundation for the state’s experimentation with ‘continuous improvement’ logics to take off (Darling-Hammond & Plank, 2015; Furger, Hernandez & Darling-Hammond, 2019; Loeb & Plank, 2008).
TRENDS

In this section, we review trends that may influence education policy in the years and decades to come. Specifically, we review trends in technology and education reform, a new movement taking shape in higher education for ‘life-long’ learners, long-term issues to consider to sustain the state’s continuous improvement efforts, and ways that the market and continuous logics appear to be co-evolving together.

Technology and education reform

Advances in online learning and technology for the classroom have taken off in recent years, and California’s education system has embraced these changes. The state currently has several virtual charter and virtual public schools, with students across the traditional K-12 public school system enrolling in about 600,000 online courses in the 2015-16 year alone (Evergreen Education Group, 2015). The California Department of Education makes it possible for students to complete online Advanced Placement courses, A-G course requirements, and other online programs through its distance learning programs. In higher education, California’s three segments have offered online courses and degree programs for several years, and the California Community College system even launched its first online college, Calbright.44 And of course, during the COVID-19 pandemic, schools and universities from across the state had no choice but to transition to online learning as state-mandated shutdowns closed school doors. These changes are happening rapidly, and arguably, the pandemic introduced new technology and online learning across all public school environments much sooner than was expected, causing schools and universities to integrate new learning tools into their classroom much more quickly than they would have otherwise planned. Below, we document two ways in which the education system is being transformed by technology.

“Unbundled classrooms” - A new movement is taking off in both K-12 and higher education to “unbundle” traditional education environments by integrating technology into the classroom to create ‘customized’ learning environments for students. Some advocates on the ideological right argue that this movement is the natural progression of school choice. Instead of parents and students choosing from a different set of brick-and-mortar facilities with unique organizational conditions, families no longer have to leave a traditional public school at all if the classroom itself can become customized to the students’ learning needs and organizational priorities (Hess, Meeks & Manno, 2011; Hess & Manno, 2011). In a nutshell, such advocates argue that this model would move beyond school choice to educational choice, resulting in the

44 The legislature has attempted to eliminate funding and shut down Calbright several times. In general, higher education has been slow to uptake new technology. There has been pushback from faculty to integrate online learning and other technologies into the three higher education segments until the COVID-19 pandemic made online learning a necessity.
unbundling of traditional education environments (for an alternative perspective of the unbundling movement in K-12, see Schneider & Berkshire, 2020).

Unbundled K-12 environments are already in motion; in California, the Rocketship charter school network has used technology in their classrooms for years to upend traditional teaching and learning formats. New York City has funded the School of One where a sophisticated algorithm leverages adaptive learning software (alongside developments in big data and artificial intelligence) to gauge a student’s baseline knowledge, and then put students through a set of exercises that develop incremental learning and ultimately bring students up to proficiency on a given skillset. Other technology such as learning analytics is being used across K-12 and higher education classrooms to better understand and study how students learn, and intelligent tutoring is helping bring students up to speed with required coursework.

In the unbundled model, the state still has a role to play in setting content standards and statewide assessments for K-12 (Hess & Manno, 2011), setting degree requirements in higher education, and the state still funds such models with taxpayer dollars. However, the organizational structure of schools would drastically change. In K-12, students using computers to receive customized learning experiences—possibly with the assistance of a teacher who would track progress and analyze learning data—would replace the role of a traditional teacher at the center of a classroom delivering the same lesson to a group of students. In higher education, unbundled online classrooms could lead to universities becoming completely unbundled, where students receive college credit from multiple higher education institutions instead of a siloed learning experience at just one institution.

**Disrupting the higher education system** - There are technology reforms taking root across the education sector that are becoming more ‘disruptive’ to the overall shape and form of education (Parker, 2020), with potential to push education completely into the marketplace, outside the purview of the state. This is especially the case in higher education, where online platforms like Udemy, Coursera, and Khan Academy have made it possible for end-users to enroll in single skills-gaining courses or in some cases take a series of courses to earn industry certifications. Such platforms provide ‘MOOCs’—Massive Open Online Courses—to adult learners and professionals, often at no charge to the end user. MOOCs have become a popular alternative for many as an alternative to traditional college degrees and credentialing programs that are high in cost, selective in their admissions processes, and provide an uncertain value in today’s changing labor market and economy (Wellen, 2013).

State legislators in California considered using MOOCs across all public higher education segments in 2013. SB 520, a bill that ultimately did not pass, proposed to grant credit to students enrolling in low-cost, online courses (including MOOCs) offered by third-party providers to address the higher education systems over-enrollment problems and to get
students through lower-level courses more quickly. Whether lawmakers pick up similar legislation in the future is an open question, and one that is feasible given the continual problems the state’s higher education system faces with over-enrollment. One point to consider about disrupting the system altogether is that the state is not able to easily regulate the content or quality of courses offered by private companies; it is entirely possible that such courses would be regulated by private industry with little to no role for the state to play in defending student equity or the democratic purposes of education.

A changing role for higher education: Adult and lifelong learning

In today’s rapidly changing economy, there is a new demand placed on adult learning to ensure that individuals can be successful in the evolving economy and labor market, which is being transformed by technology in the form of robotics, artificial intelligence, and automation (Brynjolfsson, McAfee, & Spence, 2014). Some argue that to be successful in this new economy, students must learn how to become self-guided, life-long learners (Kell & Lubinski, 2013), which means that workers will need to continually return to postsecondary education to upskill, retrain, and reskill. However, workers may not need formal degree programs to gain the skills necessary for the 21st century economy and instead may pursue certificates, licenses, or other forms of short-term training.

Evidence of this emergent trend is already coming to light as some research has found that going to traditional four-year colleges does not always pay, as course of study may becoming more important in the labor market than obtaining a formal bachelor’s degree. Rising student tuition and fees alongside spiraling student debt create new risks for students who may not see long-term payoffs of a formal degree program, which may contribute to trends in declining student enrollment in higher education. And stark inequalities in access to traditional higher education institutions by race/ethnicity and socioeconomic status may make some students question the value of traditional higher education institutions and pathways.

Yet California’s higher education institutions lack the organizational infrastructure for adult and life course education that is necessary for the 21st century economy. Several lawmakers and researchers have pointed out that the state’s Master Plan, in particular, fails to meet the demands of students and has become outdated for the transformations taking place across the economy. Moreover, they argue that the design and structure of the state’s higher education system impedes coordination between the three segments to meet regional workforce needs across the state (Berman et al., 2018; California Competes, 2017; Governor’s Office of Planning and Research, 2018). Major organizational impediments such as transfers between the CCCs and UCs and CSUs, enrollment capacity limitations, and limited opportunities for continuing education and adult learning are restraining the state’s ability to produce 21st century workers.
that are necessary for today’s economy. Instead, private platforms like Udemy and Coursera are meeting consumer and industry demand with online coursework that allow end-users to enroll in single skills-gaining courses or in some cases earn industry certifications, which is putting the future survival of California’s higher education institutions into question.

To adapt to the changes taking place, some researchers advocate for California’s higher education institutions to take a ‘regional’ approach that works with local companies to integrate industry demands into degree programs and core curriculum while also meeting the changing career goals of students. For example, this could take the form of creating applied bachelor’s degrees that allows for technical or occupational course work to count towards a BA. Alternatively, higher education organizations could create new designs for degrees and certificates that focus on short-term training or high-tech ‘bootcamps’ that reskill workers to adapt to technological advances in a given industry or region. Higher education institutions will also likely need to expand online education opportunities to meet the demands of working adults who return to higher education for short-term course work. (For a review of many of these ideas, see Scott & Kirst [2017].)

On a positive note, the California Community College system is already working to address 21st century learning needs and has modernized its career and technical education programs and infrastructure (Ton-Quinlivan, 2019). The CCC system redesigned CTE to be more responsive to industry across different regions of the state. Twenty eight CCCs are also involved in an UpSkill California consortium that delivers employee training and workforce education at Workforce Training and Development Centers.

**Sustaining continuous improvement efforts**

There are clear benefits of the continuous improvement strategy in both K-12 and higher education. In K-12, after many years of sanctions-based accountability that lacked capacity building under NCLB, school districts and teachers received substantial financial investments to bolster teacher quality and improve supports to serve students’ diverse learning needs. New state investments in Transitional Kindergarten have expanded access to early childhood education, and investments in student financial aid programs and transfer pathways have opened the way for more students to earn higher education degrees. Results from these policy reforms are already taking root and the state is seeing results. In K-12, researchers have found that LCFF school spending has led to increases in high school graduation rates and academic achievement, especially among students from low-income families (Johnson & Tanner, 2018; Fan & Liang, 2020). In higher education, more students are enrolling, more are transferring, and more students are earning degrees than ever before (Public Policy Institute of California, 2019).
However, there are two major long-term concerns to consider to sustain the continuous improvement logic over time. 1) How will the state finance these efforts in the long-run? 2) How will the state maintain the infrastructure for continuous improvement when there is an ongoing teacher shortage that has worsened during the ongoing pandemic?

With significant budget surpluses, the last few budget cycles reflect a commitment to the continuous improvement strategy. However, many of the recent continuous improvement investments were one-time funded, not ongoing, creating concern as to whether there will be political support and the right economic conditions to fund these efforts in the future. The success of LCFF is also predicated on temporary funding--voters passed Proposition 30 (and later Proposition 55), which primarily increased the income tax on the state’s top earners, providing additional funding for schools until 2030. It is unclear how state lawmakers plan to backfill revenue once Proposition 55 expires.

On the other hand, California voters have been persistent in recent years to raise new revenue for schools. For example, in 2020, California voters narrowly rejected a ‘split roll’ of Proposition 13 that would have added billions to the state General Fund with intentions to fund schools, community colleges, and local government by taxing commercial land owners at market-rates. The ballot initiative, Proposition 15, was rejected by narrow margins, but there is still momentum from organizers to move forward with property tax reform. Whether voters and legislators will secure new sources of stable revenue for California’s education system is an open question, but one that may need to be answered for the long-term success of continuous improvement policy strategies.

The state’s efforts to build sustained networks of continuous improvement learning environments are also at risk with the ongoing teacher shortage crisis. Despite the importance of teachers for student learning, attracting and retaining teachers into the profession has been difficult in California, especially because of events that have jolted districts’ efforts to keep and retain high quality teachers. During the peak and aftermath of the Great Recession, districts drastically cut salaries for most teachers (Bruno, 2018) and also cut tens of thousands of teaching positions that still have not been fully recovered (Darling-Hammond et al., 2018). This has contributed to an ongoing teacher shortage that is most prevalent in low-income districts with high-needs students, and across hard-to-teach subjects such as mathematics, science, special education, and bilingual education (Darling-Hammond et al., 2018), and in rural areas of the state (Goldhaber, Strunk, Brown, Naito, & Wolff, 2020).

Like a domino effect, this has led to an increase of state permits and waivers to hire teachers who are not yet fully credentialed. Findings from the Legislative Analyst’s Office (2019) found that in the 2016-17 academic year, state permits and waivers were given in disproportionately high numbers to high-poverty districts and to the subject areas of special education, science
and mathematics. Other events, such as the current COVID-19 pandemic and a recent onslaught of teacher retirements and resignations also impact the state’s teaching shortage. Moreover, the pandemic has created a crisis in ECE educator attrition as well. Equally troubling are high teacher turnover rates in high-needs districts and the fact that fewer people are enrolling in teacher credentialing programs altogether (Carver-Thomas, Kini, & Burns, 2020; Carver-Thomas, Leung, & Burns, 2021; Carver-Thomas, Burns, Leung, & Ondrasek, 2022). Such capacity issues put into question the long-term success of the state’s investment in the continuous improvement logic when the human capital necessary to support the infrastructure is in constant turnover.

Co-evolution of market and continuous improvement logics

An interesting trend is taking place in education reform, in that there are new examples of market and continuous improvement logics co-evolving together. For example, in K-12, new hybrid organizational models are developing that are somewhere between a charter management organization and traditional district that serve both charter schools and traditional public schools. Models like New Visions for Public Schools serve ten charters in the New York City area but also provide professional development services for teachers across public schools. Traditional public schools are also adapting some of the best practices coming out of charter schools, with positive effects on student achievement (Fryer, 2014).

The use of big data and longitudinal data systems—once used for market-based accountability policies—are also beginning to take form in continuous improvement policy ideas. California’s recent investment in its Cradle-to-Career data system will provide K-12 educators with more real-time data to improve student learning and achievement, and help lawmakers target more nuanced resources and support to schools and districts in need. In ECE, the data system will help the state track the quality of ECE programs, enrollment, affordability, and other indicators. In higher education, big data can help with California’s transfer pathways between the three segments and course alignment necessary for transfers (for example, streamlining the transition from high school to college or the transfer process between CCCs and UCs and CSUs). New technologies developed by private industry may also help with improvement efforts across the public education system. Intelligent advising systems could serve as a stand-in for the shortage of college counselors across the higher education segments (California Governor’s Council for Postsecondary Education, 2021), and adaptive learning software like ALEKS already supplements traditional coursework at UC Berkeley to help students improve their math skills.

The degree to which market and continuous improvement logics co-evolve in the future is an open question. It is entirely possible that they do not evolve together at all due to resistant institutional cultures and a strong defense of the status quo. However, blending the logics could
be a natural path forward to adapt to the changing times, and to take the best of what has been developed under the market logic umbrella while also providing education as a public good backed by the more democratic purposes of the state. For more ideas about the evolution of education policy reform, see the reports listed in Table 3 in the Appendix.
EVALUATING EDUCATION FINANCE FOR CALIFORNIA’S FUTURE

Erin Heys Ph.D., Sarah Swanbeck M.P.P., and James Hawkins M.P.P.

California has ambitious goals for its early childhood and K-16 education systems. State leaders recently released a Master Plan for Early Learning and Care that develop goals for early childhood education, and in K-12, California adopted the Common Core, a rigorous set of learning standards intended to equip students with 21st century knowledge and skills that also prepare students for college and the workplace. In higher education, state legislators established goals in the state’s education code to expand college access to more students, improve college affordability, and ensure that more students complete college prepared for the challenges of a 21st century labor market.

Achieving these ambitious goals across the early childhood and K-16 systems is no easy task and requires that early care and education programs, K-12 schools, and colleges and universities have the resources necessary to meet the challenge of providing all students with equal educational opportunities. How does a state like California—with by far the largest education system of any state that also serves more disadvantaged students than the national average—currently fund its education system? Are current funding levels sufficient to provide the resources necessary for all students, regardless of socioeconomic background or ability, to meet statewide goals? And is the state’s education finance system sustainable, ready to adapt to broader changes in the economy over time?

To answer these questions, in the ‘facts’ section of this paper, we draw on advances in school finance literature to build a conceptual framework to evaluate the current status of the state’s funding of early childhood education, K-12, and higher education. We use the concepts of adequacy, equity, and stability to assess how the state funds each of the education sectors and in some cases look at how California is doing compared to other states. In the ‘origins’ section of this paper we review the reasons for the state’s current level of financial investment, which are rooted in legal decisions, legislative mandates, and voter passed initiatives that date back several decades. Lastly, in a review of current ‘trends’ we review how changing enrollment patterns in California may affect future school funding, how accelerating trends in technology may alter the education finance landscape, and how state investments in other social safety net programs may reduce poverty and improve overall learning conditions for students across the early childhood and K-16 systems.
FACTS

Over the last several decades, school finance litigation has arisen in several states across the U.S., focusing on the issue of whether and how to fund equal educational opportunities for students from different socioeconomic backgrounds. Major research projects studying the effects of school finance litigation and state policy change show that when the basic funding components of *adequacy*, *equity*, and *stability* are met, the conditions for students to have equal educational opportunities improve (for a review of major studies, see Baker, 2017; Jackson, 2018). More specifically, this body of work shows that when states adjust school finance formulas for districts serving low-income students, short-term goals such as student achievement in math and English improve (Lafortune, Rothstein, & Whitmore Schanzenbach, 2016). Long-term outcomes have shown to improve as well when funding is adequate and stable over the course of a K-12 education, leading to improvements in graduation rates, college attendance, reduction in poverty, and stronger labor market earnings especially for low-income students (Jackson, Johnson & Persico, 2016).

A conceptual framework to evaluate California’s education funding landscape

Drawing on this body of research, we created a conceptual framework to evaluate the landscape of California’s education finance system (see Figure 1). The intention of the framework is to provide readers with an understanding of how California’s early childhood, K-12 and higher education systems are currently funded, how California compares to other states, and where the Golden State may fall short in its school financing efforts. The model contains three important elements:

- **Adequate funding** — In its simplest definition, adequacy addresses how much funding students need to achieve at least a minimum outcome standard. It is important to note that modern legal definitions of adequacy often recognize that the amount needed for all students to achieve certain goals or outcomes may vary across students, schools, and districts (Baker & Green, 2015). This means that *equitable* funding is often associated with an adequacy definition to ensure that the finance system compensates for the cost of educating students from different socioeconomic backgrounds or with special learning needs.

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45 For a review of the individual and societal benefits of funding an education system, see Text Box 1 in the Appendix.
46 The definition of adequacy in education finance has a complicated history since several school finance lawsuits have established adequacy as the *minimal* amount of funding necessary to provide equal opportunity to students. We use the term in our model for its familiarity, but aim to use adequacy to indicate the “sufficient” or “full” amount of resources necessary for students to achieve desired outcomes.
47 Throughout this paper, we discuss equity as a standalone concept from adequacy; however, we acknowledge that equity often goes hand-in-hand with adequacy, and point out the relationship where appropriate.
• **Equitable funding** — The concept that some students—such as English Language Learners, low-income students, disabled students, or other students with special learning needs—require more funding than the average student to achieve desired educational outcomes (Baker, 2018). A definition of equity in school finance recognizes that funding levels should be appropriately calibrated to provide equal opportunities for all students to achieve goals and desired student outcomes. Therefore, funding levels must account for additional programs, services, and other resources that disadvantaged students require to ensure that each student has the support they need to achieve desired learning goals. It is important to note that it is possible for a finance system to be equitable but not adequate, meaning that school finance formulas adjust for students from different socioeconomic backgrounds but may still fall short of adequacy estimates.

• **Stable funding** — The importance of stable funding has come into play more recently with the onset of economic recessions that have caused states to slash education budgets, severely affecting the operating conditions of schools in the long-run (Baker, 2016; Jackson, Wigger & Xiong, 2018). Stable funding refers to the reliability and predictability of funding across the ECE and K-16 system over time and is often overlooked in the research literature and mainstream policy conversations about education funding in California. However, we argue that the stability of education funding is just as important as the other two components in this model, especially in the context of California’s state funding environment, which is very sensitive to broader changes in the business cycle.

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48 In the school finance literature other terms such as “fair” or “progressive” funding are used instead of equity. We prefer to use “equity” or “equitable” since it is the most commonly used concept.
We maintain that these three conditions must be met to ensure all students have access to equal educational opportunities over the duration of their education experience from cradle to career; therefore, we call this a “Full and Fair” funding conceptual framework. In other words, once the conditions of a Full and Fair funding model are met, the dollars that finance the inputs of early care and education programs, K-12 schools, and colleges and universities can take root to foster strong learning environments that make it possible for students to reach desired short- and long-term goals and outcomes.49

We use the Full and Fair framework throughout the rest of the Facts section to discuss California’s current early childhood education and P-16 funding levels and the debates and tensions surrounding current funding efforts. We use the adequate, equitable, and stable funding criteria to evaluate funding for early care and education, K-12, and higher education. We intend for this framework to be used by lawmakers and other stakeholders, providing clear criteria to consider when thinking about the design and sustainability of the education finance system over the next century.50 In the sections below, we first evaluate adequacy and equity in California’s early childhood programs, K-12, and higher education system. We then move onto a conversation about stable funding across the entire early childhood and K-16 systems.

49 Most researchers would agree that money only matters up to a certain point—it is not the end all, be all to student achievement and other outcomes. What matters most is how money is thoughtfully and efficiently spent within the school or higher education environment. For an excellent review of how financial resources foster strong learning environments within schools, see Norton Grubb’s book (2009), *The Money Myth.*

50 Note that this conceptual framework could be used for early childhood education, schools, and colleges in a variety of institutional settings—whether in traditional public settings, in marketplace environments (such as charter schools or private nonprofit or for profit higher education), or in new types of institutional arrangements such as online or virtual organizations. We maintain that these three elements are essential to funding the inputs that will foster the conditions for student learning across institutional domains.
Early Care and Education (ECE): Adequate funding

California provides several state and federally subsidized early care and education (ECE) options for children, especially those from low-income backgrounds. In general, the purpose of such programs is to facilitate the growth and development of young children from disadvantaged backgrounds while also enabling low-income parents to work (Chu & Kuhn, 2014). Table 1 below describes the major ECE programs in California, their funding source, and the number of seats funded. Historically, California’s has drastically underfunded ECE programs with stark under-investments of ECE teachers, high-quality ECE programs, and an inadequate number of seats available to serve all eligible children (Gould, Whitebook, Mokhiber, & Austin, 2019; Stipek, 2018). However, funding conditions have improved in recent years and the state has made strides to strengthen investment in childcare, preschool, and Transitional Kindergarten.

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51 For a full list of available programs, see Melnick, Ali, Gardner, Maier, & Wechsler, 2017.
Table 1. Number of Seats Funded in Major ECE programs in California (2019-20)

<table>
<thead>
<tr>
<th>Program</th>
<th>State or federal funding</th>
<th>Number of seats funded</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Start</td>
<td>Federally-funded</td>
<td>69,782</td>
<td><strong>Head Start</strong> is a federally funded program that promotes school readiness for children 0-5 from low-income families. <em>California’s Head Start</em> program is the largest in the nation. Head Start programs are often mixed quality--for a review of the evidence, see Bassok &amp; Loeb (2015).</td>
</tr>
<tr>
<td>California State Preschool Program (CSPP)</td>
<td>State-funded program (General Funds; both Prop 98 and non-Prop 98)</td>
<td>242,771,141,919</td>
<td><strong>CSPP</strong> is California’s primary state-funded preschool program that provides part- and full-day preschool to 3- and 4-year-olds from low-income families, typically with parents who are working or seeking employment. The CSPP received 6 of 10 points on national quality ratings.</td>
</tr>
<tr>
<td>Transitional Kindergarten (TK)</td>
<td>State-funded (Prop 98 funds)</td>
<td>238,629,100,852</td>
<td><strong>TK</strong> is a school-based program administered by a school district or charter school, and is intended to serve as a ‘bridge’ between preschool and kindergarten for those who reach the age of 5 between September 2nd and December 2nd. TK programs were first established in 2012-13 and received 3 of 10 points on the most recent national quality ratings.</td>
</tr>
</tbody>
</table>

Source: The [2020 State Preschool Yearbook](https://www.ni4eearly.org), the National Institute for Early Education Research at Rutgers University

One root cause of the overall underinvestment of ECE is that state lawmakers in California do not use an adequacy definition (or formula) to determine ECE funding allocations. In other words, the state does not calculate the inputs that are necessary for children to access high-quality ECE programs so that they enter the K-12 system ready to meet California’s learning standards and educational goals. Instead, to determine funding each year, appropriations for pre-K are largely discretionary and the result of a political process.53

While the allocation of dollars for inputs to ECE programs is the result of an opaque and discretionary legislative process, the state has made some progress in defining the outputs, or

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52 Beginning in 2015-16, through “Expanded TK,” LEAs were allowed to admit children who turn five after December 2nd to a transitional kindergarten program; as of 2021, TK will incrementally be accessible to all of the state’s 4-year-olds in the rollout of universal TK by 2025-26, while also reducing class sizes and cutting adult-to-child ratios.

53 The exception is that a portion of funding for the California State Preschool Program is tied to Proposition 98 funding from the state General Fund.
the learning goals for early childhood education. Competencies for preschool were established by the California Department of Education in 2008 in the Preschool Learning Foundations, which outline the knowledge and skills young children are expected to learn before entering Kindergarten, including social-emotional development, language and literacy, English-language development, and mathematics, and are aligned with the state’s kindergarten academic content standards. However, some researchers argue that similar standards should be developed for infant and toddler care as well as transitional kindergarten, and that standards and curriculum for early learning should be synchronized with learning standards, curricula, instructional practices, assessments, and teacher professional development in early elementary grades (Koppich & Stipek, 2020). Establishing clear learning objectives and goals for the entire ECE system can make it easier to determine how much funding such programs will need to provide equal educational opportunities to all students.

A lack of a clear adequacy definition that links a defined funding formula to goals and outcomes is problematic because it has led to underinvestment in early childhood education, lower-quality programs, and low pay for ECE educators in California (Gould et al., 2019). Adequate investment in high-quality ECE programs—often in the form of full-day, full-year programs that enroll 0-to-5-year-olds until they are ready for kindergarten—can improve children’s academic preparedness for K-12, which has the added benefit of creating greater cost-savings later on in the K-12 system (Schweinhart & Fulcher-Dawson, 2012). In fact, research shows that early childhood interventions via ECE programs may provide the biggest ‘bang for buck’ for improvements in long-term life outcomes and overall returns to society (Carneiro & Heckman, 2003). Yet a recent study part of the statewide Getting Down to the Facts initiative found a significant skills gap in California’s children at kindergarten entry, suggesting socioeconomic disparities in educational success emerge early on in students’ lives (Reardon et al., 2018).

**How does California compare?**

California is typical among other states in that it does not have an adequacy definition or formula to calculate funding for ECE. The majority of states fund ECE programs through discretionary grants funded by state General Funds; some states such as Georgia fund their pre-K programs through a dedicated funding stream from the state lottery. Just 11 states use their K-12 funding formula to extend funding to ECE (Barnett & Kasmin, 2018). Using K-12 formulas to fund ECE programs does not guarantee adequate funding, but it does help to increase overall funding over time. A study by researchers at Rutgers University found that for the 11 states that financed their ECE programs with state finance formulas, they saw a 3.6 percent growth in funding over a ten-year period compared to a growth rate of 1.1 percent for other states that fund ECE through discretionary grants (Barnett & Kasmin, 2018).
When looking at total revenue and expenditures on ECE programs across states, California actually fares well in comparison to most other states. Below, we break down the main revenues and expenditures in early childhood education and make comparisons to national trends to get a sense for how the state ranks in a national context.

**ECE Revenues** - California has a fragmented and complicated revenue system for Early Care and Education (ECE), with numerous programs for children from birth through age 5 funded by a blend of state, federal, and local funding streams. Most ECE programs rely on a combination of state and federal funding, with the majority of federal funds coming from the US Department of Health and Human Services and state funding typically allocated from the state’s General Fund (Melnick et al., 2017). Local revenue for ECE can play a significant role in ECE funding, but programs vary by region since some cities and counties choose to invest in local ECE programs while others do not (Melnick et al., 2017; Shelton, Hajela, & Fuller, 2019).

As shown in Figure 2 below, California ranks 8th overall in its state spending on ECE programs, at about $8,000 per child in FY 2020. Washington, DC spends by far the most per child at roughly $18,400 per child, and New Jersey follows at about $14,100 per child. In California, state funding provides subsidized preschool to about 12 percent of the state’s 3-year-old population, and provides subsidized preschool and transitional kindergarten to about 37 percent of the 4-year-old population. Despite spending more than other states, California’s State Preschool Program and Transitional Kindergarten program still receive low rankings for quality using nationally benchmarked standards due to a lack of teacher credentialing requirements for staff and teachers, a deficit of professional development opportunities, and no limits on class size.

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54 These figures do not include total enrollment from all ECE programs, such as the federal Head Start program or special education. California state ECE revenues primarily go to the California State Preschool Program (CSPP) and California Transitional Kindergarten (TK).
Effects of not having an adequacy definition or formula

California’s lack of an adequacy definition or formula to guide state fiscal appropriations to ECE programs has led to several consequences for ECE budgets. Below, we briefly review existing research on low pay for ECE educators, growing cost pressures, and the prevalence of low-quality ECE programs.

**ECE educators** - There is growing concern that overall spending on ECE programs in California (and **nationally**) has been lower than it should be since many programs underpay ECE educators and underinvest in their professional development.\(^{55}\) ECE jobs in California are held primarily by Black and Latina women (Gould et al., 2019), and in 2017, their median wage was only $12.29 an hour compared to a median wage of $45.17 for Elementary school teachers and a median wage of $19.70 for all workers in the state (Stipek, 2018). Wages for ECE workers are so low that about 60 percent rely on public assistance, and many do not have access to benefits such as health insurance or paid vacation, holiday, and sick days (Gould et al., 2019). Poor working **conditions** result in high turnover rates and make it difficult to attract and retain high quality

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\(^{55}\) For empirical evidence making the link between California’s lack of an adequacy formula for ECE and low teacher pay, see Barnett & Kasmin (2016).
teachers into the profession. The COVID-19 pandemic has further complicated matters, since ECE providers have been losing teachers and employees at an alarming rate. Moreover, there is a significant lack of investment in professional development and adult learning to promote job satisfaction and ultimately enhance overall quality of ECE programs for children (Whitebook et al., 2018).

Cost pressures - There are growing cost pressures in ECE budgets that are often overlooked by lawmakers in state appropriation decisions. Over the last few decades, an increasing share of state financing for ECE has come from the General Fund, which are discretionary, and have made the ECE system particularly vulnerable to cuts during recessions. In the 2008 Great Recession, state and federal funding cuts resulted in the loss of 11,000 child care slots, or roughly 25 percent of all seats available, between 2009-09 and 2012-13 (Melnick et al., 2017), and many ECE providers receiving state contracts shut their doors, reduced staff, and experienced high employee turnover rates (Stipek, 2018). Now that state funding has recovered (Shelton et al., 2019), many ECE programs are attempting to rebuild their practices, but some providers have been limited in their options to expand their programs due to the high cost of constructing new facilities or rising rent in areas of the state where costs of living are skyrocketing (Lee & Fuller, 2019; Stipek, 2018). ECE providers also face ongoing pressures to pay ECE teachers and employees more to reduce turnover rates and improve overall program quality (Stipek, 2018).

Quality of ECE programs - The overall quality of an ECE program is extremely important, since high-quality programs improve kindergarten preparedness and later academic achievement (Heckman, 2011). Among the characteristics of high quality programs—as defined by researchers at Rutgers University—include whether early childhood programs have standards, curriculum supports, and appropriate class sizes and staff-to-child ratios, and whether teachers and staff have appropriate degrees and training. Several reports from the RAND Corporation in the early 2000’s found that California children with lower levels of school readiness and later school achievement were least likely to participate in high-quality ECE programs (see California Preschool Study reports online). California does have a Quality Rating and Improvement System to help programs assess and improve quality, but very few programs participate (Stipek, 2018). What is known about existing programs is that standards of quality in California varies greatly. For example, some programs do not require staff-to-child ratios at all, while others set limits on the number of children enrolled per instructor (see Melnick, Meloy, Gardner, Wechsler, & Maier, 2018). Teacher training requirements for ECE programs vary, with some programs requiring bachelor’s degrees and teaching credentials, while others have no requirements at all (Melnick et al., 2018). The lack of clear criteria for these organizational features (and others) is

56 Specifically, funds from the state General Fund not related to Proposition 98.
one reason why California’s State Preschool and Transitional Kindergarten programs did not receive several ‘quality’ benchmarks from the annual State of Preschool Report from Rutgers University.

**Early Care and Education (ECE): Equitable funding**

Student equity is commonly addressed in California’s early childhood programs with eligibility requirements. Some programs such as Head Start—the largest federally funded ECE program—make financial need an explicit component of eligibility, and typically enroll children from low-income families, children in foster care, homeless children, and children from families receiving public assistance. Likewise, the California State Preschool Program is free for children of families with limited incomes (California Department of Education, 2019), and other state-funded Alternative Payment Programs serve children from low-income families with working parents (Melnick et al., 2017). However, the state still has a long way to go to equitably fund ECE programs for all children and families in the state. Below, we review some major issues that remain.

Access to childcare slots - A major equity issue with the funding of ECE programs is that many more children are eligible for state-subsidized programs than the actual number of seats funded, posing an important access problem. For context: in 2015-16, just under 1 million children under the age of 5 were eligible for California’s state-funded programs, but only about one third of those children actually enrolled in any state programs that year (Melnick et al., 2017). This issue is even more concerning for children who live in poverty or near the poverty line. Researchers from the Learning Policy Institute found that nearly 650,000 children at or near the poverty line did not have access to ECE programs in 2015-16, despite being eligible (Melnick et al., 2017). Moreover, large discrepancies between eligibility and enrollment exist by race, and by region (see also Manship et al., 2018). Researchers from the National Institute for Early Childhood Education Research estimate that the state is short about 300,000 seats for the state’s low-income 3 and 4-year-olds to attend high-quality, full-day preschool, amounting to a funding shortage of about $4.5 billion (Friedman-Krauss et al., 2021). In total (not taking into account the income level of children), they estimate that the state is short about 575,000 seats to provide universal high-quality, full-day preschool for all of the state’s 3- and 4-year-olds (Friedman-Krauss et al., 2021). Of additional concern is the fact that many low-income children are enrolled in unlicensed care such as CalWORKS, a state-funded program for low-income families, and not all children will enroll in programs that meet the schedules of working parents (Stipek, 2018).

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57 Researchers from the Learning Policy Institute also indicate that there may be a lack of uptake among existing slots because of administrative barriers (Melnick et al., 2017).
**Children with disabilities** - California has an **Early Start** program that helps to identify infants and toddlers with special needs in order to receive federal funding. There are growing equity concerns that the state’s efforts are not actually identifying all children with needs. An analysis by Stanford professor Deborah Stipek found that California is below the national average for identifying special education children for every ethnic group; moreover, there are concerns that children with special needs do not have access to qualified teachers and ECE programs to meet their needs (Stipek, 2018). Two major issues contributing to this problem are that the state does not have a centralized, systematic screening program to identify children early on, and different agencies administer the special education program.

**Dual language learners** - There are also equity concerns for dual language learners in ECE programs, who may not have access to teachers or instruction offered in their native language. Up to 60 percent of California’s children (0-8-years-old) are dual language learners, meaning that English is not necessarily their first language (Stipek, 2018). Given the proportion of children who are likely to need exposure to multiple-language early learning settings, researchers have emphasized that the state should fund ECE providers with capacity to hire dual language instructors and incorporate dual language strategies into their instruction and curriculum. This includes expanding the use of culturally and linguistically responsive materials, encouraging culturally responsive pedagogical practices, and training teachers to recognize implicit bias, the adverse consequences of discipline, and practices that support the social and emotional development of children.

**Differences in the age of children who enroll in ECE** - Among eligible children who do enroll in California’s state-funded ECE programs, about 70 percent of 4-year-olds receive subsidized care, but only about 38 percent of 3-year-olds and just 14 percent of 0-3-years-old (Melnick et al., 2017). It is encouraging that the majority of 4-year olds are enrolling in state-funded ECE programs, but concerns remain that infants and toddlers do not enroll at higher rates. The duration of time children spend in ECE has been found to be associated with improved student outcomes—children who spend at least two years in ECE have been found to have more positive outcomes (i.e. Arteaga, Humpage, Reynolds & Temple, 2014). On a bright note, California enrolls a far higher percentage of 3- and 4-year-olds in ECE programs than the national average, and ranked 15th nationally among 4-year-old access to ECE programs (Friedman-Krauss et al., 2021). State lawmakers also recently invested $2.7 billion in **universal transitional kindergarten** (TK) to expand the program to all 4-year-olds in the state over the next five years, while also providing access to more basic needs services and extending after school programs for those.
enrolled in TK programs.\textsuperscript{58} That state action also provided funding to improve the quality of TK by reducing class sizes and cutting adult-to-child ratios in half.\textsuperscript{59}

\textit{ECE affordability} - For families that are not eligible for subsidized care because their incomes are too high (or just above the threshold), they must pay out of pocket; however, the cost of programs in California may put ECE out of reach for many families. In 2014, the average cost of full-time licensed care for 3- and 4-year-olds was $7,850 and just over $9,000 for enrollment in a childcare center; costs of infant care were even higher, with average annual cost of $8,462 for family childcare and $13,327 for enrollment in a childcare center (Stipek, 2018). For infant care alone, this means that families with median incomes would need to spend about 20 percent of their income on childcare (Stipek, 2018). Costs also vary greatly by region of California; for example, the average cost of daycare for an infant in the Bay Area during 2018 was over $1,800 per month. Childcare may be even more prohibitive for families with more than one child, or single-parent families making incomes just above the state-subsidized eligibility threshold.

\textbf{Funding estimates to achieve adequate and equitable funding levels for ECE}

Many experts in the field acknowledge that California still has a long way to go to provide both adequate and equitable funding for the state’s ECE programs. On the high end, some researchers estimate that it would require an investment in the range of about $30-$75 billion—or about $30,000-$37,000 per child—to provide adequate ECE funding for every eligible child in California (Gould et al., 2019); this estimate is multitudes larger than current state spending levels on ECE programs currently, the state invests anywhere between $5,000 and $25,000 per child depending on the program (Legislative Analyst’s Office, 2019). In a more modest estimate, researchers from the National Institute for Early Education Research estimated that there is about a $7,000 gap in per pupil spending between what California currently spends on preschool alone and what the state should spend.\textsuperscript{60} While these estimates may present initial sticker shock, they align with what other countries spend on early education and childcare, and are clear indication that California still has much work to do fund ECE. On a bright note, in

\begin{quote}
\textsuperscript{58} The bill also provides parents the option to pursue an alternative ECE program if they prefer not to enroll their child in TK. In part, this decision was in response to concerns that the new TK program would put many private providers out of business.

\textsuperscript{59} This is an important step, but ensuring that students have equal access to high quality TK programs will be an essential student equity issue to watch in the coming years. Researchers of New York City’s universal pre-kindergarten program have found large disparities in the average quality of providers experienced by black and white students (Latham, Corcoran, Sattin-Bajaj, & Jennings, 2020). There are also concerns for additional teacher recruitment and training that will be required among ECE teacher shortages—especially during the COVID-19 pandemic—and concerns for the cost of expanding TK facilities to meet new demand. These concerns are somewhat addressed by additional funding included in the latest budget package for teacher recruitment, training, and facilities.

\textsuperscript{60} In FY 2020, California spent an average of about $8,000 per student enrolled in preschool either part-day or full-day, and the researchers estimate the state would need to spend $15,130 per student to fund high quality, full-day preschool programs for the states 3- and 4-year-olds.
\end{quote}
December 2020, the state took a first step to design an overall strategy for improving the organization and function of programs, state financing, administration, and workforce development for ECE programs in the Master Plan for Early Learning and Care. The report establishes clear goals and strategies to build a comprehensive and equitable whole-child early learning and care system by 2030, and includes an appendix detailing how the state could fund higher-quality programs for children from birth to five years old in different types of provider settings over time.

**K-12: Adequate funding**

Like funding for ECE, California does not have an adequacy definition or formula to determine the funding inputs for students to achieve the learning objectives and goals established for the K-12 system. Instead, to determine funding each year, appropriations for K-12 are largely based on Proposition 98, an initiative passed by voters in 1988 that was designed to guarantee a minimum level (the ‘minimum guarantee’) of funding for K-12 schools and community colleges by securing about 40 percent of the state’s General Fund revenue.\(^{61}\) The original intent of the proposition was to establish a secure funding source that would grow each year with the economy and account for the number of students served in the K-12 system;\(^{62}\) legislators often use Proposition 98 as a rough estimate for adequacy, but rarely increase funding beyond the established minimum (Kapphahn & Kuhn, 2017).

Much like the progress the state has made to define outputs in ECE, California has also defined learning objectives and student achievement goals for K-12. The California Department of Education (CDE) lists three goals on its website: 1) to adopt and support rigorous academic content for K-12, 2) to assure that all students receive nationally normed and standards-based assessments, and 3) to ensure that all students are performing at grade level or higher, especially in the subjects of English and math. To meet these goals, California adopted the Common Core State Standards in 2010, a more rigorous set of learning standards across all grades that intend to equip K-12 students with 21st century knowledge and skills and provide preparation for college and the workplace. California also approved the Smarter Balanced assessments, which are aligned with the Common Core standards and measure progress

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\(^{61}\) The state meets the Proposition 98 guarantee using both the state General Fund and local property tax revenue. It is important to note that voters also passed Proposition 111 in 1990, which allows for a lower minimum guarantee when the state General Fund is weak (typically during recessions), but then requires any future funding to be accelerated when the General Fund improves. This created a ‘loophole’ for lawmakers to cut funding for K-12 and community colleges during recessions in order to balance the overall state budget. For further discussion, see the ‘stability’ section below.

\(^{62}\) Provisions in Proposition 98 also indicate a goal to return California to one of the best school systems in the nation; however, that goal is yet to be realized.
toward college and career readiness. The third goal has proven much more difficult to achieve, and the state has a long way to go to bring all California students up to proficiency levels on state exams (see Governance paper for more information about student academic performance and achievement gaps).

How does California compare?

It may seem unusual that California does not have a clear adequacy definition for K-12 that links its funding formula to student outcomes, but the reality is that very few states do (Baker, Levin, Atchison, & Kearns, 2020). Moreover, definitions of adequacy vary widely, with some states incorporating ‘equity’ definitions into their adequacy formulas while others do not. For example, states such as Kansas, Indiana, and Pennsylvania do not account for spending differences between high- and low-poverty districts, while other states such as Illinois and Nevada have regressive formulas that allow more spending in low-poverty districts than in high-poverty districts (Baker, Di Carlo & Weber, 2020). Other states, such as Wyoming, Alaska, and Utah, use a ‘progressive’ definition of adequacy that acknowledges that students from disadvantaged backgrounds or students with special learning needs tend to require more resources than the average student to achieve the same level of educational outcomes (Baker, Di Carlo, & Weber, 2020).63

The Massachusetts model is upheld as a particular national exemplar for defining adequate funding. In the 1990s, the state developed a funding formula based on 11 categories of inputs and adjusted for districts’ wage costs and for the higher costs of educating disadvantaged students; the formula also considered local revenue generation, and then created a fund of state aid to fill gaps (Baker, 2017). The model was very successful at getting more state aid to high-poverty schools and improving overall organizational conditions, which in turn has been shown to increase student achievement, especially for low-income students (i.e. Nguyen-Hoang & Yinger, 2014). We now turn to a brief review of state-by-state revenue and spending to get a sense for how California compares to other states.

K-12 revenue - California’s K-12 budget is enormous, totaling over $93 billion in state funding from the latest 2021-22 budget (California Department of Finance, 2021). Despite this large sum, the state traditionally lags the nation in per pupil funding. The good news is that public investment in California’s K-12 education has increased in recent years and is currently at an all-time high, putting California in a more favorable position among national averages. In the 2021-

63 California also has a ‘progressive’ funding system; for more information see the ‘equity’ section below.
22 budget, per pupil funding was $21,152 per student when accounting for funding from all sources, and about $13,000 per student when counting Proposition 98 state funds alone.\textsuperscript{64}

As shown in Figure 3 below, California’s state revenues to finance K-12 have improved from 2002 to 2019, putting California 18th in a ranking of U.S. states.\textsuperscript{65} California is unique among most other states in that its largest revenue stream for K-12 education comes from state rather than local revenue.\textsuperscript{66} California gets about 35 percent of its total revenue from local sources versus 56 percent from the state and about 9 percent from the federal government. Imazeki (2018) finds that California’s revenue streams stand in stark contrast to other states of similar size. For example, New York gets about 55 percent of its revenue from local sources and only 40

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\textbf{How does adequacy get defined?}
There are rich debates in the education finance community about how to determine the cost of adequacy, or rather, the minimum amount of money a school district must spend to achieve a given outcome (Baker, Atchison, Kearns, & Levin, 2020; Baker, Atchison, Levin, & Kearns, 2020a, 2020b; Baker, Levin, Atchison, & Kearns, 2020; Costrell, Hanushek & Loeb, 2008; Imazeki, 2018). Typically, two costs are included in modern adequacy calculations: the \textit{base cost}, which is the minimum dollar amount per pupil districts need to achieve a given outcome, and the \textit{marginal cost}, which refers to the additional costs associated with educating high-needs students such as those living in poverty, special education students, or English Language Learners. In order to estimate both the base and marginal costs, researchers (and lawmakers) typically rely on one of four approaches:

\textit{Professional judgment approach} – Educators within a state are asked to design an educational program to achieve a statewide goal, such as student proficiency on a state exam. The team identifies a set of inputs necessary to achieve the goal, and researchers then determine how much money is needed to fund the inputs. An example of a professional judgement approach to estimating adequacy in California can be found in the latest Getting Down to the Facts series (Levin et al., 2018).

\textit{Evidence-based approach} – A panel of professionals review the latest research evidence on strategies that have been proven to be effective at reaching statewide goals and develop cost estimates.

\textit{Successful schools approach} – This approach identifies a set of high-performing schools that meet the state’s educational goals (typically student achievement), and then estimates the cost of providing a similar education by identifying the lowest level of per-pupil spending within the set of high-performing schools.

\textit{Econometric approach} – This approach typically uses cross-state data on school expenditures, student performance and other student and school characteristics to estimate a ‘cost function’ that can be used to predict the cost of any level of student performance across districts. A recent report from the American Institutes for Research demonstrates this approach by developing a sophisticated cost model to inform state funding formulas.
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\textsuperscript{64} Proposition 98 funds come from the state’s General Fund, which includes revenue from local property tax.

\textsuperscript{65} Note that data limitations prevented adjusting this figure for regional cost of living differences. Revenues include all state, federal, and local funds.

\textsuperscript{66} This is largely due to the passage of Proposition 13 in 1978. For more on this history, see the ‘Origins’ section.
percent from the state, with a modest 5 percent contribution from the federal government. To see how California’s revenue streams compare to all other states, see Figures A1-A4 in the Appendix.\textsuperscript{67}

**Figure 3**

**Trends in Per Pupil Revenues**

*FY 2002 to 2019 Change in Per Pupil Spending, Ranked by FY 2019 Spending (2019 Dollars)*

*K-12 expenditures* - It is well known that California spends far less per pupil than other states do. As shown in Figure 4 below, in 2019, California was ranked 35th in per pupil spending (from all sources—state, local, and federal) compared to other states after adjusting for the cost of living.\textsuperscript{68} California’s underinvestment in K-12 compared to the national average has been trending \textit{for decades}, and grew much worse during the aftermath of the Great Recession when the state made dramatic cuts to K-12 funding. Spending on education in California bounced back to national averages after the national and state economy stabilized and voters passed \textit{Proposition 30} in 2012 (and \textit{Proposition 55} in 2016), which secured higher income taxes on the state’s top earners.\textsuperscript{69} Like school district expenditures in other states, teacher and employee

\textsuperscript{67} For an excellent and detailed review of how different state revenue streams affect school funding, see the California Budget and Policy Center’s guide to school funding and the state budget process.

\textsuperscript{68} For a more detailed discussion of issues to consider when comparing K-12 school spending in California to other states, see this issue brief from the California Budget & Policy Center.

\textsuperscript{69} For further discussion on recessionary impacts on California’s education funding, see the section on ‘stability’ below.
salaries (and benefits) account for California’s largest budgetary expenditure, totaling about 70 percent of overall spending, followed by services (15 percent), facilities (10 percent), and books and supplies (about 5 percent) (Legislative Analyst’s Office, 2019).

Figure 4

Alternatives for Calculating Per Pupil Spending
FY 2019 Per Pupil Spending: COLA vs Unadjusted

Source: Census Bureau.
Notes: COLA adjustment implemented using the Comparable Wage Index for Teachers (CWIFT).
Effects of not having an adequacy definition or formula

Without an adequacy definition linked to a K-12 funding formula, there are several consequences for K-12 budgets including growing cost pressures that are unaddressed by state appropriation decisions and troublesome organizational conditions within schools. We briefly review each in turn.

Cost pressures - Even at a time of record school financing, California school districts are face rising cost pressures, producing what some researchers call a ‘silent recession’ in education (Krausen & Willis, 2018). Like many other state and local entities across the country, California school districts have experienced rising pension expenditures (Koedel & Gassman, 2018). This trend accelerated after 2014, after Governor Jerry Brown signed AB 1469, a law that required the state, school districts, and school employees to more aggressively pay down outstanding pension obligations in the California State Teachers’ Retirement System (CalSTRS) (Koedel, 2019; Koedel & Gassman, 2018). Among other growing cost pressures for schools statewide are health care costs (Bruno, 2019b), increasing enrollment in special education (Warren & Hill, 2018), demand for new school facilities and repairs (Brunner & Vincent, 2018), overall declining student enrollment (Warren & Lafortune, 2020), and charter school competition (Bruno, 2019a).

Organizational conditions - California schools face troublesome organizational conditions, such as larger class sizes. A recent report from Policy Analysis for California Education (PACE) found

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**A note on teacher salaries**

California pays higher teacher salaries than the national average due to the unusually high costs of living in the state. California’s average teaching salary in 2019-20 was $84,531, which put the state second in a national ranking. While it may seem like California is ahead of the curve, an analysis of teacher compensation found that there are significant “teaching penalties” across the U.S. for people who choose to enter the profession (Baker, Di Carlo, & Weber, 2019). In California, teachers make an average of 22-25 percent less than those employed in comparable non-teacher professional positions.

Teacher salaries, plus a variety of other school organizational conditions, have major consequences for recruiting and retaining high quality teachers in the profession (for an excellent review of how this plays out in California, see Goldhaber, Strunk, Brown, Chambers, Naito, & Wolff, 2018). The good news is that state lawmakers have made significant efforts to improve funding of the teacher human capital pipeline in recent years, from recruitment and training to salaries and professional development (for a review of policy changes, see the Governance paper). The difficult news is that the state is experiencing an ongoing teacher shortage that has worsened during the COVID-19 pandemic with an onslaught of teacher retirements and resignations. There are also fundamental long-term changes happening in teacher labor markets that require higher salaries and better working conditions to attract high quality employees, especially in hard-to-staff subjects such as STEM, special education, and bilingual education.
that the student-to-teacher ratio in 2020 was 22:1 compared to a national average of 16:1. The report also found that California schools have fewer student services, such as access to guidance counselors or librarians, than national averages (Hahnel, Hough, & Willis; 2020), but on a positive note, these organizational conditions have been found to improve over recent years (Chen & Hahnel, 2017). The result of this understaffing is that it can greatly affect overall educational quality, and have more severe consequences for students with greater needs. Students from low-income backgrounds, those who face language barriers, or students with other special needs may not have access to teachers and other school employees with specialized skills who can address their learning needs (for a case study of how this plays out in a California high school, see Children Now, 2019). Ultimately, the lack of an adequacy definition and formula can lead to unfavorable organizational conditions, especially for disadvantaged students.

**K-12: Equitable Funding**

Up until 2013-14, the state has used a ‘revenue limit’ formula to fund K-12. The formula provided a base rate of per pupil funding to all districts, along with over 100 state and federal categorical programs designed to target additional funding to districts for designated purposes, such as funding to better serve disadvantaged students (Timar, 2006). Notably, the revenue limit system made it difficult for local district actors to spend budgets since district dollars were often tied to restrictive categorical funds. There was also no guarantee that dollars for disadvantaged students would even make it to the intended recipients since complicated program requirements made it difficult to spend the money (Brunner & Sonstelie, 2006). By the early 2000s it became obvious that the school finance system was overly complicated, restrictive to local district actors, and failed to address student needs, leading to a call for reform (Bersin, Kirst, & Liu, 2008).

In 2013, California lawmakers passed legislation to overhaul the school finance system by creating the Local Control Funding Formula (LCFF). The new formula is a much simpler, streamlined funding mechanism with an important equity component that acknowledges that districts serving students from different socioeconomic backgrounds have different financial needs. LCFF eliminated the revenue limit formula along with dozens of categorical programs, and replaced it with base funding dependent on ADA and four student grade-levels, plus extra supplemental and concentration grants for districts serving high-need populations, including

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70 For empirical research showing this association, see Jackson (2018), and Taylor (n.d.).
low-income students, English Language Learners (ELL), homeless and foster care youth.\textsuperscript{71} When the law first passed, districts received an additional 20 percent of the base rate for each high-needs student served, and districts serving more than 55 percent of high-needs students received additional funding at 50 percent of the base rate (Baumgardner, Frank, Willis, & Berger-Jacobson, 2018). In the latest 2021-22 budget, lawmakers approved an increase of the concentration grant from 50 percent of the base grant to 65 percent.\textsuperscript{72}

When LCFF was first enacted, it was expected to cost \textdollar{18 billion} more than the previous funding system, but this cost difference was offset by the passage of Proposition 30 (and later Proposition 55), which increased the income tax rate on the state’s top earners and was earmarked for schools. The program gradually phased in over time, and was fully implemented in the 2018-19 academic year—two years ahead of original expectations (Koppich, Humphrey, Marsh, Polikoff, & Willis, 2018). At full implementation, the base grants were funded at prerecession levels—equal to what they were in 2007-08—adjusted for inflation, with extra supplemental and concentration funding for districts serving disadvantaged students.\textsuperscript{73} All told, the majority of Proposition 98 funding—the main law guiding the state’s allocation of revenue to early childhood and K-14 education—goes to the LCFF formula.

Importantly, LCFF intended to return control over school spending to local actors; the formula did away with several “categorical” funding programs, which gave district leaders more autonomy to manage budgets and make spending decisions (Baumgardner et al., 2018).\textsuperscript{74} In return for local flexibility, state lawmakers included an accountability component to create transparency in how dollars would be spent across districts. Districts are now required to develop a Local Control and Accountability Plan, which is a tool for local school boards to use to determine how to best invest resources across the district’s schools with buy-in from communities. At the state level, lawmakers designed a dashboard to monitor measures of school performance, such as test scores, student engagement, school climate, and parent involvement.

While LCFF was very successful at getting additional money to districts serving low-income students, LCFF was never intended to be an adequacy formula, it was only intended to serve an equity function to get more dollars to districts serving students from different socioeconomic

\textsuperscript{71} This formula is used to fund students at both traditional public schools and charter schools. A few other adjustments are made to the funding formula based on declining enrollment, transportation costs, and school size (Imazeki, 2018).

\textsuperscript{72} The new 15 percent increase comes with a spending restriction: districts must use the money to fund new staff expenditures that provide direct services to students and reduce adult-to-student ratios.

\textsuperscript{73} LCFF funding levels are also adjusted for a cost of living (COLA) determined by the legislature each year.

\textsuperscript{74} LCFF also returned accountability to local control, with procedures for local communities to determine how the new dollars would be spent within the district; however, accountability metrics are still monitored by the state. For more information, see the ‘Governance’ paper.
backgrounds or with special learning needs (Bersin, Kirst, & Liu, 2008). Some researchers question whether the current level of funding tied to LCFF concentration and supplemental grants are enough for all students to achieve average test scores on national exams (Baker, Di Carlo, Schneider, & Weber, 2021).

Further complicating matters, unlike other similarly sized states, California overlooks other equity dimensions that could be considered in an adequacy formula. For example, the LCFF does not acknowledge differential costs of educating special education students, district geography (which may impact teacher labor markets and other cost of living adjustments), special programs such as career and technical education (Imazeki, 2018), or additional funding for socio-emotional learning that may be required for teaching students living in poverty or other adverse conditions (Rowan, 2011). Including these types of inputs may help California move toward a more nuanced and sensitive adequacy funding formula with an equity component that can more accurately provide funding necessary for students to achieve intended outcomes and goals.

**Effectiveness of LCFF**

LCFF has been studied in a research consortium organized by the PACE research center at Stanford University across a range of topics. In a study of whether the fully funded LCFF impacted student outcomes for high-needs students (as the law was designed to do), researchers found that LCFF school spending led to increases in high school graduation rates and 11th-grade test scores, especially among students from low-income families (Johnson & Tanner, 2018). Other researchers have found similar results: studies from Fan and Liang (2020) and Lafontune (2021) found positive effects on students meeting UC/CSU entrance requirements, and found that the marginal effects on student achievement tends to be higher in high-poverty districts compared to low-poverty districts.

These promising findings are indications that more equitable funding can indeed lift student achievement and help students meet educational goals. However, the design and implementation of LCFF is not without its critics. There have been growing concerns that the LCFF funding has been spent on cost pressures in district budgets such as pensions, retiree health care, special education enrollment increases, or on general school-wide or district-wide needs instead of spending the funds directly to improve services and learning outcomes for disadvantaged students (Alejandre & Massro, 2016; Chen & Hahnel, 2017; Hill & Ugo, 2015; Koedel, 2019; Lafontune, 2021; Roza, Coughlin, & Anderson, 2017). This concern even percolated to a state audit of LCFF, which found that the state’s approach to monitoring LCFF has not ensured that funding is benefiting students as intended. In 2021, the governor and legislature closed this loophole by not allowing LCAP end of year balances to be swept into the district general fund.

- **New ideas to further reform the LCFF:** In a landmark 2008 paper, researchers established the need for school finance reform and identified what would become the contours of the Local Control Funding Formula (Bersin, Kirst, & Liu, 2008). Importantly, the researchers called for an approach to school finance that adjusted base revenue
allocations for regional cost differences to account for differences in costs of living and labor market conditions; however, lawmakers overlooked this recommendation in the design of the LCFF. The idea has a deeper history in California’s school finance literature, with one researcher going as far as to develop an education ‘index’ to account for regional variation (Chambers, 1980; Chambers, 1999).

- In a more recent paper from Policy Analysis for California Education (PACE), researchers suggest several ways to continue improving the state’s K-12 finance system. Among the report’s recommendations, they suggest that the LCFF formula should undergo further refinement to strengthen weights and funding streams for high-need students, strengthen the transparency and accountability of the funding formula, and should modernize funding for students with disabilities (Hahnel & Humphrey, 2021).

Inter-district funding inequalities: Local revenue generation

While LCFF was a major step toward establishing an equitable school funding formula, other inequities in California’s school finance system persist, especially at the local level. Local districts have options to raise local revenue by passing parcel taxes, local sales taxes and fees, or they may raise revenue from wealthy donors, foundations, and parents (Brunner 2001; Brunner & Imazeki, 2003; Brunner & Sonstelie, 1996; Loeb, 2001; Sonstelie, 2014; Weston, Cook, Murphy, & Ugo, 2015; Zimmer, Krop, & Brewer, 2003). Parcel taxes are a particularly troublesome component of inter-district funding inequalities. Parcel taxes are a lump-sum levied on all properties within a jurisdiction that school districts can use to supplement the revenues they receive from the state and other sources. In the most recent analysis of parcel tax data by EdSource, the authors found that very few districts attempt to get a parcel tax approved during local elections. For districts that are successful at passing parcel taxes, they tend to be smaller, more affluent, and with a higher percentage of white and Asian students (Chavez & Freedberg, 2013). Some districts with a substantial low-income student population have also been able to pass parcel taxes, but they typically pass much smaller parcel taxes than the amounts secured by districts that are more affluent.

A simple case study of two Bay Area school districts illustrate how parcel taxes, in particular, can create inter-district inequalities. In 2019-20, San Leandro Unified—a low-income district in the south Bay Area—had per pupil revenue of $13,352, with a modest $842 per pupil raised from other local revenue, of which $82 is from a parcel tax. Piedmont Unified, a high-income district located in the same county, had $17,031 per pupil revenue, with a total of $6,441 in other revenue raised locally, thanks in part to a parcel tax that provides an additional $4,254 per student (data from ed-data.org).
Inequities in property tax distribution formulas also exist yet are rarely discussed in mainstream policy circles or written about in the research literature. What little has been written in recent years reveals that property tax allocations to school districts vary widely between counties, from 20-64 percent. Research also documents that the uneven distribution of property tax to school districts and other local jurisdictions has caused major friction during economic downturns, resulting in a long history of state-mandated shifts between schools and local governments (Taylor, 2012). And in some cases, districts have such strong returns from property values and favorable allocation laws that they become ‘basic aid’ districts that do not need to rely on state funding for K-12 at all (Weston, 2013). From year to year, about ten percent of districts in the state benefit from this arrangement and receive more average revenue per pupil than the typical district—Bruno (2018) found that average revenue for basic aid districts is $24,694 per student, about 43 percent more than non-basic aid districts. The legislative history of basic aid districts is rooted in several laws enacted in the 1970s, chief among them Proposition 13, which locked in historical patterns of residential segregation that persist over time (Zeimer, 2020) and AB 8, which cemented county-wide property tax distribution formulas to school districts based on archaic rates from the early 1970s. (For further discussion on this history, see the ‘Origins’ section.)

• **New ideas to address inter-district funding inequalities:** Some researchers are questioning whether these inter-district inequities could be solved with regional distribution formulas for local revenue, which could pool property taxes or other local revenue at a regional level for equitable distribution among school districts (for studies exploring this idea, see Beckett-Camarata, Camarata, & Purton, 2009; Brent, 1999). Others are considering different forms of ‘taxpayer equity’ that could better balance local revenue generation across districts (Baker, Kearns, Atchison, & Levin, 2020).

• Other countries such as Canada have experimented with provincial-level funding systems and could serve as a case study for California to learn from (Herman, 2013).

**Funding estimates to achieve adequate and equitable funding levels for K-12**

Several researchers and advocacy groups have cast doubt that the state’s current funding levels are sufficiently funded to meet the state’s desired learning outcomes, especially for low-income students (Baker, DiCarlo, & Weber, 2020; Hahnel, Hough, & Willis, 2020; Hahnel & Humphrey, 2021; Perry, Myung, & Hough, 2020). But how much more money would K-12 districts need to adequately and equitably fund students’ needs and provide equal educational opportunity? Bruce Baker, a national school finance expert, and colleagues have developed a [School Finance Indicator Database](https://www.schooldomains.com/) that evaluates California’s K-12 funding compared to other states. We narrow in here on their analysis of adequacy in California, which refers to how much the state
would need to spend to achieve national average test scores, by income quintile (in other words, this estimate of adequacy includes an equity dimension). In 2017-18, they found that California would need to spend 20-45 percent above and beyond current spending levels in the state’s high-poverty districts; to put it bluntly, the state needs to invest between $2,704-$10,645 more per pupil (depending on poverty level) just to be able to get students to meet national test score averages, as shown in Table 2 below. In the latest data available (2018-19 estimates), the researchers estimate that California must spend an additional $5,081 per pupil in the highest poverty districts in order for students to achieve average test scores on national exams. Moreover, they find that 70 percent of students in California attend districts with spending below estimated adequacy levels.

Table 2. Cost estimates by poverty quintile in California, 2017-18

<table>
<thead>
<tr>
<th>Poverty quintile</th>
<th>CA spending per pupil</th>
<th>Required spending to meet national test score averages</th>
<th>Gap between current spending and cost of average outcomes</th>
<th>Percentage above/below adequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest poverty</td>
<td>$11,672</td>
<td>$10,616</td>
<td>+$1,056</td>
<td>+9.9%</td>
</tr>
<tr>
<td>Low poverty</td>
<td>$11,472</td>
<td>$14,176</td>
<td>-$2,704</td>
<td>-19.1%</td>
</tr>
<tr>
<td>Medium poverty</td>
<td>$11,827</td>
<td>$16,821</td>
<td>-$4,994</td>
<td>-29.7%</td>
</tr>
<tr>
<td>High poverty</td>
<td>$12,656</td>
<td>$20,309</td>
<td>-$7,653</td>
<td>-37.7%</td>
</tr>
<tr>
<td>Highest poverty</td>
<td>$12,631</td>
<td>$23,276</td>
<td>-$10,645</td>
<td>-45.7%</td>
</tr>
</tbody>
</table>


Notes: Current CA spending per pupil includes state General Funds and local property taxes, but does not include federal funds or other revenue raised locally.

Other research has confirmed the inadequacy of the state’s education funding. In a 2018 report, researchers from the American Institutes for Research (AIR) used a ‘professional judgement’ approach to estimate the amount that would be adequate to help students achieve proficiency levels in accordance with the state standards established by the California

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The researchers found that in the 2016-17 year, the state would have needed to spend an additional $25.6 billion, or about 38 percent above actual spending that year, to meet adequacy levels (Levin et al., 2018).

**Higher Education: Adequate funding**

Like ECE and the K-12 funding system, California does not have an adequacy definition or formula used to fund higher education. Instead of establishing a calculated formula to determine the costs of inputs necessary to address student and institutional needs to reach statewide goals, spending decisions for higher education come down to political decision-making by state lawmakers. This is not unusual among other states, but it is a topic of development for researchers who are developing ways to apply adequacy logics developed in K-12 to higher education.

Similar to the progress that California legislators have made to define goals in ECE and K-12, state lawmakers have made progress in defining outputs or goals for all three segments of higher education in the Golden State, which are useful for thinking about the foundations of an adequacy funding definition. In 2013, the legislature established statewide goals in the education code to expand college access, encourage retention, and graduate more students with degrees and credentials to meet labor market demand. More specifically, language added to the education code by SB 195 states that higher education policy and budget decisions should adhere to the following goals: 1) to improve student success and access, especially for low-income students; 2) to better align degrees and credentials with the state’s economic, workforce, and civic needs; and 3) to ensure the effective and efficient use of resources to improve outcomes and maintain affordability.

While these newly established goals have reoriented the three segments toward a unifying north star, the state legislature has demanded more of the higher education system without adequately funding the segments to reach these new goals. Lawmakers have not funded the three systems to accommodate increasing student enrollment encouraged by goal #1, nor have

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76 Studies that use a professional judgement model to estimate adequacy typically ask educators within a state to design an educational program that will achieve the state’s educational goals, and the researchers will create estimates of how much the program will cost (Imazeki, 2018). In this study, researchers from AIR convened two 3-day meetings with highly qualified educators across the state to estimate adequacy using the professional model approach.

77 There are some difficulties with estimating adequacy for higher education since post-secondary education is not compulsory, not all students enroll full-time, and outcomes are not always easily defined for higher education like they are for K-12 since students enrolled in colleges and universities can choose different pathways and degree options with varying short- and long-term goals (Baker & Levin, 2017).

78 The 1960 Master Plan (also known as the Donohue Act) laid out an initial vision for the state’s three higher education segments focusing on the goals of access and affordability.
state lawmakers provided sufficient funding for the organizational conditions of a high quality education to take root that are necessary for goals #2. Whether the legislature has held true to goal #3 is debatable, given that the cost of higher education tuition continues to rise, especially at the UCs and CSUs, and student financial aid has not kept pace with the true cost of attending college. These are certainly shortcomings of the current funding system, but there is potential that lawmakers could use the goals established in the education code as a starting point to develop an outcome-oriented funding formula (see Baker & Levin, 2017).

How does California compare?

We now turn to a look at the revenue and expenditures for each of California’s three higher education segments to get a sense for how public investments and higher education spending have changed over time, and how they compare in a national context.

Revenue for higher education - The funding landscape of higher education in California largely mirrors the nation at-large with broad state disinvestment over the last two decades (Desrochers & Hurlburt, 2016). According to the American Academy of Arts and Sciences (2015), public investment in higher education across the US has decreased significantly over the last several decades, and accelerated rapidly during the 2008 Great Recession. A report from the Center on Budget and Policy Priorities narrowed in on the effects of the Great Recession and found that total state spending (adjusted for inflation) fell by about $20 billion between 2008 and 2013, and by 2017, states were still funding higher education below 2008 levels. The report found that this caused student tuition at public four-year colleges to rise across states, with an average increase of 35 percent; California raised its tuition nearly the most of any state and saw tuition increases at public 4-year colleges surge by 63 percent from 2008-2017. Like other states (Desrochers & Hurlburt, 2016), California was forced to look for other revenue sources to backfill state cuts and began relying more on revenue from hospitals, private gifts and grants, and investment returns (see Appendix Figures 10 and 11).

While the recession caused dramatic state cuts across California’s higher education sector, there are important distinctions across each of California’s three higher education segments. Looking back to 1987, Figure 5 shows that there has been significant volatility across each system throughout the last few decades, and this has generally corresponded to the performance of the state (and national) economy over the period. The largest drops for all

79 California lawmakers attempted to offset tuition increases for low-income students with student financial aid programs (Jackson & Warren, 2018). For a look at how overall higher education appropriations have changed as a proportion of state General Fund spending, see Appendix Figure 8; for a breakdown of how revenue streams for each of California’s three higher education segments have changed over time see Appendix Figure 10.
segments occurred during periods of economic recession, including the early 1990s, the early 2000s, and the 2008 Great Recession.

Figure 5

Despite the cuts experienced during recessions, over time state funding across the UC and CSU segments have experienced a general decline while the CCC has actually seen upward growth in state appropriations.\textsuperscript{80} State appropriations to the UC system in 2020 are half of what they were in 1987. In the same time period, CSU appropriations dropped by 31 percent while CCCs did notably better with a 48 percent increase in state appropriations over the time period shown. State funding for CCCs has likely grown over time since the majority of funding for the segment is tied to Proposition 98, which allocates a percentage of the state’s General Fund to K-14 education. In a typical year, K-14 education will receive about 40 percent of the state’s General Fund revenue; community colleges should statutorily receive 10.93 percent each year,

\textsuperscript{80} The figure adjusts state General Fund appropriations to each system for inflation and the size of each system’s student body each year (in full-time equivalents).
but in most years they receive less than that share. No such budgetary protections exist for the UC and CSU systems, which is a primary reason why funding has declined for those segments. The many drawbacks of the state’s revenue allocation process has led some researchers to think ‘out of the box’ to reimagine how the state funds the higher education segments (College Futures Foundation, 2017).

Some good news is that state funding has increased across all systems since the 2011 trough following the Great Recession with the increase in funding levels for CCC’s especially pronounced. In addition, a 2018 report from the Public Policy Institute of California found that higher education is generally more affordable here than other states (Jackson & Warren, 2018). Researchers found that the UC system is slightly more expensive than other comparable research institutions in the U.S., while CSU is slightly less expensive, and the CCC system is the least expensive in the nation.

Expenditures - Spending at colleges and universities typically includes instructional costs such as faculty salaries and benefits, as well as non-instructional costs related to student services, academic support and research activities, and operation and maintenance of facilities, among other smaller costs (Desrochers & Hurlburt, 2016). As seen in Figure 6 below, staff and faculty salaries represent the largest spending category on a student FTE, inflation-adjusted basis across all California higher education systems. UC staff and faculty salaries generally dominate, with salary compensation 6 to 7 times higher than the CSU’s and CCC’s, respectively, after adjusting for spending by student FTE. Salaries per student FTE at the CSU and CCC system are much more modest, and this is likely due to a staffing strategy that relies far more on part-time faculty and adjuncts than on full-time employees (California State University, 2021; Smith, 2012). Notably, salaries at CSU’s actually shrank over this period, while salaries at CCCs increased only slightly.

Free tuition
Some states, including California, have experimented with providing free higher education to students. Tennessee launched the Promise Scholarship in 2015 that offers high school graduates tuition-free access to two-year public colleges, which inspired the states of Oregon, Rhode Island and New York to follow suit. New York broaden the eligibility requirements and provides free tuition to public two- and four-year institutions for resident students from families with income up to $125,000. California currently offers the California College Promise grant to California residents, which waives fees at the CCCs making community college essentially free to those who are eligible.

81 Even though CCCs have a dedicated revenue stream guaranteed by funding allocations from Proposition 98, the system is in direct competition with K-12 and lawmakers do not necessarily follow the division of spending between K-12 and CCCs defined in the state education code (for more information, see Murphy, 2004).
Across all three systems, benefit expenditures have also increased rapidly in recent years (see also Hyatt, 2016). For community colleges, health care premiums increased 5 percent on average in 2020 alone, though some districts saw increases as high as 8 or 9 percent (Constantouros & Steenhausen, 2019). For the CSUs and UCs, between FY20 and FY21 health benefit expenditures for current employees and retirees increased 6 percent year-over-year (Constantouros & Steenhausen, 2019). This trend is driven by a variety of factors, including the long-term growth of national health care costs.

It is important to note that UCs spend far more per student than do the CSUs and CCCs, especially on salaries, benefits, and other costs. When thinking about adequacy funding, this presents an important question about how much spending is required for each of the three segments to reach their goals. While the goals of the CSUs and CCCs are instructional and the goal of the UCs is research-based (according to the state’s Master Plan), spending more per student on the most elite institutions (the UCs) may be problematic if the state is to reach the broader goals of expanding access, retaining more students, and improving graduation rates. The issue is further complicated by issues of student equity and the fact that CCCs and CSUs...
educate far more students and serve many more Black, Latino, and low-income students than the UCs.

**Effects of not having an adequacy funding definition or formula**

Compared to K-12, there is little research on adequacy funding for postsecondary education nationwide (for an exception, see a recent paper from Baker & Levin [2017] that addresses adequacy funding for community colleges). One possible reason for this discrepancy is that funding higher education is not an obligation written into state constitutions like primary education, and therefore states may not consider fully funding higher education a state responsibility. However, California has a unique history that establishes a commitment to the public higher education system with the 1960 Master Plan for Higher Education (and the accompanying Donohue Act that establishes many of the Master Plan principles in statute). The Master Plan established the three higher education segments, each with their own mission and eligibility targets, and identified other goals for higher education such as the state’s intention for the segments to remain accessible, affordable, high-quality, and accountable. This legislative landmark makes it even more profound that California lacks an adequacy funding definition or formula for its higher education system. Since California does not use any adequacy benchmark, there are consequences for higher education institutions and students. Namely, students have seen an increase in net tuition, both UCs and CSUs have enrollment capacity issues, and there are growing cost pressures that are overlooked in state appropriation decision-making. We briefly review each of these issues in turn.

*Increases in net tuition* - A consequence of state appropriation declines is that students have seen stark increases in net tuition since the early 2000s (gross tuition minus any allowances/deductions to students). In Appendix Figure A9, we show how net tuition and state appropriations have changed over nearly two decades. State cuts have been sharpest in the UC system over the last two decades and generally outpaced any increases in net tuition on an FTE-adjusted basis. Since 2011, however, some of the Great Recession era cuts to the UC system were modestly reversed while net tuition continued to increase. Relative to 2002, the state had cut appropriations by about $10,900 per FTE by 2020 while tuition rose to $11,400 per FTE in the same year. Since 2015, net tuition increases have almost identically offset state cuts in the UC system dollar for dollar on a per FTE basis. The CSU system has fared better in terms of state cuts, and therefore students in those systems have experienced less severe tuition increases. As seen in Figure A9, much of the post-2001 cuts to the CSU’s were reversed in the 2012 post-
recession period. The increase in net tuition at CSU’s reached a peak of close to $3,000 in 2012 but has since been on the decline.⁸²

**Capacity issues** - Both the UCs and CSUs have seen rapid increases in student enrollment in recent years in response to state legislators' efforts to improve access, retention, and graduation rates in the state’s public colleges and universities (Constantouros & Steenhausen, 2019).⁸³ Because state appropriations for the UC and CSU systems have not kept pace with the growth in student enrollment, CSUs in particular have pushed many students into online programs since it has exceeded its capacity to accommodate in-person instruction, and now serves one third of students in partial or fully online programs (Cook & Mehlotra, 2020). CSUs are also rejecting thousands of qualified freshman applicants each year, many of whom are disadvantaged students (Cook & Mehlotra, 2020). The UC system has responded to enrollment growth by increasing class size and student-to-faculty ratios and has underinvested in facility maintenance and growth quality (Douglass & Bleemer, 2018). Recently, the UC Board of Regents voted to increase tuition in the coming years to address increasing enrollment and reduce the risk of diminishing educational quality further.⁸⁴

**Cost pressures** - Like the K-12 system, the three higher education segments are facing serious cost pressures, most notably from deferred maintenance costs for campus infrastructure and rising pension costs.⁸⁵ While the state historically funded a significant portion of the UC’s capital outlay, in 2013-14, the state legislature decided to no longer fund the UC’s capital budget through state bonds or other state resources. Instead, the UC is now expected to issue their own bonds to fund capital projects and pay for the debt service on these bonds out of general operating funds. The state took a similar action with the CSUs in 2014-15 (Constantouros & Steenhausen, 2019). Both university systems also face a backlog of capital projects due to aging infrastructure and the increasing cost of seismic compliance. Rising pension costs have also had a large impact on higher education budgets. During the Dot Com bubble in the late 1990s state pension funds were performing well and the state legislature passed legislation that greatly increased pension guarantees for state workers and allowed workers to retire at earlier ages.

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⁸² During the Great Recession, a report from the Public Policy Institute of California (2018) found that the share of first-time college students taking out loans increased from 40 to 48 percent at the UC and 30 to 38 percent at the CSUs; this limited access at public institutions as student enrollment dropped across all three segments (Jackson & Warren, 2018).

⁸³ CCCs have only seen modest growth since 2012, but overall, have also experienced rapid growth since the 1980s. Higher education enrollment growth has also been encouraged by policies in K-12 that focus on college and career readiness and higher graduation rates (Gao, 2016); Douglass & Bleemer (2018) also note that enrollment growth is a much longer trend and has been on the rise (especially at the UCs) since the 1990s.

⁸⁴ The vote to increase tuition was also in response to a legislative mandate to limit enrollment of out-of-state students; enrolling more out-of-state students was formerly a revenue strategy following the Great Recession budget cuts, since the UC can charge about $20k more in supplemental tuition per out-of-state student.

⁸⁵ There are other cost pressures that the UCs, CSUs, and community colleges are facing that we do not address here. For more information on these cost pressures see this LAO analysis.
Yet assumptions about stock market gains and the stability of the economy were shortsighted—returns on pension investments dropped precipitously when the Dot Com bubble burst, and unfunded pension liabilities have continued to grow since that time (Dolan, 2016). During the recession that followed, the state stopped providing subsidies for pensions and health benefits for UC employees altogether (Douglass & Bleemer, 2018). In response, the UCs were forced to pick up full pension funding, significantly affecting the University’s overall financial stability. On the other hand, the state has continued to fund these pension costs for the CSUs and community colleges.

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86 Some pension plans even took so-called “pension holidays,” and stopped making the actuarially required annual contributions entirely. In fact, the University of California Retirement Plan took a 20-year hiatus from making its pension contributions (Hyatt, 2016).

87 The state has made occasional one-time contributions to help the UCs pay down their pension obligations, including in 2015 when then-Governor Jerry Brown allocated over $400 million to assist the University with its unfunded pension liability, but the state has not provided systemic annual funding to address the issue. The most recent actuarial valuation indicates that the UC’s retirement system has an unfunded pension liability of $16.6 billion (Constantouros & Steenhausen, 2019).
Higher Education: Equitable funding

The issue of student equity has been a persistent and growing tension in debates about higher education finance in California as the cost of college tuition at the UCs and CSUs continues to grow, posing barriers to college retention and completion for many students, especially for Black and Latino students and those from low-income backgrounds (Johnson & Cuellar Mejia, 2020). The Governance paper covers many of the policy reforms to address these challenges, but below we describe two main strategies the state legislature has used to leverage the finance system to offset student inequalities and help students achieve the state’s higher education goals.

A note on salaries for public higher education educators in California

It is no secret that higher education institutions in California (and nationally) try to cut costs by hiring faculty on non-tenured tracks, hiring faculty part-time, or hiring lecturers and adjuncts that work on an hourly or course load basis rather than being paid as salaried positions. Some researchers have dubbed this trend the ‘unbundling’ of the faculty role, and the trend has taken off across higher education institutions in recent years.

Faculty hiring at the UC--for both ladder-rank and lecturer positions--has increased over the last decade to accommodate growing student enrollment, and faculty salaries have risen over the last decade as a strategy to recruit top researchers and academics, but current salaries pale in comparison to salaries offered at private 4-year institutions. A Calmatters article highlighted the fact that even though UC lecturers provide about one-third of the instruction undergraduates receive, about a quarter of lecturers do not return year-over-year due to low pay and little job stability. This is one reason why lecturers across UC campuses nearly went on strike during November 2021.

At CSUs, about 80 percent of faculty are ladder-rank and roughly 20 percent are lecturers, but about half of all instructional faculty are part-time (California State University, 2021). A 2015 survey reported by the Los Angeles Times found that on average, CSU faculty earn about $45,000 annually, but many struggle financially and report needing to work at least two jobs.

At CCCs, the majority of faculty teach part-time or are adjunct faculty--a strategic decision to save money on the cost of instruction following the passage of Proposition 13 in the late 1970s, a constitutional amendment that reduced local property tax revenue for community colleges (Spinetta, 1990). Today, the majority of faculty and ‘adjuncts’ at CCCs teach with average wages of just a few thousand dollars per course taught (see also Smith, 2012) and many associate faculty do not earn livable wages for teaching full course loads and receive public assistance. This aligns with nationwide trends where the average pay for adjuncts is about $3,500 per course taught, and many adjuncts across the country reportedly live in poverty and struggle to pay basic household expenses. The COVID-19 pandemic worsened conditions for CCC adjuncts, many who were forced to transition online without adequate compensation for their time. For more information, see this issue brief from the California Federation of Teachers.

Higher Education: Equitable funding

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Student centered funding formula - In 2018-19, state legislators made major progress to improve student access, equity, and success by establishing a new student centered funding formula to allocate funds to community colleges. Historically, the state granted CCCs funding based on student enrollment alone, but there was political momentum to change the funding formula to incentivize the segment to align with state goals to produce more college graduates, close equity gaps, and reduce time to degree completion and transfers. The new formula is considered a ‘performance-based’ budgeting practice that has spread nationwide; in California, the formula ties funding for CCCs to how well their students are doing. In 2019-20, about 70 percent of the CCC's state funding was appropriated based on enrollment, 20 percent was linked to equity factors, and 10 percent was tied to measurable outcomes for student success, such as graduation and transfer rates and the time to degree completion. Note that the effectiveness of performance-based budgeting is debated in academic literature since there are often unintended consequences of the policy's design and it is unclear whether the policy actually improves student outcomes. (For more information, see Dougherty, Jones, Lahr, Natow, Pheatt, & Reddy, 2014.)

Student financial aid - In light of rising student tuition in California and nationally, financial aid programs have been the primary policy lever to increase access to higher education and improve retention and graduation rates. Financial aid programs are widely available from both the federal government and from California state-funded programs, as well as from local institutional aid. At the federal level, the Pell Grant program is the largest program aimed at reducing disparities in access and success across socioeconomic groups; in the 2021-22 academic year, the maximum award was $6,495. The grant is a direct-cash transfer awarded to undergraduate students with exceptional financial need. The federal government also provides low-interest loans, such as the Perkins Loan program, to undergraduate and graduate students with exceptional need, and a range of other aid programs for both undergraduates and their families as well as graduate students.

In California, the state has similarly robust financial aid programs to offset the cost of tuition for low-income students, including Cal Grants, student fee waivers like the California College Promise Grant, and a range of other programs that target low- and moderate-income students. A 2019 study found that state aid in California outpaces federal Pell grant aid; the state spends more than $4,000 per low-income student on financial aid, making California one of the country’s most generous states for student aid programs (Eaton, Kulkarni, Birgeneau, Brady, & Hout, 2019). In fact, about half of all students across the three higher education segments--especially low-income students--pay no tuition at all (Public Policy Institute of California, 2019). This plays out in the total student loan debt students take on in California.

88 The California College Promise Grant was formerly known as the Board of Governors Fee Waiver (BOG fee waiver).
versus nationally—The Institute for College Access and Success (TICAS) finds that the average California undergraduate takes out $21,485 in student loans compared to the national average of $28,950. In recent years, the California economy and state budget have been growing and state lawmakers have chosen to expand existing aid programs or in some cases created new aid programs to support students in their higher education journey. (For more information, see the Governance paper.)

Lastly, at the institution level, many colleges and universities across the state provide their own grants and scholarships (See Appendix: Governance for a full list). It has also become common practice for universities to reinvest a portion of their tuition revenue into need-based aid (also called return-to-aid), where the goal is to reduce costs for lower- and middle-income students while charging higher-income students the “sticker price” (Douglass and Lapid, 2018). As seen in Figure 7, we show how one primary revenue source—tuition—has fluctuated across three categories: gross tuition, net tuition (the amount of money that can actually fund system budgets), and return to aid (gross minus net). In 2020, among all of the public higher education systems, UC had the highest net tuition/fees at $19k, followed by CSU at $4.9k, and CCC at $1k. Notably, institutional return to aid kept overall tuition and fees from being even higher (reaching the gross tuition/fees line)—at the UC and CSU systems, return to aid was about $4.5k and $4.2k, respectively, and $1k at CCCs.

Figure 7

Revenue from Student Tuition
Changes in Gross Tuition/Fees, Net Tuition/Fees, and Return to Aid Per FTE (2020 Dollars)
Funding estimates to achieve adequate and equitable funding levels for Higher Education

Is the current level of California’s investment in higher education adequate? No estimate currently exists that costs out the price of meeting the state’s goals of access, persistence, and degree completion. However, some advocates argue that funding would be adequate if the state simply did away with student tuition and fees for all students across the three segments. Researchers from the Public Policy Institute for California estimate that it would cost the state about $4 billion a year to eliminate tuition altogether for all three segments (Jackson & Warren, 2018). Another estimate from Reclaim California Higher Education estimated that it would cost the state $15.25 billion in 2017-18 to fully fund projected enrollment and eliminate tuition in all three segments.

However, providing no tuition or very low tuition to all students equally provides breaks for wealthy students and families creating a ‘regressive’ system that fails to address student need (Deming, 2019). Moreover, providing free tuition does not guarantee that students will reach the state’s goals of degree attainment, nor will free tuition ensure that campuses will create higher quality education experiences to prepare students for 21st century labor market demands. While providing free tuition may not be the silver bullet some students, lawmakers, and advocates are hoping for, there are other indications that financial aid programs are a

Funding student financial aid – room for improvement

While financial aid programs are generous in California, there is still room for improvement on several fronts. Financial aid is not as easily available for nontraditional college students such as adult learners in continuing education programs, or for students who work and are enrolled part-time, since many financial aid programs have requirements that students not already have a bachelor’s or professional degree and enroll at least half-time.

Moreover, there are growing concerns that California’s financial aid programs fall short of covering the true cost of college. Researchers from the Public Policy Institute of California estimate that when taking into account non-tuition costs, such as housing, transportation, child care, and the cost of books and supplies, the total cost of attending one of the UCs is closer to $32,000, with tuition and fees accounting for just 42 percent of the overall price tag. At CSUs, they estimate the total cost to be just under $15,000, with tuition and fees representing just a third of the total cost; and while community colleges have very low tuition, tuition is just 12 percent of total costs, which PPIC researchers estimate to be over $10,000 (Jackson & Warren, 2018).

Lastly, financial aid will need to adapt to the 21st economy and demands from workers who want short-term training rather than formal degree programs. To ensure that all workers can afford frequent returns to higher education, state financial aid program requirements may need to adapt to students who already have a 4-year degree and take just a few classes at a time, or students who want to pursue technical education paths that do not necessarily result in a formal degree.
helpful step toward providing equitable and adequate funding to move students through the higher education pipeline and achieve broader goals (for research on this topic, see Deming, 2019). California has made progress on this front. The state has moved to a “means-tested” financial aid model that addresses student need using parents' income as the means test to determine aid eligibility, targeting the majority of financial aid to low- and moderate-income students. In this sense, the higher education system is arguably not adequate but it is equitable.

Yet some researchers argue that financial aid programs need to go further in addressing more than just the cost of tuition for low- and moderate-income students. It is well known that tuition is not the only cost of attending college--books and supplies, the cost of housing, transportation, and other costs are important components as well, especially in California where costs of living are skyrocketing and making the opportunity cost of attending college much higher. Jackson and Warren (2018) estimate that total cost at UCs is closer to $32,000, with tuition and fees accounting for just 42 percent of overall cost. At CSUs, they estimate the total cost to be just under $15,000, with tuition and fees representing just a third of the total cost. While community colleges have very low tuition, tuition is just 12 percent of total cost, which is estimated to be over $10,000. State lawmakers may want to consider accounting for the true cost of college in order to improve the goals of access, retention and graduation.

- **New ideas:** Beyond the existing need-based grant and loan programs, policymakers and advocates have considered other new policy ideas to reduce the financial burden of college and provide more equitable access. Ideas like income driven repayment plans (Brooks, 2016; Karamcheva, Perry, & Yannelis 2020; Lacy, Conzelmann, & Smith, 2018) and income share agreements (Madonia & Smith, 2019; Salmon, 2020; Schachar, 2019) have been a part of the national and state conversation about how to make college more affordable.

- Other reform ideas have centered around how to reduce the overall cost of higher education; in California, for example, researchers have pointed out ways to reduce transfer costs between the community college system and the CSUs and UCs. Research by The Campaign for College Opportunity (2021) indicates that reducing barriers like confusing or duplicative course requirements, and therefore reducing the number of courses needed to transfer, would have saved the state over $40 million in 2019-2020.

**Stable funding**

While there has been much focus on the role of adequacy and equity in the education finance literature, the stability of funding—a particularly salient aspect of education finance in California—is often overlooked. In this section, we describe two factors that have made state
revenue in California particularly unstable and that have led to greater instability in education funding overall: 1) A revenue base that is highly volatile and results in large fluctuations during economic upswings and downturns, and 2) A state budget with a large number of “restricted costs” that limit the ability of policymakers to smooth spending cuts during recessions. We then describe how the stability of funding is an important element for policymakers to consider when designing an education finance system for California’s future.

**A Highly Volatile Revenue Base**

The business cycle is often a primary driver of California’s General Fund revenue volatility. In general, across the US tax revenues have become more sensitive to business cycle fluctuations in recent decades, leading to greater volatility in revenue collections for most states. For California, research looking at the standard deviation in the annual percentage change in general fund revenue from 2006 to 2015 finds that the state has among the most volatile revenue of any state (Murphy, Paluch, & Mehlotra, 2019; Randall & Rueben, 2017). Additionally, across all states since 1977, the personal income tax (PIT), a particularly volatile revenue source, grew from 25 to 36 percent of total state revenues (Rueben, Randall, & Boddupalli, 2018). In California, today the PIT represents more than two thirds of state revenue; the state has come to rely more heavily on the PIT as a revenue source following the decision by California voters to significantly limit property taxes. As seen in Figure 8, there was a significant drop in the proportion of state revenue coming from property taxes in 1978 following the passage of Proposition 13. Following this initial drop, the share of property tax revenue has steadily increased as has the share of revenue coming from the PIT; revenue from other sources such as the sales and use tax and corporate tax have declined.
Beyond wages and salaries, business income, and retirement income, the state has chosen to include other types of income in the personal income tax base such as income from capital gains and other dividends, interest, and rent, which are highly volatile (Miller & Chu, 2018). The upside is that the state has a highly progressive PIT — high-income earners pay much higher tax rates than lower income earners, with marginal tax rates as high as 13.3 percent (Miller & Chu, 2018). The state’s top one percent of earners typically make up between 40-50 percent of the state’s PIT revenue. When the economy is performing well, state revenue collections soar as top earners produce strong tax returns, but when there is an economic downturn, top earners tend to lose income and capital gains, leading to declines in PIT revenue (Miller & Chu, 2018). For a full explanation of California’s composition of revenues and the General Fund, see the California 100 Fiscal Reform issue area.

**Restricted Spending**

In most states, constitutional and statutory budget formulas, federal grant requirements, initiatives and referenda, and court cases limit or lock in spending decisions; this type of
restricted spending requires lawmakers to take measures beyond the normal appropriations process to make budgetary changes. Research from the Urban Institute, which attempts to measure the share of overall state expenditures that are restricted, finds that at the lower end of their estimates at least 40 percent of California’s spending is restricted (Gordon, Randall, Steuerle, & Boddupalli, 2019). This represents spending that lawmakers have the least flexibility to change, which includes the state’s pension obligations and other retirement benefits, debt service, and Medi-Cal. These are particularly inflexible expenditures as issues like health care and retirement benefits are often tied to collective bargaining agreements, and the state is also constitutionally required to make the annual actuarially required contributions to the largest public employee pension system in California - CalPERS. Likewise, debt service payments for things like state bonds are contractual obligations and are unlikely to go unpaid. Technically states may opt out of Medicaid, though this would be politically unlikely and administratively costly. While California is not required by federal law to participate in Medicaid, there is a fiscal incentive for the state to participate in order to receive federal matching funds; in 2015, for example, California spent $87.2 billion on Medi-Cal (California’s version of Medicaid), including $53.6 billion in federally financed spending. Factors largely beyond the state’s control like price inflation, caseloads, and a growing number of new drugs and procedures have all led to increases in California’s Medi-Cal spending, which means that Medi-Cal has been a large, growing, and highly inflexible expenditure in the state budget.

Considering a broader definition of restricted spending, the Urban Institute finds that as much as 86 percent of California’s budget could be considered fixed (Gordon, Randall, Steuerle, & Boddupalli, 2019). In this case, the researchers include all potentially restricted spending in the state budget including the minimum K-14 education funding guarantees from Proposition 98, dedicated transportation spending, and deposits into the Budget Stabilization Account (one of the state’s reserve funds), among others. As discussed previously, Proposition 98 creates a legal floor, but an informal ceiling, for K-14 education spending in the state. Though this spending minimum is constitutionally mandated, it is unique in that it is both binding and flexible. The state has the ability to modify Proposition 98 requirements each year (Proposition 111, which was passed shortly after Proposition 98, allows lawmakers to waive the Proposition 98 guarantee during economic downturns), which gives lawmakers the ability to cut education spending during times of fiscal stress, though ultimately any short-term cuts will have to be made up for by larger future maintenance payments. In this way, Proposition 98 is unique in that funding is guaranteed in ‘good times’ only--the state has constitutional authority to cut spending when necessary, making education funding unlike other restricted, fixed costs. Likewise, the state also earmarks funds for transportation or other issues that create additional inflexibility in the state budget. Lastly, recent constitutional amendments, like Proposition 2, require annual payments toward the state’s reserves, which further restrict spending (see discussion of Proposition 2 below).
California’s unique combination of particularly volatile tax revenue, together with relatively high restricted costs in its budget, means that the state’s finances, and consequently its funding for education, are susceptible to boom and bust budgetary cycles (Petek, 2016). This means that during economic downturns, P-16 education spending can be particularly vulnerable to cuts because portions of education spending are discretionary (in particular higher education and some ECE programs) or can be discretionary if lawmakers invoke their constitutional authority to cut spending (specifically Proposition 98-funded portions of ECE, K-12, and community colleges).

**Funding cuts for education during the Great Recession**

During the 2008 Great Recession, California’s state budget had an unprecedented multi-billion-dollar shortfall (Hollingshead & Barkman, 2018). The state was home to a booming construction and housing industry, and the California economy was hit particularly hard during the mortgage crisis (Bardhan & Walker, 2010). To balance the budget, legislators made drastic cuts to state programs over three years that relied on Proposition 98 funding (Hollingshead & Barkman, 2018).

Early Care and Education programs were cut by about $1 billion, or the equivalent of about 25 percent of the state’s child care slots (Melnick et al., 2017). At the same time, according to the Legislative Analyst’s Office, the state contribution to K-12 education (after adjusting for inflation) was cut so severely that per pupil spending during the Great Recession was even lower than 1988-89 inflation adjusted funding levels. By 2012-2013, the recession’s impact on the state’s K-12 education budget had reached its trough, with district spending down by about $2,100 per student due to state cuts, and California quickly fell to the bottom of state rankings in per pupil spending (Lafortune, Mehlotra, & Paluch, 2020; Shambaugh, Kitmitto, Parrish, Arellanes, & Nakashima, 2011). For the UCs and CSUs there were also deep cuts during this same period; cuts to the both systems ranged from 9 percent to 25 percent (Murphy, Paluch, & Mehlotra, 2019).

The return on pension investments during the Great Recession also reached historic lows, further stressing the state General Fund and school budgets; both CalPERS and CalSTRS had returns 30 percent lower than expected--yet because pensions are a fixed cost guaranteed to be paid out by the state, funding the shortfall became a state priority and shrunk the revenue pie for the state’s education systems (Lin, 2018).

**Budget-balancing approaches**

Given the combination of revenue volatility and restricted costs discussed above, during recessions, California lawmakers often have to deal with significant budget shortfalls. To stave off more significant cuts to spending, policymakers may take other budget-balancing steps to help close the budget gap.

*New revenue* - While spending cuts in California may be difficult due to statutory, constitutional, or legal constraints, raising new revenue to help balance the budget during recessions can be challenging due to political constraints. Typically, it may be difficult to persuade voters and lawmakers to increase taxes during a recession if individuals and businesses are already struggling. Despite this challenge, California has a few recent examples
of being able to pass temporary revenues during recessions. During the Great Recession lawmakers successfully passed temporary increases in the personal income tax and sales tax, as well as the vehicle license fees to help balance the state budget (Murphy, Paluch, & Mehlotra, 2019). And later on, as schools were still struggling during the recovery from the recession in 2012, voters passed Proposition 30, which enacted a temporary income and sales tax increase to stem further cuts to K-14 education. In 2016, the income tax increases were extended temporarily through 2030 with Proposition 55.

**Budget maneuvers** - As a best practice, states should pay for current year expenditures using recurring revenues earned during the same year. However, during times of fiscal distress states will often delay expenditures to future fiscal years or bring expected revenues from future years into the current fiscal year. Despite this, California has used such maneuvers during previous recessions, at times with a significant impact on education funding. For example, during the Great Recession, California delayed billions of dollars in payments to K-12 districts in order to prioritize balancing the state’s General Fund (Shambaugh et al., 2011), causing school districts to dip into reserves, transfer funds between different accounts (Lafortune, Mehlotra, & Paluch, 2020), and in some cases, engage in borrowing from tax and revenue anticipation notes (TRAN’s) and bond proceeds (Campbell & Herrera, 2019). Other state budget maneuvers included eliminating Cost of Living Adjustments (COLAs) for teachers and school staff, giving districts more flexibility to spend money allocated for categorical programs, and shifting funding between districts and redevelopment agencies (Lafortune, Mehlotra, & Paluch, 2020).

**Federal intervention** - During recessions, it is now commonplace for the federal government to supplement state General Fund losses with stimulus aid--this occurred during the 2008 Great Recession and again during the most recent COVID recession in 2020. During the COVID recession, California spent down several billions in reserves and immediately delayed $11 billion in funding to K-12 schools, but was ‘lucky’ in that the federal government invested in massive stimulus packages that included aid for states. At the same time, the Federal Reserve’s macroeconomic policy interventions helped stabilize the stock market, business behavior, and asset prices, creating favorable economic conditions for the state’s General Fund with far better returns than expected (Petrou, 2021). However, the COVID recession initially left California in a vulnerable financial situation with the fate of funding for the state’s schools and higher education organizations, alongside other programs and services, reliant on the political environment of Washington, D.C. Whether or not the state will be able to rely on the federal government for this kind of budgetary relief in the future is uncertain and adds another dimension of uncertainty to the state’s ability to plan for and withstand cuts to education budgets during future recessions.

- **New ideas:** California should consider ways to diversify its revenue base to improve volatility. The clearest way to diversify revenue, though hardly a new idea, would be to
repeal all or part of Proposition 13 in order to give local governments greater leeway to raise new revenue. Likewise, the state could revisit broadening the base for consumption taxes, which it has experimented with in the past.

Short-term strategies vs. long-term resiliency

California lacks a strategic, long-term approach for managing high fixed costs in the General Fund and its exposure to revenue volatility during economic downturns. In recent years, California has relied on a short-term, “bandage” approach, building up its reserves and chipping away at its debt during economic booms in the hope this will help the state weather the storm during recessions. This was a strategy implemented by former Governor Jerry Brown following the Great Recession, as he prioritized paying down the state’s “wall of debt,” eliminating nearly $30 billion in debt between 2011 and 2017 (Petek, 2019). He also focused on building up the state’s reserves with the passage of Proposition 2, which created new constitutional rules for allocating revenue from the General Fund and from capital gains to the one of the state’s reserves (the Budget Stabilization Account) and mandated that a certain portion be dedicated to paying down outstanding debt (Hollingshead, 2021). While this approach of paying down debt and building up reserves may help somewhat in the future during mild or moderate economic downturns, the latest research indicates that this strategy may not be adequate during any future severe recession (Lafortune, Mehlotra, & Paluch, 2020).

California also lacks a long-term plan to stabilize education funding. Proposition 2 established a separate reserve account for K-12 schools; however the rules for how and when the state must contribute to the account are more restrictive, so the state did not make a contribution to the account until 2019, five years after it had been established. Even then, the amount deposited was less than one percent of annual state spending on schools in that year (Legislative Analyst’s Office, 2020).
ORIGINS

Now we turn to a brief review of how the state arrived at its current composition of education financing. Notably, California is unique in that it has a direct democracy system that allows voters to make important policy decisions that in other states are typically left up to legislators. This means that in California, many of the most important school finance decisions have been made through the ballot initiative system, where voters have played a significant role in deciding how early childhood education, K-12 schools, and community colleges are funded. It also means that school finance policies enacted through the initiative system are much more difficult to amend or alter. Below, we review the major propositions passed by voters over the last 50 years, and also briefly review important legal challenges and laws passed by the legislature that have molded the shape of school finance in California (for a more complete list of the propositions, court decisions, and laws that affect school finance in the state, see Appendix Tables 1-3).

Throughout much of the mid-20th century, revenue for California’s school districts predominantly came from local property taxes and voter-approved special taxes, alongside a modest apportionment from the state (Brunner & Sonstelie, 2006; Timar, 2006). Over time, wide disparities in local revenue generation grew at the district level—wealthy districts had higher assessed property values than low-wealth districts and were more likely to raise additional funds by voting to increase tax rates or by passing other special revenue generating measures (Brunner & Sonstelie, 2006). In 1971 the state Supreme Court ruled that such disparities in local revenue generation violated the equal protection clause of the Fourteenth Amendment in the landmark Serrano v. Priest court case (Henke, 1986).89 The decision fundamentally transformed the design of K-12 financing from a decentralized system in which local communities raised the majority of revenue for schools via property taxes to a state centralized system whereby the state legislature would play a large role in determining the equalization of per pupil funding across K-12 districts (for more information, see Timar, 2006). Shortly after the Serrano decision, the legislature passed Senate Bill 90 in 1972, which increased state aid and created a ‘revenue limit’ system that equalized per pupil revenues across districts (Sonstelie, Brunner, & Ardon, 2000).

Following the final Serrano decision, in 1978 voters passed Proposition 13 to limit increases to the residential and commercial property tax rate across the state, and to give the legislature authority to allocate property tax revenue between local jurisdictions (Brunner & Sonstelie, 2006).90 More specifically, Proposition 13 capped property tax rates at one percent of a

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89 There were actually three decisions that were a part of this case. The first was in 1971, the second decision came in 1976, and the final court decision was in 1977. For more information, see Henke (1986).

90 Other laws were put into place at this time as well such as the Gann Limit and Redevelopment Funds, which also had an impact on school district budgets. For more information, see Timar (2006).
property’s purchase price, with increases in the assessed value thereafter capped at two percent per year or capped at the rate of inflation, whichever is lower; the law also gave the state government authority to allocate locally generated property tax revenue (Chu & Uhler, 2016). While the purpose of Proposition 13 was to limit government spending and tax increases, the new voter-approved constitutional amendment put further pressure on the state to fund K-12 education from the General Fund. The composition of K-12 revenue before and after Serrano and Proposition 13 illustrates the profound transformation that took place: Up until the 1970s school districts were 60 percent financed by local revenue, 34 percent was provided by state revenue, and 6 percent from federal revenue (Timar, 2006). Today, local revenue accounts for only 32 percent, the state provides 58 percent, and the federal government contributes roughly 10 percent (Legislative Analyst’s Office, 2019).

Shortly after the passage of Proposition 13, in 1979 state lawmakers passed SB 154 and AB 8, which set in place property tax distribution rates between school districts, cities, counties, and special districts based on county-wide allocations in the mid-1970s that still remain in place today (Hill, 2000; McCarty, Sexton, Sheffrin, & Shelby, 2001).91 These antiquated allocation laws have a significant impact on school district budgets and have been overlooked in current policy debates about school funding. The Legislative Analyst’s office has found that property tax allocations to school districts vary widely from county to county, from 20-64 percent, but limited research has examined how property tax allocation laws might benefit some school districts over others (Hill, 2000; McCarty et al., 2001). Some research documents that the uneven distribution of property tax to school districts and other local jurisdictions has caused major friction during economic downturns, resulting in a long history of state-mandated shifts between schools and local governments (Murphy, Paluch, & Mehlotra, 2019). And in some cases, districts have such strong returns from property values and favorable allocation laws that they become ‘basic aid’ districts that do not need to rely on state funding for K-12 at all, and are therefore little impacted during economic recession (Weston, 2013).

Beyond changes to property tax law, another landmark change for school finance came in 1988 with the passage of Proposition 98.92 After the tax revolt that ensued during the 1970s and the shift to a centralized state model of school finance after Serrano, schools were underfunded as the state and broader economy experienced the 1980s oil shock, high unemployment, and inflation (Murphy, Paluch, & Mehlotra, 2019; Sheffrin & Sexton, 1998). Voters intended to increase funding and reduce political battles in the state legislature over school financing by requiring funding for K-12 and community colleges to be a constitutionally protected share of

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91 Property tax distribution formulas were altered again in 1992 after the legislature established Educational Revenue Augmentation Funds to distribute more property tax to schools and community colleges during an economic recession (for more information, see Hahnel et al., 2020).

92 A complex set of laws and other propositions govern Proposition 98; for a review, see Kapphahn & Kuhn (2017) and Wassmer (2008). Proposition 98 was also modified in 1990 by Proposition 111.
the state budget. Proposition 98 set a ‘minimum guarantee’ that the state allocates at least 40 percent of the General Fund to the K-14 education budget each year (Kapphahn & Kuhn, 2017), locking funding for community colleges—a discretionary program—together with K-12 funding, a compulsory program.93

In more recent years, new revenue generation for schools has fallen directly to the will of voters. In the aftermath of the Great Recession, voters passed Proposition 30 in 2012 to increase income taxes on earnings above $250,000 for seven years, and added 0.25 percent to the state sales tax for four years; the proposition provided this new revenue exclusively to K-12 and community colleges. In 2016, voters approved Proposition 55, which extended the income tax increase on those earning above $250,000 until 2030, with most of the money allocated to K-14 education (Murphy, Paluch, & Mehlotra, 2019). Both Propositions 30 and 55 were essential to getting education finance back on track following the Great Recession.

Consequences

Many of these propositions, court cases, and laws were designed with good intentions to protect students’ right to an equal education, or to provide adequate funding to students across districts. However, three of these historical decisions have had unintended consequences for K-12 districts, community colleges, and students; namely, the Serrano v. Priest court decision and Propositions 13 and 98. Together, these decisions have exposed school funding to the volatility of the state General fund and the booms and bust of the business cycle, while also tying the hands of lawmakers to raise new revenue. The Serrano decision legally centralized school finance at the state level, while Proposition 13 significantly weakened property tax revenue for the state—a stable revenue source that typically withstands wide fluctuations in the business cycle—and instead put the onus on the state to provide more revenue for schools from the state’s General Fund, which is highly unstable and unpredictable during recessions (Miller & Chu, 2018). Proposition 98 was passed with intentions to provide a minimum funding guarantee for districts, but lawmakers often see it as a ‘ceiling’ and rarely allocate more than 40 percent of the General Fund to the K-14 education budget (Kapphahn & Kuhn, 2017). In addition, lawmakers’ hands are often tied by a long list of complex rules, laws, and regulations guiding Proposition 98 that make it difficult to adjust revenue for K-14 during budgetary shortfalls or to increase funding even during times of economic stability (for further discussion, see Kapphahn & Kuhn, 2017). Arguably, the school finance system could have benefitted from Serrano or Proposition 98 alone, but their interaction with Proposition 13 has meant that the effects of state centralization have been exacerbated—Proposition 13 erodes local property taxes which are a stable source of revenue

93 The 40 percent allocation is just a rough rule of thumb. Each year, the legislature uses three ‘tests’ to determine the precise allocation, and there are a host of nuanced laws and rules governing the exact amount allocated to K-12 every year. For more information, see Kapphahn & Kuhn (2017).
for schools and community colleges, leaving the state to backfill education budgets with more volatile funds, leading to severe funding shortages during economic recessions.

Together, such decisions have resulted in a major transformation of revenue for K-12 school districts; prior to the 1970s per pupil spending was above the national average, and now it lags toward the bottom after accounting for cost of living (Hahnel, Hough, & Willis, 2020). For community colleges, the story is much the same: Proposition 13 and Proposition 98 led to massive underinvestment in community college districts, and put funding for the higher education segment in direct competition with the K-12 system (Spence, 2002). The bottom line is that such reforms have trapped the majority of education funding in a gridlock of the state’s General Fund with few, if any, options to raise new revenue for education when the economy is strong, or to address budgetary shortfalls when the entire state revenue system fluctuates during recessions.94

94 One option is for voters to undo propositions by simply placing new initiatives on the ballot to modify or eliminate existing constitutional amendments. Once placed, the initiative requires just a simple majority vote for approval. An example of this was Proposition 15, which would have changed property tax rates for commercial property owners by undoing a portion of Proposition 13 (originally passed in 1978). For a review of ideas to transform the finance system, see Appendix Table 4.
TRENDS

We now turn to a review of leading trends that may influence education finance in the years and decades to come. We narrow in on three salient trends: 1) changes in student enrollment trends; 2) rapid advances in new technology to aid student learning, alongside COVID-19’s push to move many school and college classrooms online; and 3) California’s growing economic inequality.

Enrollment declines

Since 2013-14, student attendance in K-12 schools has been declining every year in California at a rate of about 1.5 percent, and is expected to drop by another 7 percent by 2027-28 (Warren & LaFortune, 2020). Enrollment declines are also likely in ECE programs in the coming years due to slowing population growth (Shelton et al., 2019). A recent report from the Public Policy Institute of California attributes the K-12 enrollment drop to fewer births, an out-migration of school-aged children to other states, and competition in some districts from charter schools (Warren & LaFortune, 2020). Over the last several years, regions, such as Los Angeles, Orange, and Santa Clara Counties experienced larger declines than the statewide average. In the coming decade, Los Angeles, Marin, Santa Clara, Santa Cruz, Sonoma and Ventura counties are expected to decline by more than 15 percent, with enrollment expected to shrink across half of all California counties.

In higher education, community college enrollment has also been on the decline, whereas enrollment at UCs and CSUs has been on the rise. Total freshman enrollees in the UC system more than doubled from 1994 to 2020, with the total student headcount of the UC system growing from about 172,000 in 2008 to over 222,000 in 2018 (UC Regents, 2019). CSU enrollment grew in recent decades as well, with a 32% increase from 2000 to 2020. In recent decades CCC has seen a decline in its total headcount of students: 2.6 million students enrolled in 2000-01 versus 2.3 million in the 2019-20 term; however, the number of students in full-time equivalents (FTE) grew by 14% over the same period. At the same time, high school graduation rates remain high and more students are graduating having completed college preparation courses, indicating that student enrollment in higher education is likely to continue to rise.

With the onset of the COVID-19 pandemic, declining enrollment trends in K-12 and the CCC system have accelerated. On average, statewide K-12 enrollment declined by 3 percent between 2019-20 and 2020-21, but the largest enrollment drops were among low-income students in kindergarten and first grade, which saw declines of up to 13 percent, and preschool

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95 The total number of in-state resident students at UC’s grew by 12 percent over the same time period: from 163,773 in 2008 to 182,733 in 2018; the total number of nonresident students at UC’s (either domestic or international) grew by 342%, from 9,000 in 2008 to nearly 40,000 in 2018 (UC Regents, 2019).
enrollment was down by 6,000 children. Enrollment drops in K-12 were also regional, with enrollment in parts of the Sierras declining by over eight percent. Changes in higher education enrollment were present during the pandemic as well—enrollment across California’s community colleges decreased overall, while enrollment held steady in the UC system and increased slightly in the CSU system.

Implications for school finance

All enrollment changes have potential to impact ECE, K-12, and higher education finances since funding is tied to enrollment in all three systems. ECE providers, schools, and the state’s community colleges facing declining enrollment will have to make due with fewer state dollars and may have to make budgetary cuts or find ways to backfill their budgets if enrollment continues to decline. A recent study from the Public Policy Institute of California found that declining enrollments in K-12, in particular, have a cost to the state as well as districts. California is unique in that it provides a declining enrollment adjustment to school districts for the first year following an enrollment decrease; in the 2018-19 budget, the state paid nearly $1 billion to fund such enrollment adjustments (Warren & LaFortune, 2020).

While more high school students are completing course requirements necessary for college and graduating from high school at higher rates, more students are enrolling in the state’s UC and CSU systems, which is promising for the number of students who are on track to receive degrees. However, there may be new pressures for the state budget, as more student financial aid will need to be allocated to students, and the state may need to find ways to open more higher education seats to account for more students planning to enroll in one of the three public segments (Cook & Mehlotra, 2020). This will put continual cost pressures on higher education institutions as they struggle to meet the needs of a growing student population—including their basic needs, health care, and mental health—while also ensuring the quality of their education.

School finance and technology

Online learning is an appealing strategy for education institutions to expand access to more students across different geographic areas potentially at a lower cost. This is especially the case for higher education, where online courses could also provide access at a lower cost to students (Deming, Goldin, Katz, & Yuchtman, 2015; Zhang, Zhao, Zhou, & Nunamaker, 2004). Advocates of online learning posit that traditional teaching methods across K-12 and higher education are outdated, are too expensive because they require intensive human resources, and fail to take advantage of advances in human cognition and related instructional technologies (Hess &
Meeks, 2012). Research on technology use in K-12 has confirmed that schools save money with online courses; this is particularly true for schools that are completely online or virtual since they reduce the need for brick-and-mortar facilities and operations and other in-person student costs such as transportation and food services (Miron & Urschel, 2010).

However, cost challenges may arise when looking at economies of scale. For example, when California schools and colleges moved online during the COVID-19 pandemic, there were large upfront costs to doing so. The state initially established a $30 million partnership with the California Public Utilities Commission to cover costs for education technology at the onset of the pandemic (Legislative Analyst’s Office, 2020). The 2020-21 budget allocated $5.3 billion in state and federal funds to help school districts purchase computers, set up hotspots, and address other learning needs associated with the switch to distance learning. In some cases, private philanthropists stepped up to financially contribute to low-income K-12 districts to offset technology deficits during the height of the pandemic. In the 2021-22 budget cycle, the state passed AB/SB 156 to invest $6 billion to expand broadband for residents across the state.

Even with these efforts, California likely has a long way to go to provide basic infrastructure for all students to access basic infrastructure and online resources and important equity concerns in how students access online courses and other technology remain. The COVID-19 pandemic highlighted major inequalities—especially among low-income students and students of color—in access to the internet and devices to participate in online learning in both K-12 and higher education. Other inequalities exist in who accesses state broadband infrastructure, with barriers to adoption such as affordability, digital literacy, and access to devices that vary by race, class, age, gender, disability, and education-level.

In addition to concerns about the equitable access of technology are concerns that not all students are equally successful with online learning modalities. In fact, higher education research suggests that academically underprepared students will be more successful in both the short-term and long-term when they enroll in face-to-face courses rather than online courses (Bettinger & Loeb, 2017). This is especially the case for low-income, Black and Hispanic students in higher education enrolled in non-selective institutional settings such as community colleges (Hart, Friedmann, & Hill, 2018; Jaggars & Xu, 2010; Johnson & Cuellar Mejia, 2014; Xu & Jaggars, 2014). On the other hand, online courses have been found to have some success for nontraditional students who work, have children, or have other outside commitments that mean they cannot as easily show up for in-person learning; online courses provide these students with a convenient alternative to access programs for degree completion (Johnson, Cuellar Mejia, & Cook, 2015). Whether or not online courses help or hurt student performance, there is also the fact that online learning platforms are contracted out to third-party, profit-seeking vendors, creating what is now a multi-billion dollar industry and raising the question of whether this is how public tax dollars should be spent.
The same concern holds for learning inequalities in K-12 or early childhood education, with one researcher in the field claiming that “online courses are hurting the students that need the most help.” Moreover, there are other concerns that younger students will continue to need in-person learning for the social and emotional aspects of schooling (Vaillancourt et al., 2022), and parents will prefer in-person schooling for the benefits of child care during the work day. Overall, research suggests that funding human resources and brick-and-mortar classrooms will remain an important variable in in education finance for the foreseeable future (Baum & McPherson, 2019; Morgenthaler & Barrett, 2021).

**Addressing poverty and inequality in California**

California’s education system and the students it serves are embedded within a broader political, economic, and historical context. Students represent a deeper set of social and economic inequalities in California--despite being one of the wealthiest states in the county, California is also one of the most unequal, with more than a third of people living in or near poverty. In fact, income inequality is worse today in California than it has ever been, with a growing gap between the wealthiest 10 percent of earners and the bottom 90 percent. It is no secret that wages have stagnated for decades, housing costs have soared, and child care costs have spiraled upward putting enormous pressures on everyday Californians. Other inequalities in wealth accumulation and political power have been in motion for years, furthering the state’s economic divide (Lewis & Burd-Sharps, 2014). Together, this web of factors contribute to the inequalities students bring with them to school that result in complex learning needs.

International researchers have found that student education outcomes improve when many features of the social safety net are sufficiently funded, since this can help reduce the overall effect of poverty and reduce the level of inequality students bring with them to school. For example, in the book, *Too Many Children Left Behind: The U.S. Achievement Gap in Comparative Perspective*, the authors compare how the design of welfare state programs in the United States, the United Kingdom, Australia, and Canada influence student achievement by income-level (Bradbury, Corak, Waldfogel, & Washbrook, 2015). The researchers show that the U.S. faces a much starker achievement gap by students’ socioeconomic background than students from the other countries since American students experience greater inequalities in school quality, family resources, and home environments. Notably, they find that programs like childcare, paid maternity leave, housing benefits, health insurance, and unemployment programs are much more generous in these other countries than in the United States, which mitigate disparities in student achievement.

Researchers studying the association between individual safety net programs and student achievement in the U.S. context alone find similar results. For example, in a study of the black-
white achievement gap in the U.S., researchers found that the greatest progress for closing the achievement gap was the 1970s and 1980s during a period of widespread investments in safety net programs following the Civil Rights Movement and Lyndon Johnson’s War on Poverty (Barton & Coley, 2010). Further, in studies of specific safety net programs such as the Earned Income Tax Credit, researchers have found an association between additional financial supports for working families and student test scores (Dahl & Lochner, 2008; Duncan, Huston, & Weisner, 2007). Other investments in programs like Medicaid or the Supplemental Nutrition Assistance Program (SNAP) have also been shown to improve academic outcomes and reduce the intergenerational cycle of poverty (Bailey, Hoynes, Rossin-Slater, & Walker, 2020; Chester & Alker, 2015).

In California, lawmakers have invested in many aspects of the state’s social safety net, which may ultimately help offset the large socioeconomic differences students currently experience. The state operates a complex array of social welfare programs, including public health insurance, cash and food assistance, child care, housing subsidies, and school meals, many of which received major spending boosts in recent years when the state has experienced budgetary surpluses or when the federal government has included increases in economic stimulus packages. Notably, in the aftermath of the Great Recession, the state established its own California Earned Income Tax Credit (EITC) in 2015 and the Young Child Tax Credit in 2019 to help offset the effects of poverty for working families. Research from the Public Policy Institute of California and the Stanford Center on Poverty and Inequality have found that investment in such programs significantly reduce poverty, especially for children. In turn, sustained and improved investments in safety net programs may ultimately reduce growing student inequalities and help reduce pressure on the education system alone to ameliorate the harmful effects of poverty.

Despite these investments, California’s K-12 system still serves more students living in poverty than any other state, with an astounding 60 percent of California students who are eligible for free and reduced-price lunches, a proxy for low-income status (Legislative Analyst’s Office, 2019). In addition, a significant portion of students come to California’s public K-12 system with unique learning needs; for example, enrollment in special education has been on the rise, with disproportionate enrollment of low-income and Black students (Anderson & Li, 2019). Clearly, California has a long way to go to invest in safety net programs that can continue to offset the challenges disadvantaged students bring with them to the classroom.
EDUCATION TECHNOLOGY IN CALIFORNIA

Zachary A. Pardos, Mahua Baral, and Bruce Fuller

This report presents the current state (facts), historical context (origins), and trends in online, tangible, and adaptive education technology in California. It aspires to be a brief digest for policy makers on what education technology supported pedagogies and modalities of instruction have been trialed, evaluated, and why, and the wisdom garnered along the way. We aim to inform future generations of what might be effective innovation and integration of technology to serve all of California’s learners.

FACTS

The current state of education technology in California has centered around online modalities of teaching and learning and the digital tools that support this type of instruction. In this section, we will cover the state of practice of blended and fully online learning and their supporting technologies, with a focus on experiences during the pandemic. This section will also touch on the use of inventive tangible devices and adaptive learning technology in the classroom.

BLENDED LEARNING

Blended learning and hybrid models combine online and in-person components to provide students with an integrated learning experience through the use of multiple forms of instruction (Bonk & Graham, 2005; Horn & Staker, 2016). Advocates of using online platforms and digital tools to educate argue they offer opportunities for personalized and competency-based learning, allowing teachers to focus classroom or asynchronous time on meaningful and cognitively rich activities throughout the day (Horn & Staker, 2015).

There are several ways educators may organize learning activities. Many instructors, when taking up digital tools, use a rotational method where students alternate between online and in-person tasks. Rotations may occur in stations within a classroom or outside computer labs, using individual customized schedules, or through 'flipped classrooms' where students watch lectures and online lessons on their own time and work on homework assignments in class with support of teachers (Horn & Staker, 2016).

In addition to rotational models, blended learning takes the form of acquiring credits from non-mainstream classrooms such as through alternative education centers, taking online courses while attending traditional brick-and-mortar schools, or through enriched virtual classes in which students take required in-person classes and enrich their learning online (Horn & Staker, 2016). Online classes in blended learning environments may be asynchronous in which students engage with content at their own pace and interact with instructors through the platform when
needed, or synchronous in which students and instructors simultaneously engage with each other and course material at pre-arranged times (Serdyukov, 2020).

The idea behind flipped or inverted classrooms stems from the belief that educators should not be solely responsible for delivering instruction, but rather that students should be active participants in their own learning. In flipped classrooms, activities that are traditionally done in classrooms and for homework are switched, and students engage with lecture material on their own time at home. Then, teachers support students in class through discussions, problem-solving, and providing guidance (Akcyir & Akcayir, 2018; Bergmann & Sams, 2012; Reidsema, Kavanagh, Hadgraft, & Smith, 2017). This theoretically allows for more complex instruction, helping students to apply facts and concepts acquired online within socially engaging classroom settings (synchronously).

Though the idea of blended learning has drawn attention from educators and researchers across the world, in a systematic review of literature on the use of flipped classrooms, Akcayir and Akayir (2018) found insufficient evidence to draw generalizable conclusions on its advantages and challenges. Evidence to date indicates blended learning could lead to positive student academic outcomes in learning, motivation, and attitude, but challenges to implementation include identifying quality videos, making sure teachers and students have easy ways to interact and communicate, and ensuring that students have required technologies and understanding of how to use them. In short, how blended learning and digital tools are organized by teachers likely drives the magnitude of benefits for students.

Schools implementing flipped classroom models require access to a rich variety of digital instructional material. Freely licensed online materials called Open Educational Resources (OER; Porcello & Hsi, 2013), curated by various websites, provide one source for such material. In a study analyzing data from a sample of almost 6,000 teachers who responded to a 2019 survey, researchers concluded that while a majority of teachers in English language arts, mathematics, and science use open educational resources, they typically do so to supplement existing curriculum (Tosh, Doan, Woo, & Henry, 2020). That is, most teachers build-out from conventional curricular material – often pegged to state learning standards – then aim to enliven instruction with digital tools.

Teachers most frequently reported using a service called Teachers Pay Teachers (56%), followed by search engines such as Google (41%), Pinterest (24%), Common Core State Standards related resources (18%), and State Department of Education websites (14%, international schools) when planning lessons. In addition to using digital materials to plan lessons, 88% of teachers reported using digital materials in class, with YouTube, Kahoot!, Quizlet, ReadWorks, NewsELA, BrainPOP, Prodigy, and Khan Academy topping the list of sources used during classroom instruction (Tosh, Doan, Woo, & Henry, 2020). The robust market of software producers, many
based in California, is remarkable – offering an ever expanding range of digital tools for inventive educators.

FULLY ONLINE LEARNING

Public K-12 schools, along with private organizations, now offer fully online programs, options that have become increasingly popular over the last couple of decades (Bowyer, 2017; Hrastinski, 2019). California students have a range of options for online schooling, including charter schools, national and international virtual schools, public and private online and hybrid schooling, and a variety of learning management systems.

According to the California Department of Education, there are 45 fully virtual K-12 schools operating in the state (https://www.cde.ca.gov); One is a preschool, seven are elementary schools, four are high schools, fifteen cover K-12, and 18 are alternative schools with unconventional curriculum. Seven are private schools and 12 are public charters. Many of the schools are affiliated with Stride K12 where students work with teachers as well as with a parent or guardian that serves as a learning coach to support and monitor student progress. In California, K12 Stride works with five free online public schools, five tuition-based online private schools, and offers more than one hundred online courses (https://www.k12.com).

California Virtual Academies (https://cava.k12.com/) operate a variety of charter schools across the state. In recent years, however, non-classroom-based charter schools, or those serving at least 20% of students exclusively online, have come under recent scrutiny over concerns of corruption or simply ineffectiveness. In light of the allegations, the state of California issued a moratorium on the creation of new non-classroom-based charter schools in October of 2019, to take effect from January 2020 to January 2025 after it was recently renewed (Charter School Operation, 2021). Additionally, the University of California offers online high school courses approved as A-G qualifying credit.

TEACHING AND LEARNING DURING THE PANDEMIC

While online learning began to spread by the 1990s, the global pandemic forced educators across the world to accelerate movement toward distance education, taking-up a variety of digital tools. By mid-March 2020 schools closed for half of all students in the United States affecting over 50 million learners in all 50 states (Bakker & Wagner, 2020; Morgan, 2020). In July of 2020, California Governor Gavin Newsom ordered schools to close and offer virtual instruction unless their counties were no longer on the state's coronavirus watchlist for two consecutive weeks (Office of Governor Newsom, 2020).

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96 https://www.ucscout.org/
When schools reopened for the new school year in the fall of 2020, 47% of districts offered only remote learning, most effecting districts with larger populations of Black or Latino students (66%), English learners (52%), and low-income students (60%). In contrast, about 87% of rural districts were open for at least partial in-person instruction (Hill, Gao, & Lafortune, 2021). Educators and school managers around the world were largely underprepared to shift to motivating forms of distance learning. Instructors and students required a variety of supports – offered by fellow educators and many software producers – to devise engaging lessons online (Ronkowitz & Ronkowitz, 2021).

Findings have emerged recently on how teachers innovated during the pandemic, along with the extent to which digital tools affected the social organization of schooling. Studies examining the experiences of students and educators during the pandemic shed light on the potential of distance learning and offered insights into what needs to be taken into consideration if schools and districts wish to continue offering online options. One study, conducted by Professors Pardos and Fuller at UC Berkeley observed and analyzed Zoom class sessions across 18 California charter schools. These investigators also conducted interviews with teachers and principals (UCB, 2021). Their findings speak to the breadth and variety of digitally spurred innovations, seen both inside remote classrooms and in how school days were often rearranged in ways that may persist. Teachers’ own voices on innovations they embraced during the pandemic can be heard in a project video (Fuller & Sherod, 2021).

The Berkeley team discovered that teachers deployed a remarkable array of digital tools during the many months of remote instruction, including 33 different software packages across the participating schools. A host instructional platform, like Google Classroom, typically housing lessons and assignments, compiled formative assessment results and stored a variety of digital material to enliven Zoom sessions (e.g., music, animation, art projects, YouTube, or Khan Academy supplemental material). Teachers frequently used programs, like Freckle, to assess children’s pace of learning and generate assignments pegged to each student’s proficiency level. These digital tools remain helpful as students return to school, teachers report, with widely varying competencies, requiring differentiated forms of instruction.

Teachers also individualized their teaching during the pandemic with the help of software, such as Peardeck, in which each student works on their own small whiteboard, as the teacher views on her screen the unique work by each pupil. This form of personalization would not be possible without digital tools. In addition, educators participating in the Berkeley study reported sharing strategies they found effective including rearranging school days to focus on whole-class instruction in the mornings, then hosting small groups and individual tutoring in the afternoons. This allowed teachers to work closely with students needing social and emotional support (UCB, 2021).
Principals reported communicating closely with families to deepen trust and build relationships, telling researchers that texting was a useful way of sharing information (UCB, 2021). These ties were fostered with simple digital tools as well, texting programs that connect teachers with parents, or parent conferences held on Zoom with teachers. And digital tools not only reordered classroom instruction, they helped foster new forms of social organization school-wide.

Similarly, a RAND study analyzing results from a national survey of district superintendents and heads of charter management organizations, uncovered various new approaches that organizations plan to, or would like to adopt, as the pandemic wanes (Schwartz, Grant, Diliberti, Hunter, & Setodji, 2020). Respondents expressed interest in creating virtual learning communities for teachers and principals, adjusting policies around instructional time, adopting flexible staffing models, establishing partnerships to offer online instruction, and adjusting policies regarding teacher compensation and work rules (Schwartz, Grant, Diliberti, Hunter, & Setodji, 2020). Research on the effects of the pandemic on schooling is ongoing; future studies may shed more light on the merits and drawbacks of online education and may provide insights into what works and for whom.

These early findings detail how quickly teachers and students became tech savvy, as well as growing weary of being online month after month. Yet prior to the pandemic, instructional technology was often relegated to the computer lab, or laptops were pulled out of the classroom cabinet for math instruction. During the pandemic, a variety of digital tools proved essential to connect teachers and pupils remotely, then to animate and enhance classroom instruction. Much remains to be learned regarding how these promising innovations sparked by remote instruction -- inventive online pedagogies and school-wide organizational change -- may persist over time. The blended use of synchronous teaching and asynchronous work by students seemed out of reach prior to the Covid-19 era. But now many teachers and students alike have become quite savvy, on the whole, even enthused about a variety of instructional technologies.

Case studies further detail classroom innovations fueled by digital tools – pedagogical inventions not always originating with the pandemic, but spurred along by the rising acceptance of education technologies. Analysts and educators based at Sesame Street’s research center, for instance, have completed a variety of such qualitative studies (Sobel & Jhee, 2020). One county digital curriculum director has adapted the Mindcraft game, deploying virtual-reality technology, that asks students to create a waterpark set to particular dimensions. This inventive approach pushes students to learn and apply concepts of area,

perimeter, and volume – demonstrating the intersection of mathematical operations and kids’ spatial reasoning.

California hosted a variety of online innovations for preschool-age children during the pandemic, inventions that engaged parents and kids together in learning activities. The Fresno County Office of Education, for instance, began synchronous online sessions with preschoolers and their parents featuring read-alouds with storybooks and basic lessons in math concepts (Johnson, 2021). This effort helped to keep parents in touch with their Fresno preschools, while providing much needed support for families eager for a variety of activities for their young children. Whether such innovations – drawing on the versatility of electronic tools and digital material – persist in the wake of Covid-19 remains a key empirical question.

Public agencies and private donors in California significantly widened internet access during the pandemic. Twitter CEO Jack Dorsey, for example, donated $10 million to the Oakland Unified School District, helping to distribute Chromebooks to students and free wifi accounts. Firms came forward to help buy devices and extend internet access to many California families, including Google, Amazon, and AT&T. The share of families reporting use of a home computer, laptop, or tablet climbed from 78% in 2019 to 85% in 2021. These survey results are further detailed in the Inequities section below (Galperin, 2021).

Whether policy makers and education leaders sustain the conditions that further digital innovation and new ways of organizing schooling remains a pivotal question. As the pandemic eased and state legislators reestablished 'normal' contact hours between teachers and students (Summer, 2021), lawmakers have inadvertently undone the increased time spent in small groups with English learners and special education pupils, earlier reported by teachers (UCB, 2021). Such institutional drift back to conventional classroom instruction works against the unanticipated progress made with education technologies during the pandemic.

HIGHER EDUCATION ONLINE

Fully online learning is more pervasive in higher education than K-12, one reason being that in K-12 there is a presumed necessity for physical supervision that does not pertain to adult learners. While many college and university instructors first experienced online teaching during the pandemic (Ali, 2020), the online-based modality of learning has been around for some time, initially branded “distance education” (Keegan, 2013).

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99 https://edsorce.org/2021/a-california-program-spent-millions-on-devices-for-distance-learning-heres-where-it-went/654590
A high percentage of postsecondary students in the U.S. currently take online courses. Analyzing the results of a survey from the National Center for Education Statistics (NCES, 2019), Figure 2 shows the percent of students enrolled in distance education in postsecondary education by state. New Hampshire has the highest percentage with 71.3% of students enrolled in at least one online course, 65.8% of them in exclusively online classes. Large shares of postsecondary students enroll in at least one online course in Arizona (62%), West Virginia (59.6%), Alaska (57.6%), and Utah (56.6%). California, despite being home to the world’s leading technology industry, has 32.1% of students taking online classes, 12.6% of them taking only online coursework.

The percentage of undergraduate students taking online courses also varies by institution, with some gaps widening over time (see Figure 3). According to data from NCES, students at private 4-year schools are more likely to take online classes, with 26.3% enrolled in 2003-2004 to now 83.5% enrolled in 2019. Private for-profit less than 2-year schools (1.3%) are the least likely to incorporate distance education into their programming, whereas public 4-year (35.8%), public 2-year (36.5%), and private non-profit 4-year colleges and universities (32%) display comparable percentages of students enrolled in online courses.
While California has a relatively low percentage of students taking online classes, it is no stranger to online innovation. California's community colleges represent the nation's largest post-secondary education system with 116 campuses serving more than 2.1 million students (CCCCO, 2017). The system has offered some form of distance learning since the 1980s, when courses were only available for transferring to baccalaureate-granting institutions, offered through television, radio, and correspondence.

Policy changes in 1994 led the system to explore and develop their distance learning courses, and in 2002, the California Community Colleges Board of Governors approved a seven-year pilot project to expand distance education to establish and offer regular credit and noncredit online courses (CCCCO, 2017). The number of students that enrolled in online courses steadily grew during the pilot and it garnered widespread interest to develop the program amongst educators, policymakers, and prospective students (Johnson & Mejia, 2014). Through the California Budget Act of 2013, California's Community Colleges received an investment of $16.9 million to expand the delivery of courses through technology. To address the need, the Online Education Initiative (OEI) was established as a collaboration among campuses to deliver online courses ensuring all students have access to certain core courses at all campuses (CCCCO,
The schooling system now offers over 10,000 courses, 90 associate degrees, transfer pathways, and 80 fully online certificate programs (https://cvc.edu).

Online courses have adopted either an asynchronous format, in which students engage with content at their own pace and interact with instructors through the platform when needed, or synchronous in which students and instructors simultaneously engage with each other and course material at pre-arranged times (Hart, Friedmann, & Hill, 2017). In addition to offering online courses at their campuses, the state of California passed legislation in 2018 to create a fully online community college. The California Online Community College Act of 2018 established The California Online Community College noting that "working adults should have access to high-quality, affordable, and flexible opportunities to pursue postsecondary education that does not conflict with their work and familial obligations" (California Online Community College Act, 2018). California's 115th community college, The Calbright College, became its first fully online school in the fall of 2019 offering all Californians free classes in customer relationship management, information technology, cybersecurity, and medical coding (https://www.calbright.org). The school is currently in the process of seeking accreditation, set to complete the process by the end of 2021 and to be fully accredited by the end of 2023. The new school has, however, struggled with a variety of administrative growing pains and received sharp criticism for its extremely low graduation rate thus far.101

Figure 4. Total Enrollment of Full-Time Students in Distance Education at California Community Colleges

Source: California Community Colleges Chancellor’s Office's (2017) Distance Education Report

Online learning at California's community colleges continues to expand its distance education program (see Figures 4 and 5) and are subject to regular evaluations of the effectiveness of their distance education and educational technology programs (CCCO, 2017). Although online education has gained popularity in community colleges, research comparing online learning to in-person learning in the schooling system shows that students taking online courses are less likely to complete courses with passing grades, are more likely to retake courses, and are less likely to take new classes in the same subject areas (Hart, Friedmann, & Hill, 2018; Johnson & Mejia, 2014).

Moreover, achievement gaps across racial and ethnic lines are worse in online courses than in face-to-face classes (Johnson & Mejia, 2014). Yet, the gap between success rates of distance
education and traditional courses has steadily decreased over time, with 53% completing online coursework in 2006 compared to 60% in 2011 and 66% in 2016, while about 70% completed traditional courses throughout the same time period (CCCCO, 2017). Long term, students taking at least some online courses were found to be more likely to earn an associate's degree or to transfer to a four-year college (Johnson & Mejia, 2014).

In 2013, the University of California launched the Innovative Learning Technology Initiative (now called UC Online) with the support of $10 million from the state to increase the use of technology and access to high demand undergraduate online and hybrid courses (UC, 2013). Multiple stakeholders were engaged in the planning process including the UC Office of the President (UCOP), Academic Senate, faculty, students, and administrators – developing new courses and shifting current classes to online formats (UC, 2013). In November of that year, UCOP launched a cross-campus enrollment system so students can search for and enroll in courses at other UC campuses to earn credit (https://uconline.edu). Since its inception, the project has funded the development and enhancement of over 80 fully online and hybrid courses and plans to evaluate the initiative are ongoing to measure progress and ensure accountability (https://www.ucop.edu).

TANGIBLE DIGITAL DEVICES

Online has not been the only modality in which education technology innovations have been brought to bear. Recently, educators have begun to integrate the use of interactive technologies in-class to engage students and increase involvement in cognitively stimulating discussions (Bojinova & Oigara, 2013). Student response system devices, such as clickers, are used during classroom instruction to promote interaction between participants engaged in learning activities (Banks, 2006). To use them, educators typically start by posing a question to an audience, each participant anonymously chooses from a set of options, and results are displayed. This allows students the flexibility to share how they are thinking without fear of being judged for their responses, while also letting them view how others are thinking about the same issues. Questions may have a right answer, allowing instructors to assess whether students are learning, or may be to survey how students feel about a particular issue. Research on the use of interactive technologies shows that using audience response systems increases participation and enjoyment. Many researchers have found it to enhance active learning and student concentration, while others report that it helps students achieve higher levels of learning, both in student performance on class assignments and through improved test scores.

While clickers are an inexpensive tool that educators can purchase and use in their classrooms, students may also use tablets and smartphones while learning, giving students opportunities in class to engage with information on their devices while also learning and engaging with their teacher and peers (Grinols & Rajesh, 2014). Research on multitasking with smartphones in
college classrooms is mixed with findings suggesting that it is useful in promoting creative thinking but increases risks of failing to complete tasks (Grinols & Rajesh, 2014). Other studies find smartphones to be powerful teaching tools (Williams & Pence, 2011). Incorporating the use of smartphones and tablets requires sound pedagogy and instructional design. It can be particularly useful when students are required to read and learn material on their own (Grinols & Rajesh, 2014).

K-12 classrooms have clearly increased access to digital technologies over the last several decades, but their use and integration into everyday classrooms remains sporadic. In a study of observations from 140,000 classrooms in the U.S. and around the globe, researchers at AdvanceED found that "there is still relatively few classrooms in which students' use of digital tools and technology is a regular part of the student's school experience" (Broekhuizen, 2015, p.1). According to their research, some ways that classrooms use technology are to gather, evaluate, and use information for learning; to conduct research, solve problems, and create original works; and to communicate and work collaboratively. In order to increase use, teachers need support and professional development to better understand how to incorporate and leverage these tools (Zinger, Tate, & Warschauer, 2017). Powerful use of digital tools that teachers have pedagogical knowledge, technological knowledge, and content knowledge. In a study of student perspectives on using digital devices in higher education, students reported that some advantages include assessing information quickly, communication and collaboration, creating a variety of ways to learn, and increasing situated learning (Gikas & Grant, 2013). Challenges included having instructors that were unwilling to incorporate technologies into their lessons, challenges with devices, and viewing devices as a distraction.

**ADAPTIVE AI TECHNOLOGY**

Adaptive technology, often driven by artificial intelligence (AI), is a way of personalizing a student's path or differentiating instruction using software. The motivation for this technology is the premise that one-on-one human tutoring, while ideal, is not feasible to scale because of both financial and educational labor market constraints. Teachers in some studies report how adaptive technology can personalize instruction and conserve their own time (UCB, 2021). Most adaptive technology (Corbett et al., 1997) is designed around the model of “mastery learning” (Bloom, 1984), where students are allowed to progress at their own pace, with a system providing personalized remediation.

A common adaptive technology now used in universities is the ALEKS PPL system. The system was originally developed at the University of California, Irvine with the support of funding from the National Science Foundation in 1993 by cognitive psychologist Dr. Jean-Claude Falmagne and a team of software engineers, mathematicians, and cognitive scientists (https://www.aleks.com). The ALEKS system "is an artificially intelligent learning and
assessment system, which utilizes big data and machine learning” applying “Knowledge Space Theory to determine precisely what each individual student knows, and what the student is ready to learn next” (https://www.aleks.com). ALEKS can create a personalized curriculum tailored to the unique needs of students who need to catch up and fill knowledge gaps before taking college courses (https://www.mheducation.com).

It starts by using adaptive assessments to identify what students know and need to learn, and results from the assessments are then used to assign learning modules of online lessons to help students learn material and to track how they are progressing in their work (https://www.mheducation.com). The system offers a flexible, efficient, and effective way for students to prepare and make sure they have the prerequisite knowledge to take and succeed in college courses. For example, at UC Berkeley ALEKS is used by the mathematics department to help students strengthen their knowledge and improve performance in their courses, to offer credit as a part of a class, and as a diagnostic tool to determine placement in advanced courses.

Adaptive technologies are now used in education assessments at states across the country. Students at public schools in California are tested annually to measure progress using online adaptive summative tests. After adopting the Common Core State Standards in 2013, the state began using the Smarter Balanced assessment system to measure how well students are learning academic standards. Unlike previous high-stakes summative assessments, Smarter Balanced uses adaptive technology to test student learning, asking students either easier or harder questions based on previous responses to determine an accurate level at which students are performing (https://smarterbalanced.org).

In addition to summative tests, the company creates formative assessments aligned to standards for educators to use while teaching to collect information on how well their students are grasping material so that they can determine next steps. By the Spring of 2015, all public schools across the state began using Smarter Balanced assessments as the key indicator to measure school and district performance (https://www.cde.ca.gov/ta/tg/sa). The increased use of digital tools in K-16 is also creating an abundance of longitudinal data that may be used to conduct new forms of assessment (Arum et al., 2018). In California, an effort is under way to store these data in a central Cradle-to-Career data system102.

102 https://cadatasystem.wested.org/
ORIGINS

The advent of the internet and increased internet access, combined with the proliferation of personal computing devices, laid the foundation for online and adaptive education technologies. In this section, we briefly review the historical context for these technological advances, educators’ capacity to apply digital tools, and subsequent demand for online education, and the education technology movements that emerged to meet the demand.

GROWTH OF COMPUTERS AND THE INTERNET

The digital revolution laid the technological foundations for the education technologies that we see today. Digital devices were first utilized in education and workforce training in the 1950s using computer-based instruction, with public schools and universities experimenting with the use of computers and intelligent tutoring systems throughout the 1960s and 1970s (Corbett, Koedinger, & Anderson, 1997; Reiser, 2001). Computer technology continued to attract interest from the general public and educators (Cuban, 2001). By 1983, 40% of elementary schools and over 75% of secondary schools were using computers for educational purposes (Raiser, 2001). Though computers were readily available in schools, their impact on instruction was limited, with teachers throughout the 1980s reporting they used technology primarily for drill and practice or to teach computer-related skills (Cuban, 2001; Raiser, 2001). The use of computers in education rapidly grew with the advent and spread of the internet in the 1990s and early 2000s (see Figure 1). As more schools and universities connected, in part thanks to the E-Rate Program103 – part of the 1996 Telecommunications Act – establishing lower connectivity and information services rates for libraries and schools, they also began integrating technologies into their pedagogy (Raiser, 2001; Wells, Lewis, & Greene, 2006). Meanwhile, even young children were logging-on to personal computers, soon taking up their parents’ mobile devices.

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103 https://www.fcc.gov/general/e-rate-and-education-history
To utilize much of the education technology available today, students need access to devices, software, and the internet (Bulman & Fairlie, 2016). Throughout the early 2000s, states, districts, and schools across the country experimented with programs to provide students with laptops and devices to aid in their learning (Warschauer, Grant, Real, & Rousseau, 2001). Founded in Los Altos, California, Apple Inc. has a long history as a vendor providing some of the first available computation devices in schools. Apple’s work with schools began in 1978 with a deal with the Minnesota Educational Computing Consortium (MECC) to supply computers that MECC could then sell to state schools. Four years later, MECC became the largest seller of Apple computers (Silver & Wuerthele, 2001).

In California, then-Governor Jerry Brown signed a bill in 1982 that allowed a 25% tax credit against the state corporate income tax for computer equipment donated to schools, leading Apple to donate computers to around 9,000 schools across the state. These early incentives helped the company secure a lead in the education technology market. After its initial successes in K-12, Apple aimed to get its new Macintosh computer into colleges, starting in 1986. Apple founder Steve Jobs left the company in 1985, in part due to disputes around how much to cater to the education market. He then founded NeXT Computer specifically to create a workstation designed for education. Although Dell overtook Apple in selling computers to
educational institutions overall by 2001, Apple continued to be a leader in K-12 education, with International Data Corporation (IDC) reporting Apple’s lead in providing both desktops (27.7%) and portables (34.7%) to the education market (“IDC Report Shows Apple is the Leader in K-12 Education”, 2001). In 2010, Apple released the iPad, advertising its variety of educational uses and attracting school districts around the country to purchase the new devices.

One of the first state-level initiatives, and the largest at the time, was the Maine Learning Technology Initiative (MLTI). In late 1999, then-Governor Angus King proposed to use the state's surplus in general funds to provide all middle school students and teachers in Maine with a laptop (Silvernail, 2011). The governor convened a task force to explore issues around the proposal who concluded, "if technology is a challenge for our educational system, it is also part of the solution... to move all students to high levels of learning and technological literacy, all students will need access to technology when and where it can be most effectively incorporated into learning" (Silvernail, 2011, p.3).

The program began implementation in the Fall of 2002, providing 17,000 teachers and students at over 240 middle schools with laptop computers, and still provides devices to middle schoolers and their teachers with minor changes to the program (https://www.maine.gov/doe, 2021). Researchers have conducted annual evaluations of the effectiveness of the program, concluding there is evidence that laptops raise student achievement.

Teachers reported a variety of perceived benefits including exploring topics in greater depth (87%), more effectively teaching some types of content and skills (86%), a greater ability to individualize curriculum (82%) and differentiate instruction (76%), and greater ability to teach students to be critical thinkers (66%) (Silvernail, 2011). Teachers reported using laptops a few times a week or more to develop instructional materials and conduct research for lesson development, and as a management and communication tool. Use of laptops increased over time, climbing from 42% using laptops to provide classroom instruction in 2005 to 75% in 2010, 50% using them to research lessons in 2003 to 78% in 2010, and 57% applying laptops to develop instructional materials in 2003 to 83% in 2010.

Students reported using laptops most for language arts, social studies, and science. Teachers reported using laptops for instruction in language arts (83%), mathematics (74%), science (86%), social sciences (89%), fine arts (61%), and foreign languages (67%). In 2009, the state expanded the program to also include high schools. To address new needs in 2019, the Maine Department of Education recast their plan as MLTI 2.0, to include more support for the educational software that occupies the devices, broadband, and professional development (https://www.maine.gov/doe, 2011). It has been suggested that the laptop program in Maine, like other similar programs, can potentially lead to large gains in student achievement, but
students most benefit when they also have access to software and teachers that are well trained in incorporating technology into their pedagogy (Bulman & Fairlie, 2016).

In addition to the Maine program, education organizations across the world began spreading the classroom use of laptops in the 2000s with policymakers pointing out their potential to increase engagement, advance technology skills for pupils and teachers, and improve student writing (Zucker & Light, 2009; Malamud et al., 2019; Bergmann & Sams, 2012). Research and evaluation studies on programs generally found increased student engagement, with educators noting enthusiasm about the programs and students stating they frequently use laptops to search for information.

Scholars reported strong evidence of benefits for student writing, acquiring facts and skills, and engagement in laboratory sciences. Others reported that they contributed to increased student achievement, though large-scale studies of benefits for pupil learning remain scarce. Overall, studies found that providing laptops was not enough and that educators needed a clear approach to using computers and digital resources, along with ongoing professional development, to learn how to best utilize digital tools (Zucker & Light, 2009).

**EDUCATIONAL IDEOLOGIES, INDIVIDUAL GROWTH AND DIVERSITY**

As novel digital technologies enter schools and classrooms, educators inevitably mold these tools to their competing notions of human learning and development. In turn, curricular materials and ways of organizing knowledge or pedagogy must evolve to fit a variety of educational philosophies. “Personalizing instruction” offers one perennial concern among American educators – how teachers might get to know the individual student and tailor pedagogy to each member of the class. It’s a popularly held aspiration, nearly impossible to fully achieve. Yet, adaptive assessments have become quite common in gauging each student’s proficiency level, then generating exercises and assignments individualized to each student. Or, tools like Peardeck allow the teacher to see on-screen how each student is puzzling-through a math problem, quickly enabling teachers to ask individually tailored questions.

Another variant of “individualizing” stems from the growth of special education in California and nationwide. During the era of remote instruction, many educators and special-education resource teachers reported more time for synchronous instruction online with disabled pupils (UCB, 2021). State-afforded flexibility in scheduling the school day, along with the ease of Zoom sessions, may have yielded more focused teaching of special-education students.

A second educational ideology speaks to the cultural and linguistic diversity of California’s students and families. The state has attempted bilingual education – of late, “dual-language immersion” – over the past half-century. Governor Gavin Newsom’s recently approved of an ethnic studies graduation requirement for high schoolers offers a related example – where
digital materials could support more inventive forms of teaching and learning, more vivid sharing of differing cultural and racial experiences.

A third set of educational ideals relates to the push for social-emotional learning in the schools, especially as students come off 18 months of isolation from peers. Here too, Zoom chat rooms and online applications already offer options for teachers in nurturing stronger social skills and emotional well-being. The mere ease of interacting one-on-one with a student or parent, realized on a mass scale during the pandemic, offers additional options in the social-emotional domain.

The overall point is that education technology offers a variety of pedagogical and behavioral possibilities for teachers and students. Kids themselves already explore the internet to customize their own learning, to pursue their particular interests outside of school. As educators adapt to this digital reality, they will bend and modify educational technologies to fit their educational ideologies. Software designers, education planners, and policy makers must be sensitive to these underlying teaching philosophies held by diverse teachers.

DEMAND FOR ONLINE HIGHER EDUCATION

The use of online learning and distance education has steadily grown over the past few decades, but the growth of distance education was initially limited due to the '50 percent rule' of the Higher Education Act (HEA) of 1992, which denied federal student aid funding such as Pell Grants, subsidized loans, and work-study to students enrolled at institutions that offered more than half of their courses online or had more than half of their students enrolled in distance education (HEA, 1992; Xu & Xu, 2019). Increasing demand in distance education and new advances in technology led to amending the HEA to offer waivers from the 50 percent rule, spurring growth in online institutions and attracting more interest in distance education.

By 2015, most states had modified or eliminated the rule through statutes and regulations. Several states began to allocate public funding to grow their online higher education programs (Xu & Xu, 2019). In California, Senate Bill 520 was introduced in March 2013 that would require the state’s 145 public colleges and universities to give credit to students taking pre-approved online courses for classes that are unable to register for due to capacity limits (“California bill seeks campus credit”, 2013; "MOOC bill dead for now", 2013; “Outsourcing public higher ed”, 2013).

The bill received ample media attention with critics suggesting that it would end traditional higher education models. Specifically, it was heavily criticized by faculty from the California Community Colleges, California State University, and the University of California, who argued it would lower academic standards and hurt disadvantaged kids. Despite the opposition, the bill passed the legislature in June ("California bill allowing credit for MOOCs", 2013; "CA bill
mandates credit for online MOOC style courses“, 2013). Subsequently, then-state Senate leader Darrell Steinberg, the plan’s chief backer, announced that he no longer planned to advance the measure noting he wanted to first better understand the results of new online efforts by the state’s public higher education systems (“MOOC bill dead for now”, 2013). This legislative battle did demonstrate the growing policy support for expanding online teaching and learning in higher education.

MASSIVE OPEN ONLINE COURSES

Massive online open courses (MOOCs) provide widely accessible classes designed to admit an unbounded number of participants (Joksimovic et al., 2018; Taneja & Goel, 2014; Wulf, Blohm, & Brenner, 2014). Their designers were initially motivated by a desire to scale instruction to audiences larger than would fit in a traditional lecture hall. Academic work on MOOCs characterizes them into two types: cMOOCs with intensive interaction among participants and resembling traditional courses; and xMOOCs consisting of structured courses, short videos, and tests tied to specific subject matter, all easily accessed by anyone (Taneja & Goel, 2014).

Wulf, Blohm, Brenner (2014) identify key mechanisms and technologies embedded in MOOCs, including peer support, peer grading, gamification, learning analytics, identity control and monitoring, and digital administration of user rights. Early MOOCs started with the rise of the OER movement. MIT OpenCourseWare was a pioneer in making course materials public when in 2001 it began publishing all of MIT’s undergraduate and graduate course lectures and assignments for the public to access (https://ocw.mit.edu).

MOOCs grew in popularity when in the summer of 2011, researchers from Stanford University’s computer science department collaborated to develop and offer a course on artificial intelligence that drew the attention and participation of 160,000 students from around the world (Waldrop, 2013). Involved in the project were Professors Andrew Ng and Daphne Koller, who collaborated to develop Coursera in 2012, and Professor Sebastian Thrun, who went on to create Udacity. Raising concerns about the commercialization of online education, Anant Agarwal, former head of the computer science and artificial intelligence laboratory at MIT, developed his own platform in 2012, first called MITx and later renamed edX when Harvard joined in May 2012. Recently it is set to be acquired for $600M by 2U, a for-profit company that partners with institutions to develop self-supporting online degree programs (Mascarenhas, 2021), including UC Berkeley’s master’s program in Data Science.

While MOOCs increased access to educational materials in higher education, their impact on student success remains questionable. Stop-out rates in MOOCs have been notoriously high, often with fewer than 8% of registered learners continuing past the first week. A survey of edX courses from the first four years at the two founding institutions showed that learners who most often completed a course were those who already had substantial educational
experience, most frequently already holding a master’s degree (Chuang & Ho, 2016). Completing a one-off MOOCs only earns the learner a certificate.

Designers of MOOC platforms quickly learned that degrees are where the significant value lies and that partnering with accredited institutions is the key to increasing revenue. An early example of this type of partnership in California was between Udacity and San Jose State University in 2013 known as SJSU Plus (Woodhead et al., 2017). The initial pilot of offering Udacity courses in place of usual in-person courses was abysmal, with failure rates exceeding 50% (Oremus, 2013; Woodhead et al., 2017). However, after tailoring the courses more towards the style of the instructor and creating high touch learning experiences, outcomes steadily improved. Still, the partnership did not last. After negative evaluations of courses, SJSU administration decided to end plans to revise courses and ended their partnership by December of 2013 (Woodhead et al., 2017). Udacity, in partnership with AT&T, offers fully online Computer Science degrees with Georgia Institute of Technology. A recent study found students graduating from their online MA to receive equivalent scores on a standardized test as students graduating from the considerably more expensive in-person MA (Joyner & Isbell, 2019).

OPEN EDUCATIONAL RESOURCES

As more students and educators gained access to the internet and computers, greater efforts were placed on developing online resources to assist teachers in creation and delivery of lessons. Beginning in the early 1990s, the federal government began funding online repositories of content, where crowdsourced and curated open educational resources (OERs) were shared publicly for anyone to use (Atkins, Brown, & Hammond, 2007; Porcello & Hsi, 2013). Organizations from public education systems to government agencies and museums contribute to the vast amount of material available on the internet. But because materials are created independently, there is often much duplicated work (Atkins, Brown, & Hammond, 2007).

While teachers commonly integrate OERs into their lessons, challenges persist with their adoption, including concerns over inconsistent quality and difficulty in finding appropriate content due to incomplete or inaccurate metadata (Porcello & Hsi, 2013; Tosh, Doan, Woo, & Henry, 2020). The need to organize, manage, assign and grade led to the development of online learning management systems (LMS; Porcello & Hsi, 2013). An LMS makes it easier for educators to search and use available resources by organizing and delivering educational content, tracking and reporting learner progress, and providing an interactive space for teachers and students to communicate online during the learning process (Coates, James, & Baldwin, 2005).

Khan Academy offers another vast repository of open educational resources in multiple languages covering a variety of subject-areas. It has become a popular open educational
resource among students and by teachers to implement flipped classrooms, a movement that accelerated during the pandemic (Zengin, 2017; UCB, 2021). The California-based company, founded by Salman Khan in 2006 initially started as a library of instructional videos posted to YouTube. With the support of funding from Google, Bill & Melinda Gates Foundation, and charitable organizations, it established itself as Khan Academy and rapidly grew from about 144,000 users per month in 2010 to about 10 million users per month by February of 2014 (SRI, 2014).

Khan Academy's rapid growth sparked the interest of California educators, who began exploring ways to innovatively transform classroom experiences. In a two-year study from 2011-2013 of nine sites, 20 schools and 70 teachers, researchers concluded that there were wide variations in the way teachers used Khan Academy resources and how the company used feedback from schools to make significant redesigns to its website (SRI, 2014). Across sites, students perceived that their time using Khan Academy was highly positive, with 71% reporting they enjoyed it and 32% stating they liked math more since starting Khan Academy. Students from all grade levels had generally high engagement while using Khan Academy with teachers reporting that 87% of students were either moderately or highly engaged. Students stated they felt Khan Academy encouraged greater independence in learning with 45% saying they were able to learn new things about math without the help of a teacher.

Teachers stated that they would recommend Khan Academy materials to other teachers (86%), and the majority of teachers (91%) indicated that it increased their ability to provide students with opportunities to practice new concepts and skills. In addition, exploratory analysis from two sites found a positive association between the use of Khan Academy and improvements in test scores and improvements in self-reported social-emotional benefits (math anxiety, math self-concept, and academic efficacy) (SRI, 2014).

**ADAPTIVE LEARNING**

In a classic study on learning, Bloom (1984) and researchers compared how students learned under three conditions: in conventional classrooms with periodic tests to assess learning, in classrooms with mastery learning and formative tests to determine corrective procedures, and with one-on-one tutoring and formative tests where students received individual attention from instructors. Students that received one-on-one tutoring performed on average two standard deviations above students in the conventional groups (1 instructor to 30 students), and those in the mastery learning condition performed one standard deviation above. Through a meta-analysis of literature on the topic, researchers then examined variables that can be altered to determine their influence on learning such as quality of teaching, use of time, cognitive and affective characteristics of students, formative testing, rate of learning, and home environments. Their research demonstrated that multiple variables need to work together for
students to achieve learning gains in conventional settings at the level achieved through one-on-one tutoring. The approach of adaptive learning research has been to attempt to automate the remediation and differentiation of instruction achieved in a mastery learning classroom, while also supporting the student with personalized hints that share characteristics of efficacy with one-on-one human tutors.

Intelligent tutoring systems – advancing from Bloom’s early model – require examining and redesigning the role of the teacher, tracing the ways students acquire knowledge, and adapting instruction by building on students' prior knowledge. Learning is broken down into sub-skills and knowledge components, then programs continually gauge student progress towards mastery. Contemporary adaptive learning programs identify students' skills and abilities and customize instructional actions based on student learning needs.

While education organizations across the country have designed lessons and pedagogy assuming students possess a specific learning style, auditory, visual, read/write, or kinesthetic method, studies have found no evidence that students learn differently in these ways (Cuevas & Dawson, 2018; Husmann & O'Loughlin, 2018). Instead, now a community of researchers are working together to develop open learning analytics to use student data to study learning. The Digital Learning Lab based at the University of California, Irvine, and led by Mark Warschauer, for example, uses a variety of approaches to understand student learning processes from pre-K through graduate school, and is designing new tools and resources to support digital learning (https://www.digitallearninglab.org).

Because adaptive technologies aim to map the way students learn and develop understanding of subject matter, they are often used as companions to traditional textbooks, and publishers across the country are shifting towards developing or acquiring adaptive learning tools to complement their conventional curricular materials. In turn, this trend is prompting technology companies to advance adaptive-learning models and intelligent tutoring systems.

A majority of studies looking at adaptive technology have focused on STEM subjects, finding that while it has not yet received wide attention, it holds promise in giving educators new ways to create and deliver personalized instruction. In a $10m RAND study examining users of an adaptive algebra system called “the cognitive tutor,” researchers found that while the first year of implementation had no effect on student learning, by the second-year significant gains became discernible (Pane, Griffin, McCaffrey, & Karam, 2014). Findings suggest that new technology takes time to fine-tune and that part of the formula for efficacy is giving teachers time to learn how best to integrate the technology into their classrooms with students.
The use of adaptive technologies has been trending since 2011, and recent efforts aim to use artificial intelligence to transform the way students progress through schooling. The school board of San Diego Unified School District recently approved a shift in their grading practices to focus on mastery learning (SDUSD, 2020). The district notes that over the past three years, they have been using a standard-based reporting system that outlines a curriculum across grade levels. When the district shut down schools during the pandemic, stakeholders called for a need to create clear and consistent expectations of students, and in the summer of 2020, greater calls for social justice led activists to also call for equitable practices.

To address these needs, the San Diego school board enacted a new policy, AR 5121, that moves all grades, from transitional kindergarten through grade 12, to assessments of students' levels of mastery on standards. These designers hope to reduce the influence of pupil behavior and other nonacademic measures. Rather than simply checking completion of assignments, grades will now look at how students are progressing towards mastering knowledge. During the 2020-21 school year, educators, administrators, and their IT department worked together to align their systems to the new policy and will continue planning and developing the system this year. Wide-scale dissemination of this mastery learning and adaptive tutoring could dissolve conventional notions of grades in K-12, as competency-based learning proves more motivating and effective for students.
TRENDS

Data and artificial intelligence have increased efficiencies and changed the complexion of many industries. Education technology is beginning to embrace these trends as well, opening a variety of possibilities for improved educational attainment in California. Academia and industry have competed in the space of education technology innovation. Where industry has led, it has meant an increase in public/private partnerships with respect to accredited degree programs and considerable sharing of revenue. In this section, we cover these trends as well as the threat to equity and inclusion posed by a persisting digital divide of shifting character.

LEARNING ANALYTICS AND AI IN EDUCATION

The remarkable spread of digital tools integrated into the online and in-person learning experiences of students has meant a substantial increase in the amount of data collected about the learning process. The most common sources of learning data in education (Pardos, 2017; Fischer et al., 2020) have become learning management systems, which organize assignments and other course materials, and tutoring systems and open educational resources, such as Khan Academy. This has spawned an academic field of education data science, dedicated to analyzing these data to better understand student learning and to leverage these insights and capabilities afforded by data to engineer new interventions and tools for teaching and learning (McFarland et al., 2021).

Data dashboards in K-12 (Bodily et al., 2018) and predictive modeling in higher education have been among the first tools used to drive new interventions. These include early warning detection systems at universities that proactively deploy tutoring and other support resources to students predicted to be at risk of failing a course or dropping out. While these interventions can be effective, they can also have unintended consequences, such as students learning that these interventions are correlated with a predicted likelihood of them dropping classes. In these cases, the prediction can be a self-fulfilling prophecy, leading to increased drop-out over courses in which the intervention was not deployed (Jayaprakash et al, 2014). Other software and use cases utilizing predictive modeling are being adopted in higher education, including in the admissions process and software to provide personalized career advice.

Prediction of individual student test scores has been trialed as well (Feng, Heffernan, & Koedinger, 2009), finding that the predictions were within the error margin of the test and raising the question of the necessity of testing. In the United Kingdom, test predictions were temporarily used in place of actual test scores when Covid-19 prevented students from attending standardized test sessions. The decision was reversed after an uproar over bias in the predictions along racial lines. The high consequences of predictive models, particularly when it comes to grades, has necessitated a field of study on the fairness of AI algorithms in education and ways to audit and correct for biases (Jiang & Pardos, 2021).
Another trend is the expanding use of data and AI to help students navigate their path through the complex landscape of higher education. A variety of information systems have cropped up, leveraging enrollment and course evaluation data newly made available to researchers. A system developed at Stanford University, called “CARTA,” displays grade distribution information to students among other institutionally collected data on a course (Chaturapruek, 2018). The system has become very popular among students for aiding in their course selection decision making. A study of the system’s effect on student course performance, however, showed a mild negative effect on GPA. Another system, developed at the University of California, Berkeley, called “AskOski,” uses AI to recommend courses and course pathways personalized to students (Pardos, Fan, & Jiang, 2019; Sho, Guo, & Pardos, 2021).

The California public postsecondary system has been lauded as an “upward-mobility machine” in large part because of the transfer agreements that allow students to elevate from a 2-year associate’s degree program at a community college to 4-year programs at state university or UC campuses. Creating these transfer agreements regarding what course credit will and will not transfer is expensive, and with 36 million potential course-to-course credit equivalencies between the community college system and the University of California, there is increasing demand to use data-driven technologies (Pardos, Chau, Zhao, 2019) to evaluate and maintain credit transfer.

AI is also showing signs of contributing to a new generation of adaptive tutoring systems that can address a wide range of topics and provide a higher degree of personalized assistance. A programming tutor recently featured in the *New York Times* is showing promise in scaling the teaching of python by providing highly tailored and automated help messages to students as they learn to code. Maturing technologies like these may open possibilities for more effective upskilling, ironically to counteract the labor market displacement effects of AI in industry.

**DEVICES**

The latest trend in using devices for educational purposes centers on augmented reality strategies, combining real and digital worlds to create learning experiences where students feel immersed in augmented digital spaces, opening opportunities to teach material in new ways (Challenor & Ma, 2019). The term 'virtual reality' has been used since the 1960s and has since evolved into two types: non-immersive and immersive. Non-immersive refers to computer-based environments that simulate real and imagined places, whereas immersive refers to giving

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the perception of being physically present in the non-physical world via virtual reality devices such as goggles and headsets (Freina & Ott, 2015).

The idea behind both aims to make learning more engaging by simulating real-life experiences and environments. We mentioned above the example of the teacher who advanced pupils’ math and spatial reasoning proficiencies by adapting an electronic game and asking students to create a theme park in virtual reality. In a review of literature on the use of virtual reality, researchers found that the majority of studies stem from the field of computer sciences, often delving into the use of education technology in the field of medicine. Virtual reality strategies are used in adult training as well, while little research examines such tools with young children or in elementary grades (Freina & Ott, 2015).

MARKETS, DIFFUSE GOVERNANCE, INVENTIVE EDUCATORS

The private sector has become a growing stakeholder in public education. Once thought unimaginable, private firms such as Maryland-based 2U have partnered with public universities, providing instructional design, delivery, and marketing of accredited online programs in exchange for a 40-50% revenue split. In July 2021, 2U entered into an agreement to purchase Harvard and MIT founded non-profit startup, edX, in a deal estimated at $800M\(^{107}\). While edX did not begin with the goal of partnering with institutions to deliver fully online degree programs, it later moved into that space to establish a sustainable source of revenue to support its operations. This purchase perhaps signals that private industry is nimbler and more effective in meeting educational market demands. One possible future we can imagine is one in which innovation in public education stagnates and we see private industry’s educational market share grow to the point where the influence of education as a public good becomes negligible.

Looking forward, who are the California actors that might motivate innovation and deploy education technologies to enliven public education? Digital designers and firms will continue to feel rich economic incentives, along with professional challenges, to innovate. These actors may also move from a commitment to invigorate traditional classrooms, hoping to lift children and gain market share. State and local governments play a role in sustaining favorable conditions for dot-com firms and software designers to thrive in California, including producing college graduates that spark greater inventiveness. Governor Brown’s earlier use of tax incentives to advance the use of education technology in California classrooms is an example.

At the same time, the state’s public schools – deeply institutionalized and in need of stronger incentives to innovate—operate within a diffuse network of authorities. More than one thousand local school boards manage neighborhood schools, at times with funding guardrails

\(^{107}\) https://www.forbes.com/sites/paulleblanc/2021/07/06/what-2us-800-million-deal-to-acquire-edx-means-for-higher-ed/?sh=42afc3951b04
or priorities set by the governor and legislature. California’s Local Control Funding regime returned budget authority to local school boards in 2013, but with sparsely observable effects on educator innovation. Charter schools continue to expand in many districts, applying competitive pressure on conventional schools to think anew about digital tools and evolving pedagogy.

When Pardos, Fuller, and colleagues (UCB, 2021) dug into school innovations during the pandemic (2020-21 school year), they discovered many teachers and school principals who pursued innovative teaching practices, embracing the variety of digital tools detailed above. A slice of school managers advanced novel ways of deploying teachers and support staff, or radically rearranged the school day. These seeds for innovation were often planted by creative school principals, district leaders, or charter management organizations. But it typically required a threshold level of dedicated and curious teachers to “test-drive” digital tools, from assessment software to easy ways for communicating with parents, to lively curricular material delivered online. Teachers often tapped into conversations hosted by online subject-matter networks, fellow teachers within their district or charter firm, including digital materials offered by private software firms.

What may be key – if the state, education leaders, or philanthropic groups pursue potent use of learning technologies – is that these players must build from the diffuse nodes of influence and innovation that mark California’s decentralized K-12 governance arrangement. In higher education, more centralized locations of influence may better motivate technological innovation. A University of California effort, described above, to serve undergraduates via a growing array of creative online courses offers one promising example. Survey results from undergraduates emerging from their experience with emergency remote instruction during the pandemic reveal that while they are looking forward to returning to in-person instruction, a mix of both online and in-person courses are now desired. This demand for online instruction, past the pandemic, may prompt further adoption of industry platform innovations around remote delivery of instruction. Additionally, online modes of instruction and the institutions that can provide it may better serve adult learners who work full-time jobs while pursuing a degree (Arum & Stevens, 2020).

THE DIGITAL DIVIDE: ISSUES OF EQUITY AND INCLUSION

To use education technologies in schools, students must have access to devices and the internet, both at home and at school. Yet, we have long known that some subgroups of learners have greater resources than others and inequalities exist between the quantity and quality of technology that students use in their learning, as introduced above (Cuban, 2001; Warschauer, Knobel & Stone, 2004).
In addition, teachers report daunting barriers when trying to introduce digital resources, including not having access to devices or reliable internet, materials being too expensive, and lacking knowledge about available materials (Tosh, Doan, Woo, & Henry, 2020). The era of remote instruction helped lower these barriers, especially bringing public dollars and a novel variety of hardware and software to teachers, disparities have not necessarily receded. While the term 'digital divide' has been used since the 1990s to illustrate the gaps in access to computers and the internet, it has since been expanded to also examine the ways students use technology – in school or at home in the wild (i.e., “the homework gap”) – along with outcomes on student learning (Warschauer & Matuchniak, 2010; Wei & Hindman, 2011).

By organizing education online, distance learning can reach students around the globe, but it requires that learners have access to required technologies. Students without access face barriers to online learning, and when access falls along income, racial, or geographical lines, it may exacerbate existing inequalities. In California, when schools first closed down during the pandemic, 67% of students always had access to computer devices at home. Over the summer of 2020, the California Department of Education set up the Bridging Digital Divide Fund to provide devices to students and provided 45,884 Chromebooks (Johnson & Willis, 2021). This initiative program, along with charitable donations from the technology industry helped narrow the digital divide. By March of 2021, by some estimates 95% of California students had devices to use for their remote classes (Johnson, 2021). It's important to note that data estimates on the gaps vary, perhaps because districts are not required to report data on connectivity. At least one other estimate finds -that the percentage of students connected may be closer to 80% in California (Gao, Lafortune, & Hill, 2021).

Analyzing U.S. Census Bureau data from 2015, the Pew Research Center found that 15% of households with school-age children do not have high-speed internet at home. Large disparities exist between income levels with over a third (35%) of households with an annual income of less than $30,000 lacking high-speed internet compared to only 6% of households with an annual income of $75,000 or more (Anderson & Perrin, 2018). Differences in access exist between racial groups as well, with more Black (25%) and Hispanic households (23%) without high-speed internet connection compared to White (10%) and Asian (5%) households (Anderson & Perrin, 2018). Lack of internet access and digital technologies leads some teens to be unable to complete homework assignments, again disproportionately impacting students from low-income families and Black teens (Anderson & Perrin, 2018; Hampton et al., 2020).

How digital devices are situated in households, along with their availability to children or for school work, remains constrained. Overall, one in seven homes in the U.S. below the median income ($75,000) still rely only on a mobile device or dial-up internet, or have no access (Katz & Rideout, 2021). This proportion of households with limited access goes up to one-fourth for
families below the poverty line, and nearly one-third in homes where parents have less than a high school education.

**Figure 7. Families below U.S. Median Income Without Home Computer or Broadband, 2021**

The unequal distribution of “learning loss” suffered by millions of students during the pandemic stems in part from these differing levels of broadband access, or how electronic devices are couched in everyday home life, as various family members require time online. Katz and Rideout (2021), for instance found that one-third of students in homes had to rely on a phone during remote instruction. One-fifth reported they couldn’t always log-on, given they must share with other members of the household.
The disparate ways in which home computers or mobile devices are used by children in the home offer another worrisome set of facts. Racial disparities in use of the internet have narrowed considerably over the past generation, thanks in part to mobile devices. Since 2009 use of the internet from inside Latino households has increased from 80% to 87% (reviewed by Fuller, Lizárraga, & Gray (2015).

We also know that young children take-up phones and home computers early in their lives. Research from OECD countries, for instance, reveals that one-fifth of all kids access the internet for the first time before 6 years of age, and this rate is rising (OECD, 2017)\(^\text{108}\). Many preschool-age children now become familiar with digital devices before they engage books (Hopkins, Brookes, Green, 2013). In the U.K., recent studies show that just over half of 3-4 year-olds are playing or learning online (Ofcom, 2019).

\(^\text{108}\) https://www.oecd-ilibrary.org/sites/71b7058a-en/index.html?itemId=/content/component/71b7058a-en
Similar findings are emerging in the U.S., based on surveys of parents with children under 6 years of age. Researchers at the Erikson Institute (2016)\textsuperscript{109} in Chicago found that over half (53%) of preschoolers already used a portable tablet, while two-fifths accessed a smartphone, one-third a home computer. Three in five parents reported that these technologies held a positive impact on their time spent with young children. Nearly three-fourths (73%) were logged-on with their young child for at least 30 minutes each day.

Still, mobile devices and stationary home computers may be deployed by parents to keep children busy, rather than facilitating learning. Television continues to be the primary electronic tool to occupy children; deploying mobile devices, handheld games, and computers occurs less frequently (Wartella et al., 2013). Researchers at Common Sense Media (2013) found that 63% of children, 0-8 years of age, played games, while half engaged other kinds of apps, including educational programs. Forty-seven percent (47%) reportedly watched videos. Only 30% read books on mobile devices.

Such uses of electronic devices may dwarf time that children spend on school work, whether its pandemic-driven periods of remote instruction or working asynchronously on class assignments. On the one hand, young children are becoming tech savvy at earlier ages. On the other hand, the educational value of their online engagement varies tremendously. That said, children’s high levels of connectivity, along with varying cognitive demands and social dynamics they experience outside of school hours, must be taken into account as educators and policy makers consider how to meaningfully apply digital technologies to formal schooling.

California’s Emerging Technology Fund (CETF), in collaboration with researchers from the University of Southern California, annually collects data on the progress the state is making towards deploying and adopting broadband throughout California. The results of the CETF 2021 Broadband Adoption Survey sampling 1,650 California households, reveals the persisting and evolving character of the digital divide.

Principal investigator Hernan Galperin and his team report that while 91% of Californians overall report having access to broadband, only 82% of low-income households had broadband, 11% of these homes gaining access only through their smartphones (Aguilar, Galperin, & Le, 2021). Moreover, while non-Hispanic White (91%), Black, (91%), Asian American (89%), and English-Speaking Hispanic (92%) are comparably connected to the internet, Spanish-speaking Hispanic households lag other groups with only 65% of households having access (Aguilar, Galperin, & Le, 2021). Figure 9 shows how broadband has been adopted by select groups over time, and Figure 7 how it varies across regions in California.

Since 2008, more and more Californians have gained access to broadband, and the gap between those who only have access via smartphones versus those connected through desktops, laptops, or tablets has continued to narrow. Figure 8 shows the trends of broadband adoption among different groups and regions in California.
adoption in California from 2008-2021. Forty-one percent of households that are either unconnected or under-connected to the internet reported logging-on outside of their homes, most frequently at the home of family or friends (61%), at stores or cafes and restaurants (37%), or at work (33%), and libraries (33%) (see Figure 9).

In July 2021, Governor Gavin Newsom and legislative leaders announced an agreement on a broadband bill, AB/SB 156, that will invest $6 billion to expand broadband and increase connectivity for families and businesses in California (Office of Governor Gavin Newsom, 2021). Included in the legislation are plans to hire a third-party to build high-capacity fiber lines, and create within the Department of Technology an Office of Broadband and Digital Literacy to oversee development and construction (AB-156, 2021). In signing the bill, Newsom noted, "this legislation will yield vital, broadened access for California families by prioritizing the unserved and underserved areas, facilities, households, and businesses that remain disconnected in the digital era" (Office of Governor Gavin Newsom, 2021).

**Figure 11. Broadband Adoption in California Over Time**

Source: California Emerging Technology Fund and University of Southern California's (2021) Statewide Broadband Adoption Survey
When the coronavirus pandemic forced schools into remote instruction, the persisting digital divide was laid bare. While many educators and district leaders contemplate the future of distance learning in their organizations, they must now also address disparate levels of so-called “learning loss.” In a study of about 100,000 students in 19 school districts, those belonging to California's CORE Data Collaborative, researchers used assessment data to measure student learning during the pandemic.

Researchers measured academic progress from fall of 2019 to winter of 2021 and compared it to an equivalent time period before the pandemic shut down schools. Their findings indicate that on average across assessments, students experienced a learning lag of approximately 2.6 months in English-language arts (ELA) and 2.5 months in mathematics (Pier, Christian, Tymeson, & Meyer, 2021).
Students from low-income families were disproportionately affected, experiencing a learning lag of 3.2 months in ELA and 2.8 months in math, compared to a lag of 1.1 months in ELA and 1.7 months in math among non-poor students (Pier, Christian, Tymeson, & Meyer, 2021). A portion of these widening achievement gaps are likely due to differential access to reliable wifi at home, along with variation in housing density and parental employment rates, which together constrained time available for students to log-on at home and carefully watched-over by parents.

Our study of charter schools in California during the pandemic also suggests that students may have learned less during the pandemic, with teachers and principals reporting that while they continued to teach standards set by the state, they reduced the number of learning aims for each curricular unit, narrowing the curriculum in hopes of enhancing student engagement (UCB, 2021). To address the learning lag, the California legislature and governor passed a new law in July 2021, AB 104, that will allow students that received deficient grades during the pandemic to enroll in learning-recovery options (AB 104, 2021).

These findings indicate the need to combat worsening gaps in learning, as educators and policymakers consider the best approaches to delivering high-quality education post-pandemic. Dollars are not the constraint, as billions will flow to California school districts – via federal stimulus funding and state Expanded Learning Grants – through 2024. Whether educators and district leaders will sustain and enrich digitally-aided innovations remains an open and consequential question.

To equitably implement distance learning, students require a level of competency in digital skills. Those who are raised with technologies in their homes, benefiting from parents and have caretakers well versed in using electronic tools, will more easily adapt to online teaching and learning in the various forms we have described. Whereas, students less familiar with digital technology will require basic training on how to use computers and the internet before they can fully engage. Some students are gaining digital fluency with technology in information learning contexts. Interest-driven, or connected learning (Wortman & Ito, 2019) is happening outside of school, often interacting with commercial apps supported by venture capital such as California’s Learn Capital. There is a growing digital divide in informal learning experiences, as family expenditures on educational enrichment, such as purchasing of educational apps, is widening with respect to income bracket, with the top quintile of earners spending eight times that of the bottom quintile.

In response to the growing need to understand issues related to equity in education technology, The National Center for Education Statistics (NCES), the primary federal organization responsible for collecting and analyzing education data, recently launched the NCES Ed Tech Equity Initiative. It aims "to better inform the condition of American
education by giving greater attention to education technology and equity as it relates to K–12 education" (https://nces.ed.gov). NCES aims to be the primary source of information on education technology equity for policymakers and education stakeholders and are prioritizing three areas in their work: technology resources and support, the integration of technology, and technology knowledge, skills, and attitudes (https://nces.ed.gov).

In the spring of 2020, NCES joined in partnership with the Census Bureau and other federal agencies to gather information to understand the nation's response to the global pandemic, and future surveys "could ask schools, students, and teachers about their technology use and access at home, what resources for learning and instruction they have at home, and the environment in which many students and teachers now find themselves learning and teaching" (NCES, 2021).
## GOVERNANCE APPENDIX

### Table 1. Major governing bodies of the P-16 system

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Organizing body</th>
<th>Active dates</th>
<th>Role</th>
<th>Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Childhood Education</td>
<td>CA Department of Social Services</td>
<td>1903 - present</td>
<td>Per the Early Childhood Development Act of 2020, administers many childcare programs that were previously under the purview of the CDE</td>
<td><a href="https://www.cdss.ca.gov/">https://www.cdss.ca.gov/</a></td>
</tr>
<tr>
<td></td>
<td>California Department of Education (CDE)</td>
<td>1921 - present</td>
<td>Operates the California State Preschool Program</td>
<td><a href="https://www.cde.ca.gov/">https://www.cde.ca.gov/</a></td>
</tr>
<tr>
<td></td>
<td>California Department of Public Health</td>
<td></td>
<td>Establishes immunization requirements for preschools and child care facilities</td>
<td><a href="https://www.cdph.ca.gov/">https://www.cdph.ca.gov/</a></td>
</tr>
<tr>
<td></td>
<td>California Department of Developmental Services</td>
<td></td>
<td>Oversees the coordination and delivery of services (such as Early Start) for children with developmental disabilities</td>
<td><a href="https://www.dds.ca.gov/">https://www.dds.ca.gov/</a></td>
</tr>
<tr>
<td></td>
<td>First 5 California</td>
<td>1998 - present</td>
<td>Distributes funds through local county commissions</td>
<td><a href="https://www.ccfc.ca.gov/">https://www.ccfc.ca.gov/</a></td>
</tr>
<tr>
<td>K-12</td>
<td>California Commission on Teacher Credentialing</td>
<td>1970 - present</td>
<td>Serves as a standards board to license, credential, and hold state educators accountable</td>
<td><a href="https://www.ctc.ca.gov/">https://www.ctc.ca.gov/</a></td>
</tr>
<tr>
<td></td>
<td>California Department of Education (CDE)</td>
<td>1921 - present</td>
<td>Operates programs that provide funding to schools, establish standards for student</td>
<td><a href="https://www.cde.ca.gov/">https://www.cde.ca.gov/</a></td>
</tr>
<tr>
<td></td>
<td>State Board of Education (SBE)</td>
<td></td>
<td>Part of the governor’s office as of 2011.</td>
<td><a href="https://www.cde.ca.gov/be/">https://www.cde.ca.gov/be/</a></td>
</tr>
<tr>
<td></td>
<td>State Superintendent’s Office</td>
<td></td>
<td>Part of the CDE</td>
<td><a href="https://www.cde.ca.gov/re/di/or/osspi.asp">https://www.cde.ca.gov/re/di/or/osspi.asp</a></td>
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<tr>
<td></td>
<td>Office of Public School Construction</td>
<td></td>
<td>Implements and administers the School Facility Program</td>
<td><a href="https://www.dgs.ca.gov/OPSC">https://www.dgs.ca.gov/OPSC</a></td>
</tr>
<tr>
<td>Higher education</td>
<td>Coordinating Council for Higher Education</td>
<td>1960-1973</td>
<td>Advised Governor and Legislature on resource allocation; engaged in long-term planning;</td>
<td></td>
</tr>
<tr>
<td>Education Level</td>
<td>Organizing body</td>
<td>Active dates</td>
<td>Role</td>
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<tr>
<td></td>
<td>California Postsecondary Education Commission</td>
<td>1973-2011</td>
<td>Planning and advising functions for the Legislature and Governor.</td>
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<tr>
<td></td>
<td>California Student Aid Commission</td>
<td>1955 - present</td>
<td>Manages CalGrant and other financial aid programs</td>
<td><a href="https://www.csac.ca.gov/">https://www.csac.ca.gov/</a></td>
</tr>
<tr>
<td></td>
<td>California State University Board of Trustees</td>
<td>1961-present</td>
<td>Adopts rules, regulations, and policies governing the CSU</td>
<td><a href="https://www2.calstate.edu/csu-system/board-of-trustees/Pages/default.aspx">https://www2.calstate.edu/csu-system/board-of-trustees/Pages/default.aspx</a></td>
</tr>
<tr>
<td></td>
<td>University of California Regents</td>
<td>1961-present</td>
<td>Oversees the University of California</td>
<td><a href="https://regents.universityofcalifornia.edu/">https://regents.universityofcalifornia.edu/</a></td>
</tr>
<tr>
<td></td>
<td>California Community College Board of Governors</td>
<td>1961-present</td>
<td>Sets policy and provides guidance for the California Community College system</td>
<td><a href="https://www.cccco.edu/About-Us/Board-of-Governors">https://www.cccco.edu/About-Us/Board-of-Governors</a></td>
</tr>
<tr>
<td></td>
<td>Governor’s Council for Postsecondary Education</td>
<td>2018-present</td>
<td>The Newsom Administration created this advisory group with the purpose to create an integrated system for postsecondary education and to provide the governor with consultation regarding the economic and social impact of higher education in the state. The Council includes members spanning both the K-12 and higher education sectors.</td>
<td><a href="https://postsecondarycouncil.ca.gov/about/purpose/">https://postsecondarycouncil.ca.gov/about/purpose/</a></td>
</tr>
</tbody>
</table>

**Table 2. Major types of student financial aid available in higher education**

<table>
<thead>
<tr>
<th>Name</th>
<th>Level</th>
<th>Description</th>
<th>More info</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cal Grants</td>
<td>State aid</td>
<td>Cal Grant A assists with tuition and fees towards a two or four-year degree. Cal Grant B provides low-income students with a living allowance and also helps with tuition and fees. Cal Grant C assists with the costs of a technical or career education.</td>
<td><a href="https://www.csac.ca.gov/cal-grants">https://www.csac.ca.gov/cal-grants</a></td>
</tr>
<tr>
<td>Pell grants</td>
<td>Federal Aid</td>
<td>Awarded to undergraduates who display exceptional financial need</td>
<td><a href="https://studentaid.gov/understand-aid/types/grants/pell">https://studentaid.gov/understand-aid/types/grants/pell</a></td>
</tr>
<tr>
<td>Name</td>
<td>Level</td>
<td>Description</td>
<td>More info</td>
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<tr>
<td>Middle Class Scholarship Program</td>
<td>State Aid</td>
<td>Provides undergraduate students (up to $191k income and $191k assets) with scholarships to attend UC or CSU campuses</td>
<td><a href="https://www.csac.ca.gov/middle-class-scholarship">https://www.csac.ca.gov/middle-class-scholarship</a></td>
</tr>
<tr>
<td>Blue &amp; Gold Opportunity Plan</td>
<td>Institutional</td>
<td>Full tuition for students with family incomes up to $80k</td>
<td><a href="https://admission.universityofcalifornia.edu/tuition-financial-aid/types-of-aid/blue-and-gold-opportunity-plan.html">https://admission.universityofcalifornia.edu/tuition-financial-aid/types-of-aid/blue-and-gold-opportunity-plan.html</a></td>
</tr>
<tr>
<td>Board of Governor (BOG) fee waiver</td>
<td>California</td>
<td>Covers about 60 percent of units taken; available to any student who demonstrates financial need, maintains satisfactory academic progress, and meets residency requirements</td>
<td></td>
</tr>
<tr>
<td>California College Promise Grant</td>
<td>State Aid</td>
<td>Permits enrollment fees ($46/unit) to be waived for eligible California residents</td>
<td><a href="https://icangotocollege.com/financial-aid/california-college-promise-grant">https://icangotocollege.com/financial-aid/california-college-promise-grant</a></td>
</tr>
<tr>
<td>Perkins Loan</td>
<td>Federal</td>
<td>Low-interest federal student loans for undergraduate and graduate students with exceptional financial need</td>
<td><a href="https://studentaid.gov/understand-aid/types/loans/perkins">https://studentaid.gov/understand-aid/types/loans/perkins</a></td>
</tr>
<tr>
<td>Subsidized Loans</td>
<td>Federal</td>
<td>Available to undergraduate students with financial need</td>
<td><a href="https://studentaid.gov/understand-aid/types/loans/subsidized-unsubsidized">https://studentaid.gov/understand-aid/types/loans/subsidized-unsubsidized</a></td>
</tr>
<tr>
<td>Unsubsidized Loans</td>
<td>Federal</td>
<td>Available to undergraduate and graduate students; no requirement to demonstrate financial need</td>
<td><a href="https://studentaid.gov/understand-aid/types/loans/subsidized-unsubsidized">https://studentaid.gov/understand-aid/types/loans/subsidized-unsubsidized</a></td>
</tr>
<tr>
<td>Federal Work Study</td>
<td>Federal</td>
<td>Provides part-time jobs for undergraduate and graduate students with financial need</td>
<td><a href="https://studentaid.gov/understand-aid/types/work-study">https://studentaid.gov/understand-aid/types/work-study</a></td>
</tr>
<tr>
<td>California Community Colleges Scholarship Endowment (CCCSE)</td>
<td>Institutional</td>
<td>Provides more than 3,000 student scholarships annually</td>
<td><a href="https://foundationccc.org/What-We-Do/System-Support-and-Services/Student-Scholarships">https://foundationccc.org/What-We-Do/System-Support-and-Services/Student-Scholarships</a></td>
</tr>
<tr>
<td>NextUp</td>
<td>State Aid</td>
<td>Offers support and services including help with books and supplies, transportation, tutoring, food, and emergency housing</td>
<td><a href="https://nextup.cccco.edu/">https://nextup.cccco.edu/</a></td>
</tr>
<tr>
<td>Educational Opportunity Program</td>
<td>Institutional</td>
<td>Operates at CSU and provides admission, academic and financial support services to historically underserved students</td>
<td><a href="https://www.calstate.edu/attend/student-services/eop">https://www.calstate.edu/attend/student-services/eop</a></td>
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<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
<td>Citation</td>
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<tr>
<td>Bay Area Council Economic Institute (2014)</td>
<td>Higher education governance</td>
<td>Recommends that the state give more flexible governance to the UC, CSU, and community colleges systems to innovatively respond to fiscal challenges and reduce administrative and operating mandates. The report also proposes the development of new, outcome-oriented goals, and the establishment of a new statewide coordinating mechanism to improve alignment between the UC, CSU and Community College systems. In addition, the state should designate “charter” Community Colleges campuses to experiment with service delivery without current administrative restrictions. The state should support the development of regional consortia of community colleges and regional consortia of UC, CSU, and community colleges in conjunction with K-12 partners to better align educational resources. The 72 community college districts should also be consolidated or better integrated.</td>
<td>Bay Area Council Economic Institute. (2014). Reforming California Public Higher Education for the 21st Century.</td>
</tr>
<tr>
<td>Berner (2017)</td>
<td>K-12 governance</td>
<td>Explores the school inspection model in a United States context, which can offer multiple measures of school quality and culture beyond just student test scores and can help the public make informed enrollment decisions.</td>
<td>Berner, A. (2017). Would School Inspections Work in the United States? Institute for Education Policy, Johns Hopkins School of Education.</td>
</tr>
<tr>
<td>Buenrostro &amp; Machado (2018)</td>
<td>K-12 governance</td>
<td>Recommends establishing charter board commitments, sound and transparent fiscal practice commitments, governance commitments, and LCAP commitments. The CSBA also recommends establishing goals for student enrollment and non-discriminatory enrollment, inclusive decision-making processes involving the community, and district and county office of education policies. Legislatively, the CSBA also recommends that charter governing boards be required to comply with the Brown Act, Public Records Act, Political Reform Act, and the state conflict-of-interest statutes. The CSBA also recommends that the state prohibit changes to the charter petition on appeal, and provide districts with</td>
<td>Buenrostro, M., &amp; Machado, C. (2018). Uncharted Waters: Recommendations for Prioritizing Student Achievement and Effective Governance in California’s Charters Schools.</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
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<tr>
<td>California Competes (2012)</td>
<td>Higher education governance</td>
<td>more time to act on a petition. The state should also seek flexibility for school districts to innovate, strengthen requirements for charter resource centers, and limit out-of-district charters, and fully fund oversight activities.</td>
<td>California School Boards Association.</td>
</tr>
<tr>
<td>California Governor’s Council on Higher Education (2021)</td>
<td>Higher education governance</td>
<td>Recommends the establishment of a California Higher Education Investment Board, to assist the Governor, state and local policymakers, and California consumers in making investments and policies in postsecondary education, and arrange for the efficient administration of student financial aid programs. Recommends the development of a system office for community colleges that is independent of the Governor’s administration, allowing it to establish policy priorities and hold colleges accountable for meeting goals. Also calls for the Board of Governors to amend its regulations for the purposes of clear accountability to local boards of trustees and administrators.</td>
<td>California Competes. (2012). The Road Ahead: Higher education, California’s promise, and our future economy.</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
<td>Citation</td>
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<tr>
<td>California Student Aid Commission (2020)</td>
<td>Higher education - financial aid reform</td>
<td>The Cal Grant Reform Work Group proposes Cal Grant/2 and Cal Grant/4 to provide greater access and choice to two- and four-year institutions for low and middle-income families. Cal Grant/2 guarantees grants of up to $6,000 for low income students entering community college. Cal Grant/4 guarantees financial aid for tuition and fees for students attending a qualifying four-year college or university. This program is also meant to encourage institutions to target resources to fund non-tuition awards for low-income students.</td>
<td>California Student Aid Commission. (2020). Cal Grant Modernization: A Vision for the Future.</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
<td>Citation</td>
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<tr>
<td>Douglass (2010)</td>
<td>Higher education governance</td>
<td>Argues that growth in California’s higher education system requires clear goals (such as degree attainment rates), restructuring of higher education, and a revised funding model. The paper also mentions that the higher education systems should prioritize access and coordination across the segments over quality and autonomy, so as to not disproportionately impact lower income and disadvantaged students.</td>
<td>Douglass, J. A. (2010). FROM CHAOS TO ORDER AND BACK? A Revisionist Reflection on the California Master Plan for Higher Education@50 and Thoughts About its Future. Center for Studies in Higher Education, University of California, Berkeley.</td>
</tr>
<tr>
<td>Douglass (2010)</td>
<td>Higher education governance</td>
<td>Recommends that the state’s political leadership set access and degree production goals. A potential structural reform to shift more students to four-year institutions is to designate a key number of Community Colleges as four-year degree granting institutions that remain part of the larger community college system but are pulled from local district control, and instead be guided by a separate “council.” Douglass also proposes the establishment of a new polytechnic sector and a California Open University offering on-line courses that are independent of the UC and CSU systems, to increase degree attainment.</td>
<td>Douglass, J. A. (2010). Re-Imagining California Higher Education. Center for Studies in Higher Education, University of California, Berkeley.</td>
</tr>
<tr>
<td>Finney et al. (2014)</td>
<td>Higher education governance</td>
<td>Argues that the lack of a statewide coordinating and policymaking agency for higher education, and the siloed efforts of the higher education segments from the state government, create missed opportunities for a unified agenda and for long-term higher education goals and policies across California, while allowing it to remain independent from the higher education segments. This will also inform a coordinated statewide finance policy, and facilitate greater statewide coordination of two-year to four-year transfers.</td>
<td>Finney, J. E., Riso, C., Orosz, K., &amp; Boland, W. C. (2014). From Master Plan to Mediocrity: Higher Education Performance and Policy in California. Graduate School of Education,</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
<td>Citation</td>
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<tr>
<td>Governor’s Committee on Education Excellence (2007)</td>
<td>K-12 governance</td>
<td>Recommends that California adopt a system of local control and return primary decision-making authority to local entities (counties, districts, and schools), while strengthening essential state functions. The state also should create a commission, appointed by the Governor and the Legislature, that conducts a comprehensive review of the Education Code, which could be periodically re-evaluated and reauthorized, and recommends a statutory streamlining of the multiple mandates. For the purposes of accountability, the Committee also recommends that the state agency funding and supporting districts should be separate from the agency that holds them accountable, with the Secretary of Education, the Superintendent of Public Instruction, and the State Board of Education holding separate functions. In addition, the Committee proposes the establishment of a regional support system to provide oversight for all districts and interventions for struggling districts. California should also implement a school inspection system and intervention process.</td>
<td>Governor’s Committee on Education Excellence. (2007). Student’s First: Renewing Hope for California’s Future.</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
<td>Citation</td>
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<tr>
<td>Johnson &amp; Cuellar Mejila (2020)</td>
<td>Higher education governance and financial aid reform</td>
<td>Strategies for improving access to higher education, including reimagining the college admission process to be inclusive and prioritize low-income and underrepresented students, such as through affirmative action. Also proposes that UC and CSU admit all low-income high school seniors who meet minimum eligibility criteria. To increase transfers, the authors recommend building on the Associate Degree for</td>
<td>Johnson, H., &amp; Cuellar Mejia, M. (2020). Higher education and economic opportunity in California. Public</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
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<td>Maricle (2014)</td>
<td>K-12 governance</td>
<td>Transfer (ADT) program, by admitting students to the CSU and UC system when they start at a community college. Low-income students should also receive more financial aid by establishing a funding formula that provides additional funding to colleges enrolling low-income students.</td>
<td>Policy Institute of California.</td>
</tr>
<tr>
<td>Mehta (2011)</td>
<td>K-12 governance</td>
<td>Five strategies for transforming the education system in the 21st century: (1) transform the system by changing who is doing the teaching and what they know; (2) replace the institutions that currently comprise the system with new institutions filling the same functions but performing them better; (3) reassemble the system by changing its roles, structures, elements, and incentives; (4) expand the system by integrating school and nonschool factors; or (5) dissolve the system by providing students with more direct access to the ever-growing universe of knowledge.</td>
<td>Mehta, J. (2011). The futures of school reform: five pathways to fundamentally reshaping American schooling. American Enterprise Institute for Public Policy Research.</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
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<tr>
<td>Murphy, Cook, Johnson, &amp; Weston (2014)</td>
<td>Higher education finance</td>
<td>Suggests that a performance-based funding model linked to goals and outcomes would institutionalize a focus on student performance. It should articulate clear goals and be built into a substantial portion of base funding. This linking of funding and outcomes should be based in the individual systems—UC, CSU, and the community colleges—with required regular reporting to the governor and legislature.</td>
<td>Murphy, P., Cook, K., Johnson, H., Weston, M. (2014). Higher Education in California: Performance Budgeting. Public Policy Institute of California.</td>
</tr>
<tr>
<td>Scott, Kirst, and</td>
<td>Higher education governance</td>
<td>W. Richard Scott, Michael W. Kirst, and colleagues focus on the changing relations between colleges and companies in one vibrant economic region: the San Francisco Bay Area. Colleges and tech companies, they</td>
<td>Scott, R. S., Kirst, M. W. (2017). Higher education and Silicon Valley:</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
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<td>colleagues (2017)</td>
<td></td>
<td>argue, have a common interest in knowledge generation and human capital, but they operate in social worlds that substantially differ, making them uneasy partners.</td>
<td>Connected but conflicted. Baltimore, MD: John Hopkins University Press.</td>
</tr>
<tr>
<td>Shireman, Baum, &amp; Mishory (2018))</td>
<td>Higher education - financial aid reform</td>
<td>Recommends consolidating the major California Student Aid Commission programs into one Cal Grant entitlement that is available to students regardless of their age, time out of high school, high school GPA, or other barring factors, while working to improve affordability broadly for low-income and middle-income students. Also recommends scaling and improving CSAC’s communication and outreach efforts to provide early and clear information about student aid.</td>
<td>Shireman, R., Mishory, J., &amp; Baum, S. (2018). Expanding opportunity, reducing debt: Reforming California student aid. The Century Foundation.</td>
</tr>
<tr>
<td>Shulock &amp; Moore (2002)</td>
<td>Higher education governance</td>
<td>Proposes the development of a state-level accountability framework through a higher education coordinating agency that starts with setting policy goals and performance indicators. Each higher education segment would implement an internal accountability system with separate priorities and performance indicators that align with the state’s overall priorities, to be reported annually to the Legislature and Governor. The statewide framework would monitor not only the individual segments, but also the outcomes of the whole higher education system and evaluate opportunities for state policy reform.</td>
<td>Shulock, N., &amp; Moore, C. (2002). An Accountability Framework for California Higher Education: Informing Public Policy and Improving Outcomes. Institute for Higher Education Leadership &amp; Policy, California State University, Sacramento.</td>
</tr>
<tr>
<td>Sonstelie, Brunner, &amp; Ardon (2000)</td>
<td>K-12 governance</td>
<td>Outlines a model for state governance that eliminates school districts and replaces legislative rulemaking with bureaucratic control, allowing the state to allocate resources according to need. On the other hand, under local control, school districts could raise their own revenue, with the state distributing aid so that similar tax rates would produce the same revenue per pupil.</td>
<td>Sonstelie, J., Brunner, E., &amp; Ardon, K. (2000). For Better or For Worse? School Finance Reform in California. Public</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
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<tr>
<td>WestEd (2020)</td>
<td>ECE governance</td>
<td>In November 2019, the California Health and Human Services Agency engaged a team of researchers led by WestEd3 to develop a Master Plan for Early Learning and Care (Master Plan) to create a roadmap that put into action past recommendations and research about the benefits of quality early learning and care. The team was tasked with addressing five interrelated substantive issue areas within California’s early learning and care system: access, quality, universal preschool, facilities, and financing.</td>
<td>WestEd (2020). Master Plan for Early Learning and Care: Making California for all kids.</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
<td>Description</td>
<td>Citation</td>
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<td></td>
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<td>The report also recommends the development of a common data system.</td>
<td>Education in California: Problems and Solutions for Getting In and Getting Through. Rossier School of Education, University of Southern California.</td>
</tr>
<tr>
<td>Williamson</td>
<td>Education governance</td>
<td>Presents the idea of a shift in governance from hierarchy to fluid and decentralized networks, featuring new cross-sectoral hybridizations of public, private, and crossover organizations and actors involved in the design and deployment of new education programs, particularly curriculum design. The government would retain its role in coordinating and steering policy, monitoring delivery and contracts, but not necessarily manage services directly.</td>
<td>Williamson, B. (2013). The Future of the Curriculum: School Knowledge in the Digital Age. The MIT Press.</td>
</tr>
</tbody>
</table>
**Figure A1**

National Rankings for State Reading Achievement for 6th Grade

2009 to 2018 Difference in Reading Achievement (Ranked by 2018 Achievement)

Source: Stanford Education Data Archive (Version 4.1).
Notes: An achievement score of 6.0 is equal to the national NAEP average for 6th grade. A one unit increase in the achievement metric is equivalent to the mean per-grade increase in achievement between 4th and 8th grade.
Figure A2

National Rankings for State Math Achievement for 6th Grade

2009 to 2018 Difference in Math Achievement (Ranked by 2018 Achievement)

Source: Stanford Education Data Archive (Version 4.1)
Notes: An achievement score of 6.0 is equal to the national NAEP average for 6th grade. A one unit increase in the achievement metric is equivalent to the mean per-grade increase in achievement between 4th and 8th grade.
Figure A3

Trends in Rates of High School Attainment

1960 to 2019 Difference in HS Attainment (Ranked by 2019 Attainment Rates)

Source: IPUMS-USA.
Sample: Adult non-institutionalized population.
Notes: This figure plots the fraction of the adult population of each state with a high school degree.
**Figure A4**

*Trends in Rates of High School Attainment*

Fraction of Adult Californians with a High School Degree (1960-2019), by Race/Ethnicity

Source: IPUMS-USA.
Sample: Adult non-institutionalized population in California.
Notes: This figure plots the fraction of each race/ethnicity group in California with a HS degree.
Figure A5

Historic Trends in Student Debt in the U.S.

Average Student Debt Distributed in Each Year (2019 Dollars)

- Undergraduates & Graduates: Federal and Nonfederal Loans
- Undergraduates & Graduates: Federal Loans
- Undergraduates: Federal and Nonfederal Loans
- Undergraduates: Federal Loans

Source: The College Board.
Notes: This figure plots total student loans in each academic year divided by total FTE enrollment (including students that do not receive loans). Years represent the start of the academic year. Values for the 2019 academic year are estimates.
Figure A6

Costs at Public Colleges in California
Mean of Costs and Fees (2018 Dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>University of California</th>
<th>California State Universities</th>
<th>California Community Colleges</th>
</tr>
</thead>
</table>

- **Housing Costs**
- **Books and Supplies**

Source: IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License.
Sample: Public colleges in California.
Notes: We calculate the (unweighted) mean of each cost/fee category in each year across all schools in each system.
Figure A7

Trends in Rates of College Attainment

1960 to 2019 Difference in College Attainment ( Ranked by 2019 Completion Rates)

Source: IPUMS-USA.
Sample: Adult non-institutionalized population.
Notes: This figure plots the fraction of the adult population of each state with a college degree.
Figure A8

Trends in Rates of College Attainment

Fraction of Adult Californians with a Bachelor's Degree (1960-2019), by Race/Ethnicity

Source: IPUMS-USA
Sample: Adult non-institutionalized population in California.
Notes: This figure plots the fraction of each race/ethnicity group in California with a college degree.
Figure A9

Trends in Rates of College Attainment

Fraction of 25-34 Californians with a Bachelor's Degree (1960-2019), by Race/Ethnicity

Source: IPUMS-USA
Sample: 25-34 non-institutionalized population in California.
Notes: This figure plots the fraction of each race/ethnicity group among 25-34-year-olds in California with a college degree.
Figure A10

Delivering that Cap and Gown?
Graduation Rates within Six Years

Stanford
UCB
UCLA
Other UC's

CSU's

Start of Academic Year

Source: IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License.
Notes: The figure shows the fraction of full-time, first-time bachelor’s degree-seeking undergraduates who graduated in 150% of normal time (six years).
## Finance Appendix Table 1: Statewide Propositions that Affect School Finance

<table>
<thead>
<tr>
<th>Proposition</th>
<th>Year Passed</th>
<th>Description</th>
<th>Affected Tax/Rule</th>
<th>More Information</th>
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</thead>
<tbody>
<tr>
<td>Prop 13</td>
<td>1978</td>
<td>Limits property tax rates to 1 percent of a property’s assessed value at the time of acquisition, or purchase price. Provisions also capped annual increases in assessments at two percent or the rate of inflation, whichever is lower, and allowed reassessment only when the property changes ownership. The proposition also made raising taxes more difficult by requiring state tax increases to receive the approval of two-thirds of the legislature and by imposing restrictions on the taxing authority of local governments.</td>
<td>Revises terms relating to the assessed valuation of real property for property tax purposes.</td>
<td><a href="http://www.californiataxdata.com/pdf/Prop13.pdf">www.californiataxdata.com/pdf/Prop13.pdf</a></td>
</tr>
<tr>
<td>Prop 8</td>
<td>1978</td>
<td>Authorizes temporary reductions in assessed property value for property tax purposes to reflect substantial damages, destruction or other factors causing a decline in value, including falls in the real estate market.</td>
<td>Revises terms relating to the assessed valuation of real property for property tax purposes.</td>
<td><a href="https://www.boe.ca.gov/proptaxes/decline-in-value/">https://www.boe.ca.gov/proptaxes/decline-in-value/</a></td>
</tr>
<tr>
<td>Prop 4</td>
<td>1979</td>
<td>Establishes a constitutional limit on state and local government expenditures, including school districts, based on annual appropriations from the prior fiscal year. No agency’s expenditures can exceed this “Gann Limit”, which is adjusted annually for cost of living and population increases.</td>
<td>Limits state and local government spending</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/864/">https://repository.uchastings.edu/ca_ballot_props/864/</a></td>
</tr>
<tr>
<td>Prop 3</td>
<td>1982</td>
<td>Provides that &quot;change in ownership&quot; for tax assessment purposes does not include the acquisition of real property as a replacement for comparable property if the person acquiring the real property has been displaced from the property replaced by eminent domain proceedings, by acquisition by a public entity, or governmental action resulting in a judgment of inverse condemnation.</td>
<td>Revises terms relating to the assessed valuation of real property for property tax purposes.</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/895/">https://repository.uchastings.edu/ca_ballot_props/895/</a></td>
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<tr>
<td>Prop 5 &amp; Prop 6</td>
<td>1982</td>
<td>Repeals existing Gift and Inheritance Laws and prohibits the imposition of these taxes by state or local government. This measure also required the state to levy a California estate tax equal to the maximum federal credit allowable.</td>
<td>Revises terms relating to tax liabilities regarding gifts, inheritances, and estates.</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/899/">https://repository.uchastings.edu/ca_ballot_props/899/</a></td>
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<tr>
<td>Proposition</td>
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<tr>
<td>Proposition 46</td>
<td>1986</td>
<td>Restores the ability of counties, cities, and school districts to issue general obligation bonds, with a limit on the amount of assessed valuation debt that could be issued.</td>
<td>Provision for local funding</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/901/](<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/901/)</td>
</tr>
<tr>
<td>Proposition 62</td>
<td>1986</td>
<td>Requires approval of new or higher local general taxes by two-thirds of the governing body and by a majority of local voters. Also requires the tax to contain specific information, such as the method of collection or proposed use of tax revenue, and penalizes agencies that do not comply with these requirements.</td>
<td>New rule regarding taxes or approval of taxes</td>
<td>[<a href="https://ballotpedia.org/California">https://ballotpedia.org/California</a> Proposition 46, Authorize Local Tax Increases for Bond Repayment Amendment (June 1986)](<a href="https://ballotpedia.org/California">https://ballotpedia.org/California</a> Proposition 46, Authorize Local Tax Increases for Bond Repayment Amendment (June 1986))</td>
</tr>
<tr>
<td>Proposition 47</td>
<td>1986</td>
<td>Requires all revenues from taxes imposed by the Vehicle License Fee Law to be allocated to counties and cities (exempts fees on trailer coaches and mobile homes and the costs of collection and refunds).</td>
<td>Re-allocation of state tax revenue to localities</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/952/](<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/952/)</td>
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<tr>
<td>Proposition 50</td>
<td>1986</td>
<td>Allows property owners whose property has been damaged or destroyed in a natural disaster to transfer their existing assessed base-year value to a comparable replacement property within the same county.</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/955/](<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/955/)</td>
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<tr>
<td>Proposition 58</td>
<td>1986</td>
<td>Exempts the purchase or transfer of (1) real property between spouses and (2) the principal residence and the first $1,000,000 of other real property between parents and children from property reassessment on “purchase” or “change of ownership.” This has implications for reduced property tax revenues, impacting funding to school and community college districts and shifting greater state aid to education to offset losses.</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/963/](<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/963/)</td>
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<tr>
<td>Proposition 60</td>
<td>1986</td>
<td>Permits the Legislature to allow persons over age 55, who sell their residence and buy or build another of</td>
<td>Revises terms relating to the assessed</td>
<td><a href="https://repository.uchastings.edu">https://repository.uchastings.edu</a></td>
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<td>Proposition</td>
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<tr>
<td>Proposition 90</td>
<td>1988</td>
<td>equal or lesser value within two years in the same county, to transfer the old residence’s assessed value to the new residence. This has implications for reduced property tax revenues, impacting funding to school and community college districts and shifting greater state aid to education to offset losses.</td>
<td>valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td>[ca_ballot_props/965]</td>
</tr>
<tr>
<td>Proposition 98</td>
<td>1988</td>
<td>Extends Proposition 60 by authorizes homeowners over the age of 55 to, under certain conditions, transfer the current assessed value of their home to a replacement dwelling of equal or lesser value located in different counties if the county of the replacement dwelling adopts an ordinance participating in the program. This has implications for reduced property tax revenues, impacting funding to school and community college districts and shifting greater state aid to education to offset losses.</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot_props/1007/">https://repository.uchastings.edu/ca_ballot_props/1007/</a>]</td>
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<tr>
<td>Proposition 110</td>
<td>1990</td>
<td>Authorizes the Legislature to allow severely disabled homeowners to transfer base year values of former primary residences to replacement dwellings, and excludes from the definition of &quot;newly constructed&quot; the construction, installation, or modification of any component of a single or multiple family dwelling if it is for the purpose of making the dwelling more accessible to severely disabled persons. This has implications for reduced property tax revenues, impacting funding to school and community college districts.</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot_props/1064/">https://repository.uchastings.edu/ca_ballot_props/1064/</a>]</td>
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<tr>
<td>Proposition 162</td>
<td>1992</td>
<td>Grants the board of a public employee retirement system sole and exclusive authority over the system’s administration and investment decisions, limiting the Legislature’s authority over CalPERS and other public retirement systems, including their administrative costs and actuarial assumptions.</td>
<td>Change in ownership and administration of public retirement system</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot_props/1077/">https://repository.uchastings.edu/ca_ballot_props/1077/</a>]</td>
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<td>Proposition 171</td>
<td>1993</td>
<td>Extends Proposition 50 by allowing the Legislature to authorize county boards of supervisors to adopt an ordinance allowing property owners with damaged or destroyed property affected by a natural disaster to</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of</td>
<td>[<a href="https://repository.uchastings.edu">https://repository.uchastings.edu</a>]</td>
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<td>Proposition</td>
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<tr>
<td>Proposition 193</td>
<td>1996</td>
<td>transfer the base year existing assessed value to another comparable replacement property in another adopting county, within three years of substantial damage or destruction.</td>
<td>an existing assessed value for property tax purposes.</td>
<td>/ca_ballot_props/1086/</td>
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<tr>
<td>Proposition 218</td>
<td>1996</td>
<td>Amends State Constitution by not requiring new assessment of real property upon purchase or transfer between grandparents and their grandchild, subject to certain conditions. This has implications for reduced property tax revenues, impacting funding to school and community college districts.</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1114/">https://repository.uchastings.edu/ca_ballot_props/1114/</a></td>
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<tr>
<td>Proposition 1</td>
<td>1998</td>
<td>Limits authority of local governments to impose taxes and property-related assessments, fees, and charges. Requires a majority of voters to approve increases in general taxes and reiterates that two-thirds must approve special tax.</td>
<td>New rule regarding taxes or approval of taxes.</td>
<td><a href="https://ballotpedia.org/California_Proposition_218,_Voter_Approval_Requirement_for_Local_Tax_Increases_Initiative_(1996)">https://ballotpedia.org/California_Proposition_218,_Voter_Approval_Requirement_for_Local_Tax_Increases_Initiative_(1996)</a></td>
</tr>
<tr>
<td>Proposition 1A</td>
<td>1998</td>
<td>Authorizes Legislature to allow repair or replacement of environmentally contaminated property or structures without increasing the tax valuation of the original or replacement property. For property rendered unusable due to environmental contamination, this measure allows the transfer of the base-year, existing assessed valuation to a comparable replacement property.</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1153/">https://repository.uchastings.edu/ca_ballot_props/1153/</a></td>
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<tr>
<td>Proposition 10</td>
<td>1998</td>
<td>Bond funding provides $9.2 billion in state funding for education facilities for at least four years for the purposes of class size reduction. Also funds the construction and modernization of new classrooms in community colleges, the California State University, and the University of California.</td>
<td>Authorizes bond that impacts education funding</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1152/">https://repository.uchastings.edu/ca_ballot_props/1152/</a></td>
</tr>
<tr>
<td>Proposition 10</td>
<td>1998</td>
<td>Imposes a 50 cent per pack surtax on cigarette distributors and equivalent increase in state tax on other distributed tobacco products to provide funding for state and county commissions and programs, primarily for early childhood development programs.</td>
<td>New rule regarding taxes or approval of taxes</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1162/">https://repository.uchastings.edu/ca_ballot_props/1162/</a></td>
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<td>Proposition</td>
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<tr>
<td>Proposition 39</td>
<td>2000</td>
<td>Authorizes bonds for repair, construction or replacement of school facilities and classrooms, if approved by 55% of the local vote for projects evaluated by schools, community college districts, and county education offices for safety, class size, and information technology needs. Authorizes property taxes over the 1% limit by 55% vote, rather than the current two-thirds, as necessary to pay school bonds.</td>
<td>Authorizes bond that impacts education funding</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1168/">https://repository.uchastings.edu/ca_ballot_props/1168/</a></td>
</tr>
<tr>
<td>Proposition 47</td>
<td>2002</td>
<td>Authorizes $13.05 billion in bonds for education facilities, to address overcrowding and repair older schools. Funds used to upgrade and build new classrooms in the California Community Colleges, the California State University, and the University of California, to provide adequate higher education facilities to accommodate growing student enrollment.</td>
<td>Authorizes bond that impacts education funding</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1205/">https://repository.uchastings.edu/ca_ballot_props/1205/</a></td>
</tr>
<tr>
<td>Proposition 49</td>
<td>2002</td>
<td>Increases state grant funds available for before/after school programs and makes every public elementary, middle/junior high school, including charter schools, eligible for after school grants, with a required local funding match. Requires that new funding for before/after school programs not be taken from education funding, guaranteed under Proposition 98.</td>
<td>Increases state funding for education</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1207/">https://repository.uchastings.edu/ca_ballot_props/1207/</a></td>
</tr>
<tr>
<td>Proposition 57</td>
<td>2007</td>
<td>Authorizes $15 billion deficit-financing bond and pledges one-quarter cent of local sales tax to a special fund dedicated to the bond’s repayment. In addition, property taxes would be diverted from school districts to local governments to offset the sales tax loss. The school districts’ diverted funds are then offset by the state’s General Fund.</td>
<td>New rule regarding taxes or approval of taxes</td>
<td><a href="https://lao.ca.gov/ballot/2004/57_03_2004.htm">https://lao.ca.gov/ballot/2004/57_03_2004.htm</a></td>
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<tr>
<td>Proposition 1A</td>
<td>2004</td>
<td>Prohibits the State from reducing local governments’ property tax proceeds and requires local sales tax revenues to remain with the local government to be spent for local purposes. In addition, the State is required to fund legislative mandates on local governments or suspend their operation.</td>
<td>New rule regarding taxes or approval of taxes</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1235/">https://repository.uchastings.edu/ca_ballot_props/1235/</a></td>
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<tr>
<td>Proposition 55</td>
<td>2004</td>
<td>Provides for $12.3 billion in bonds for school and college facilities, to address overcrowding and repair older schools. Funds will also be used to upgrade and build</td>
<td>Authorizes bond that impacts education funding</td>
<td><a href="https://ballotpedia.org/California_Proposition_55">https://ballotpedia.org/California_Proposition_55</a></td>
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<td>Proposition</td>
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<td>Proposition 1D</td>
<td>2006</td>
<td>Provides $7.3 billion in bonds for school facilities, to address overcrowding and repair older schools. Funds will also be used to upgrade and build new classrooms in the California Community Colleges, the California State University, and the University of California, to provide adequate higher education facilities to accommodate growing student enrollment.</td>
<td>Authorizes bond that impacts education funding</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1262/">School and College Facilities Measure (March 2004)</a></td>
</tr>
<tr>
<td>Proposition 1A</td>
<td>2009</td>
<td>Prohibits the State from reducing local governments’ property tax proceeds and requires local sales tax revenues to remain with the local government to be spent for local purposes. In addition, the State is required to fund legislative mandates on local governments or suspend their operation.</td>
<td>New rule regarding taxes or approval of taxes</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1235/">https://repository.uchastings.edu/ca_ballot_props/1235/</a></td>
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<td>Proposition 22</td>
<td>2010</td>
<td>Prohibits the State from borrowing, taking, or delaying the distribution of funds used for transportation, redevelopment, or local government projects and services. Also prohibits the State, even during a period of severe fiscal hardship, from delaying the distribution of tax revenues for transportation, redevelopment, or local government projects and services.</td>
<td>Limits state funding authority</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/index.html">https://repository.uchastings.edu/ca_ballot_props/index.html</a></td>
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<tr>
<td>Proposition 25</td>
<td>2010</td>
<td>Amends the Constitution to allow a simple majority vote for each house of the Legislature to pass a budget and spending bills (lowered from the previous vote requirement of two-thirds). However, this retains the two-thirds vote requirement for taxes.</td>
<td>Amends State Constitution regarding budget legislation</td>
<td><a href="https://lao.ca.gov/ballot/2010/25_11_2010.aspx">https://lao.ca.gov/ballot/2010/25_11_2010.aspx</a></td>
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<tr>
<td>Proposition 26</td>
<td>2010</td>
<td>Broadens the definition of a state or local tax to include payments previously considered to be fees or charges. At the same time, the measure specifies that any legislation resulting in higher taxes for taxpayers must be New rule regarding taxes or approval of taxes</td>
<td><a href="https://lao.ca.gov/ballot/2010/26_11_2010.aspx">https://lao.ca.gov/ballot/2010/26_11_2010.aspx</a></td>
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<td>Proposition</td>
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<td>Proposition 2</td>
<td>2014</td>
<td>Requires a minimum annual transfer of state general fund revenues to the budget stabilization account and, in particular, establishes a state education reserve fund for schools and colleges. In addition, it sets the maximum reserves that school districts can keep at the local level, leading some districts to keep smaller reserves.</td>
<td>Amends State Constitution regarding state funding</td>
<td><a href="https://lao.ca.gov/ballot/2014/prop-2-110414.aspx">https://lao.ca.gov/ballot/2014/prop-2-110414.aspx</a></td>
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<tr>
<td>Proposition 30</td>
<td>2012</td>
<td>Provides additional state tax revenue for schools by increasing taxes on earnings over $250,000 for seven years and sales taxes by one-quarter cent for four years.</td>
<td>New rule regarding taxes or approval of taxes</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1309/">https://repository.uchastings.edu/ca_ballot_props/1309/</a></td>
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<tr>
<td>Proposition 55</td>
<td>2016</td>
<td>Extends by twelve years the temporary personal income tax increases enacted in 2012 on earnings over $250,000 (for single filers; over $500,000 for joint filers; over $340,000 for heads of household), and allocates the revenue to K–12 schools (89%) and to California Community Colleges (11%) for administrative costs. The measure increased state revenues and funding for schools and community colleges of roughly half of the revenue raised by the measure.</td>
<td>New rule regarding taxes or approval of taxes</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1348/">https://repository.uchastings.edu/ca_ballot_props/1348/</a></td>
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<tr>
<td>Proposition 51</td>
<td>2016</td>
<td>Authorizes $9 billion in general obligation bonds to fund improvement and construction of school facilities for K-12 schools and community colleges.</td>
<td>Authorizes bond that impacts education funding</td>
<td><a href="https://repository.uchastings.edu/ca_ballot_props/1344/">https://repository.uchastings.edu/ca_ballot_props/1344/</a></td>
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<tr>
<td>Proposition 19</td>
<td>2020</td>
<td>Allows homeowners who are over 55, disabled, or are victims of wildfire/disaster to transfer their primary residence’s tax base to a replacement residence.</td>
<td>Revises terms relating to the assessed valuation of real property and transfer of an existing assessed value for property tax purposes.</td>
<td>[<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/1386/](<a href="https://repository.uchastings.edu/ca_ballot">https://repository.uchastings.edu/ca_ballot</a> Props/1386/)</td>
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### Finance Appendix Table 2: Major School Finance Litigation in California

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<tr>
<th>Lawsuit</th>
<th>Year Passed</th>
<th>Description</th>
<th>More Information</th>
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| Allen v. City of Long Beach (The “California Rule”) | 1955        | Public pension agreements have been protected under the “contract clause” of the constitution for over 70 years. However, in recent years, the California Supreme Court has sided with challenges to public pension agreements. In 2012, Governor Jerry Brown signed the Public Employees’ Pension Reform Act (PERPA), which restricted the compensation of new public employees. Several challenges to PERPA arose in the years following:  
  ● Marin Ass’n of Public Employees v. Marin County Employees’ Retirement Ass’n  
  ● Alameda County Deputy Sheriff’s Ass’n v. Alameda County Employees’ Retirement Ass’n  
  ● Cal Fire Local 2881 v. California Public Employees’ Retirement System |
<p>| Serrano v. Priest (I-III)                         | 1970s       | Three court cases that together determined that imbalances in school district funding -- due to inequalities in property tax revenue -- violated the Equal Protection Clause of the Fourteenth Amendment.                                           | <a href="https://edsource.org/glossary/serrano-v-priest">https://edsource.org/glossary/serrano-v-priest</a>                                   |
| Williams v. California                            | 2004        | The court case determined that the state should provide the level of resources necessary for each school to educate its students up to a high standard. The settlement requires the State to fund building repairs, instructional materials, and fund adequately credentialed teachers, with ongoing annual review of the conditions of schools in which plaintiffs had alleged deplorable conditions. | <a href="https://www.cde.ca.gov/eo/ce/wmslawsuit.asp">https://www.cde.ca.gov/eo/ce/wmslawsuit.asp</a> |</p>
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<th>Bill Number</th>
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<tr>
<td>SB 154</td>
<td>1972</td>
<td>Establishes school “revenue limit” funding system, giving the state a significant fiscal interest in the allocation of local property tax revenue.</td>
<td><a href="https://eric.ed.gov/?id=ED139068">https://eric.ed.gov/?id=ED139068</a></td>
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<td>AB 8</td>
<td>1978</td>
<td>State’s first law allocating property tax revenue. Allocation amounts are based on the share of property tax received prior to Proposition 13. Stipulates that the state will provide grants for some of local revenue loss.</td>
<td><a href="https://lao.ca.gov/1996/082196_prop_taxes/property_tax_differences_pb82196.html">https://lao.ca.gov/1996/082196_prop_taxes/property_tax_differences_pb82196.html</a></td>
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<td>ERAF I</td>
<td>1992</td>
<td>The Legislature permanently redirected a significant portion of property tax revenue from cities, counties, and special districts to schools and community colleges. The redirected revenue is deposited into a countywide account known as the Educational Revenue Augmentation Fund (ERAF). Revenue from ERAF is allocated to schools and community colleges to offset the funding they would receive from the state General Fund.</td>
<td><a href="https://lao.ca.gov/Publications/Report/4193">https://lao.ca.gov/Publications/Report/4193</a></td>
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| ABX1 7 (Triple Flip) | 1993        | The Triple Flip is an exchange of revenues generated from 0.25% of the sales and use tax that was previously credited to the general funds of all cities and counties:  
  ● State “flips” the sales and use tax from the counties and cities for debt service payments on State Economic Recovery Bonds  
  ● To compensate cities and counties for lost revenue, a direct dollar for dollar replacement is made to the county and each city in the county from the county ERAF.  
  ● The revenue lost from each ERAF would be replaced by direct subsidies from California’s General Fund to each school, community college, and office of the county superintendents to maintain their respective funding levels. | [http://www.californiacityfinance.com/ElledgePropertyTax06.pdf](http://www.californiacityfinance.com/ElledgePropertyTax06.pdf) |
<p>| ERAF II     | 1993 &amp; 1994 | The ERAF shift for counties was targeted for $1.998 billion, while cities were to shift $288 million. A permanent shift based on population was also part of ERAF II. Counties shifted $0.78 per person and cities $0.99 per person. | <a href="http://www.californiacityfinance.com/ElledgePropertyTax06.pdf">http://www.californiacityfinance.com/ElledgePropertyTax06.pdf</a> |
| VLF Swap    | 2004        | The state permanently “swaps” the discretionary motor vehicle license fees (VLF) from cities and counties to the State of California. To ensure that cities and counties are not financially impacted, the state permanently shifts some property tax revenue from ERAF and K-14 | <a href="http://www.californiacityfinance.com/ElledgePropertyTax06.pdf">http://www.californiacityfinance.com/ElledgePropertyTax06.pdf</a> |</p>
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<tr>
<td>ERAF III</td>
<td>2004 &amp; 2005</td>
<td>Increased contributions by local governments (counties, cities, special districts, and redevelopment agencies) to each county’s ERAF. The increased contributions remained in effect for two years.</td>
<td><a href="http://www.californiacityfinance.com/ElledgePropertyTax06.pdf">http://www.californiacityfinance.com/ElledgePropertyTax06.pdf</a></td>
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<tr>
<td>ABX1 26</td>
<td>2012</td>
<td>Abolished redevelopment agencies. Established timeline for reverting the redevelopment agency share of the property tax to other local governments.</td>
<td><a href="http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0001-0050/abx1_26_bill_20110629_chaptered.html">http://www.leginfo.ca.gov/pub/11-12/bill/asm/ab_0001-0050/abx1_26_bill_20110629_chaptered.html</a></td>
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<tr>
<td>SB 97</td>
<td>2013</td>
<td>Creates the Local Control Funding Formula which created a new funding formula for schools which included: 1) base funding dependent on average daily attendance and four student grade-levels, and 2) extra supplemental and concentration grants for districts serving high-need populations, including low-income students, English Language Learners, homeless and foster care youth.</td>
<td><a href="https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140897">https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201320140897</a></td>
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<td>Author</td>
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<td>Affeldt (2018)</td>
<td>K-12 new revenue streams</td>
<td>Suggests reducing the tax subsidy for the highest value multi-million dollar properties from Prop 13’s annual 1 percent cap on property taxes and 2 percent annual limit on increases in reassessed value. Also suggests that reinstating the 2 percent Vehicle License Fee could raise new revenues for education. Affeldt also highlights the recent proposals calling for a business and personal services tax, a tax on the extraction of oil, and the reinstatement of a California estate tax. In addition, authorizing local jurisdictions to raise new revenues outside of Prop 98 is key to long-term school funding.</td>
<td>Affeldt, J. (2018). California needs a new master plan to close the education equity gap. EdSource.</td>
</tr>
<tr>
<td>Barnett &amp; Kasmin (2018)</td>
<td>Early care and education finance</td>
<td>Suggests that pre-K benefit from the K-12 funding formula, as evident in other states, which can be determined based on the cost of meeting specific standards, and variations in the needs of children and local funding capacity. This will shift the burden on the state and require the generation of additional revenue.</td>
<td>Barnett, S., &amp; Kasmin, R. (2018). Fully Funding Pre-K through K-12 Funding Formulas. National Association of State Boards of Education.</td>
</tr>
<tr>
<td>Author (year)</td>
<td>Type of reform</td>
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<tr>
<td>Bersin, Kirst, &amp; Liu (2008)</td>
<td>K-12 education finance</td>
<td>Proposes a reformed finance system of five components: 1) base funding, 2) special education, 3) target funding for low-income students and English learners, 4) regional cost adjustments, and 5) a hold harmless condition. Base funding is the amount per pupil to cover the basic costs of education that enables an average student to meet California’s academic performance standards, and is adjusted for regional cost differences. The hold harmless condition ensures that every district receives at least as much total revenue as it receives now. This paper laid the foundation for the LCFF formula, but some ideas in the initial proposal were not adopted.</td>
<td>Bersin, A., Kirst, M.W., Liu, G. (2008). <em>Getting Beyond the Facts: Reforming California School Finance</em>. The Chief Justice Earl Warren Institute on Race, Ethnicity &amp; Diversity. <a href="https://www.law.berkeley.edu/files/GBTFissuebriefFINAL.pdf">https://www.law.berkeley.edu/files/GBTFissuebriefFINAL.pdf</a></td>
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<tr>
<td>Brunner (2001)</td>
<td>K-12 new revenue generation</td>
<td>Presents a model school finance system, based on a square footage parcel tax, that provides school districts with a flexible source of discretionary school revenue. It would consist of primary funding, or a base level of funding per pupil that can be adjusted based on need, which can be supplemented with secondary revenue raised through a square footage parcel tax.</td>
<td>Brunner, E. J. (2001). <em>The Parcel Tax</em>. Public Policy Institute of California (PPIC). [<a href="http://www.mike">http://www.mike</a> mcmahon.info/ParcelTaxReview.pdf](<a href="http://www.mike">http://www.mike</a> mcmahon.info/ParcelTaxReview.pdf)</td>
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<tr>
<td>California Forward (2015)</td>
<td>K-12 new revenue generation</td>
<td>Recommends the current tax structure under Proposition 30 be reformed to produce more stable revenues (especially during economic downturns) for K-12 and higher education. Also suggests including a diversity of revenue sources under Prop 30, including those outside the state General Fund, such as through specific investments, regional economies, or community-level governments, while remaining progressive. For funding school facilities, California Forward lays out several options: 1) Reduce the size of a statewide General Obligation bond and narrow the state’s role to supporting equity in school construction and facility modernization, 2) implement a lease purchase program tied to the growth on the school districts’ share of the property tax to fund a lease obligation bond, or 3) levy a</td>
<td>California Forward. (2015). <em>Financing the Future: How Will California Pay for Tomorrow?</em> <a href="https://cafwd.app.box.com/s/izluytlZgucoF50fbd57pwet7v98pl">https://cafwd.app.box.com/s/izluytlZgucoF50fbd57pwet7v98pl</a></td>
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<tr>
<td>California School Boards Association (2015)</td>
<td>K-12 new revenue generation</td>
<td>special tax to pay the debt service on revenue bonds or to finance construction directly.</td>
<td>California School Boards Association (2015). California’s Challenge: Adequately Funding Education in the 21st Century.</td>
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<tr>
<td>California School Boards Association (2015)</td>
<td>K-12 new revenue generation</td>
<td>Argues that progress toward an adequate K-12 funding system requires continued Proposition 30 funding, or alternative funding sources to replace it and generate revenue. Suggests sources of new revenue. Also suggests that in order to move toward adequacy in the Local Control Funding Formula (LCFF) system, the state should increase base grant levels and the supplemental and concentration grants to provide greater funding for high-need districts.</td>
<td>California School Boards Association (2015). California’s Challenge: Adequately Funding Education in the 21st Century.</td>
</tr>
<tr>
<td>The Campaign for College Opportunity (2021)</td>
<td>Higher education finance</td>
<td>Recommends prioritized funding to the California Community Colleges, CSU, and UC campuses that will help close racial equity gaps and improve timely college graduation rates for transfer students. Also recommends significant investment in the community college system to support student services and successful transfers, as well as funding to UC and USC in order to serve a greater number of community college transfer systems. Lastly, the report addresses potential cost savings to the state and students if the college transfer process is streamlined.</td>
<td>The Campaign for College Opportunity. (2021). Chutes or Ladders? Strengthening California Community College Transfer So More Students Earn the Degrees They Seek. The Campaign for College Opportunity.</td>
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<tr>
<td>Author (year)</td>
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<td>Douglass (2010)</td>
<td>Higher education finance</td>
<td>Growth in California’s higher education system requires a revised funding model and the containment of costs for taxpayers and students, namely a moderate tuition and high financial aid model. The institutions need an adequate revenue stream that includes fee and tuition income to offer degree-bearing programs in a timely manner. Some lawmakers have proposed a specific new tax or reform in the budget to ensure dedicated state funding for higher education, such as a tax on oil revenues. The federal government should also support greater degree completion through increased federal financial aid funding and funding support for expanding enrollment capacity.</td>
<td>Douglas, J. A. (2010). <em>Re-imagining California Higher Education</em>. Center for Studies in Higher Education, University of California, Berkeley.</td>
</tr>
<tr>
<td>Douglass (2019)</td>
<td>Higher education finance</td>
<td>Proposes a revised tuition pricing model with a 5-tiered tuition rates based on family income, with federal Pell Grants, university aid, and Cal Grants. Existing financial aid sources should be consolidated and then combined with additional tuition income from wealthier students to increase funding for need-based aid and academic</td>
<td>Douglas, J. A. (2019, May 20). UC Needs to Rethink Tuition and Innovate. UC Berkeley Blog.</td>
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<tr>
<td>Author (year)</td>
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<td>Finney et al. (2014)</td>
<td>K-12 education finance Proposes amendments to statutes and the state constitution to remove constraints on capital investment currently imposed by property values, Proposition 13, and debt limits. State funding for facilities should be adjusted for differences in local resources. For example, it has been proposed that general obligation bonds be replaced with annual, per-pupil grants to fund a minimum portion of a district’s expected facility needs.</td>
<td>Finney, J. E., Riso, C., Orosz, K., &amp; Boland, W. C. (2014). <em>From Master Plan to Mediocrity: Higher Education Performance &amp; Policy in California</em>. Graduate School of Education, University of Pennsylvania.</td>
<td><a href="https://www.gse.upenn.edu/pdf/irhe/California_Report.pdf">https://www.gse.upenn.edu/pdf/irhe/California_Report.pdf</a></td>
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<tr>
<td>Furger, Hernández, &amp; Darling-Hammond (2019)</td>
<td>Higher education finance Highlights the need for greater coordination and alignment of state appropriations, tuition setting, and financial aid across systems and with statewide priorities. Higher education finance policy in California has been developed and implemented haphazardly with little alignment of long-term goals. Reform is needed to Proposition 98, which creates competition between the higher education segments and public schools, since funding for higher education is discretionary, unlike for K-12 education, which is mandated. It also often acts as a “ceiling” of funding rather than a “floor.” Recommends a statewide policy for establishing tuition, and greater cohesion between state aid policy (Cal Grants) and institutional aid.</td>
<td>Furger, R. C., Hernández, L. E., Darling-Hammond, L. (2019). <em>The California Way: The Golden State’s Quest to Build an Equitable and Excellent Education System</em>. Learning Policy Institute.</td>
<td><a href="https://learningpolicyinstitute.org/sites/default/files/products/Caifornia_Way_Equitable_Excellent_Education_System_REPORT.pdf">https://learningpolicyinstitute.org/sites/default/files/products/Caifornia_Way_Equitable_Excellent_Education_System_REPORT.pdf</a></td>
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<tr>
<td>Governor’s Committee on Education</td>
<td>Education finance Recommends transitioning to a more flexible, student-centered funding model that provides a base level of funding for every student, and provides additional resources for those who are most underserved, including low-income students and English learners, and consolidates categorical funding programs. The report</td>
<td>Governor’s Committee on Education Excellence. (2007). Student’s First:</td>
<td><a href="https://hanushek.stanford.edu/sites/default/files/GovCommEducExcelle">https://hanushek.stanford.edu/sites/default/files/GovCommEducExcelle</a></td>
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<td>Excellence (2007)</td>
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<td>also recommends providing financial incentives to reward schools that succeed in student improvement. The funding system should also be more stable and predictable by aligning calculations under Prop 98. The state should provide greater fiscal stability and use the same base year to calculate (1) personal income data and (2) General Fund revenues. The report also recommends establishing an education finance reserve that sets aside unexpended funds from the Prop 98 Reversion Account.</td>
<td>Renewing Hope for California’s Future.</td>
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<tr>
<td>Hahnel, Hough, &amp; Willis (2020)</td>
<td>New revenue generation</td>
<td>Interviews with CA state finance experts about reform. recommends that the state broaden the tax base to modestly spread the tax burden and make it fairer and more stable, providing an increasing, but not volatile, revenue supply. For example, tax rates on high-income individuals and corporations can be increased, the sales tax can be expanded to services, and a “split roll” in corporate property taxes can remove the limit on increases in assessed value. The experts also propose that the state reduce tax expenditures by eliminating tax loopholes, credits, and deductions that reduce state revenues and exacerbate economic inequalities.</td>
<td>Hahnel, C., Hough, H. J., &amp; Willis, J. (2020). Securing and Protecting Education Funding in California. Policy Analysis for California Education (PACE).</td>
</tr>
<tr>
<td>Herman (2013)</td>
<td>K-12 education finance</td>
<td>Uplifts Colorado’s finance reform efforts as a model, which determines a district’s funding using the average daily membership, includes a uniform, statewide base per-student amount that is adjusted based on certain district factors and includes weights for at-risk students. Under this reform, the state will determine each district’s total state and local funding allocation by subtracting the amount of funding expected to be raised locally from the district’s total allocation. The reform also requires that funding provided to students eligible for free or reduced-price lunch or ELL students follow them to their schools across a district.</td>
<td>Herman, J. (2013). School-Finance Reform: Inspiration and Progress in Colorado. Center for American Progress.</td>
</tr>
<tr>
<td>Hillman, Nicholas (2016)</td>
<td>Higher education finance</td>
<td>Argues for a need-based funding model for higher education over a performance-based one, to focus on building the resource capacity of the lowest-performing</td>
<td>Hillman, N. (2016). Why Performance-Based College Funding</td>
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<tr>
<td>Imazeki (2018)</td>
<td>K-12 education finance</td>
<td>Proposes changes to school funding should include reforms to Prop 13 or revenue restrictions in order to increase local revenue, with careful consideration of equity across districts. Proposes a Guaranteed Tax Base (GTB) system, in which for a chosen tax rate, the state guarantees to each district the revenue it would have raised with a guaranteed tax base, giving low-wealth districts proportionately more state aid. Districts can also raise revenue by levying a tax at a rate higher than the minimum required rate, and also by implementing local income taxes.</td>
<td><em>Imazeki, J.</em> (2018). <em>Adequacy and State Funding Formulas: What Can California Learn From the Research and National Context?</em> Policy Analysis for California Education (PACE).</td>
<td><a href="https://gettingdowntofacts.com/sites/default/files/2018-09/GDTFII_Report_Imazeki.pdf">https://gettingdowntofacts.com/sites/default/files/2018-09/GDTFII_Report_Imazeki.pdf</a></td>
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<td>Johnson (2010)</td>
<td>Higher education finance</td>
<td>Suggests that renewed public support for higher education will help close the state’s workforce gap, with increased state funding to support college enrollment and graduation. New revenue streams, such as an oil severance fee, may be necessary.</td>
<td><em>Johnson, H.</em> (2010). <em>Higher Education in California New Goals for the Master Plan.</em> Public Policy Institute of California (PPIC).</td>
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<td>Kirst, Goertz, &amp; Odden (2007)</td>
<td>K-12 education finance</td>
<td>Suggests that a more coherent, less centralized state finance system that allows for local flexibility with incentives and support aligned to student performance standards, takes into account regional cost differences, and relies less on prescriptive categorical programs, could lead to greater achievement.</td>
<td>Kirst, W., Goertz, M., &amp; Odden, A. (2007). <em>The Evolution of California’s State School Finance System and Implications from Other States. Getting Down to Facts</em>.</td>
<td><a href="https://cepa.stanford.edu/sites/default/files/3-Kirst%283-07%29.pdf">https://cepa.stanford.edu/sites/default/files/3-Kirst%283-07%29.pdf</a></td>
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<td>Lazarin (2013)</td>
<td>K-12 education finance</td>
<td>Finds that categorical grants can offer a relatively stable form of funding for districts and schools, but at the expense of local flexibility. Lazarín recommends that states and school districts adopt weighted student funding systems that, down to the school level and not only the district level, provide operational funding based on the needs of students.</td>
<td>Lazarín, M. (2013). <em>How Approaches to Stuck-in-the-Mud School Funding Hinder Improvement</em>. Center for American Progress.</td>
<td><a href="https://www.americanprogress.org/issues/education-k-12/reports/2013/11/18/79401/how-approaches-to-stuck-in-the-mud-school-funding-hinder-improvement/">https://www.americanprogress.org/issues/education-k-12/reports/2013/11/18/79401/how-approaches-to-stuck-in-the-mud-school-funding-hinder-improvement/</a></td>
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<td>Loeb (2001)</td>
<td>K-12 local revenue</td>
<td>Presents the income tax as a feasible alternative to the property tax in funding education. One administratively easy method would be to implement an optional local surcharge on state income taxes. “This surcharge would be equalized so that the same tax effort would raise the same supplemental funds per pupil in each district.”</td>
<td>Loeb, S. (2001). Local Revenue Options for K-12 Education. In Sonstelie, J., &amp; Richardson, P. (Eds.), School Finance and California’s Master Plan for Education (125-154). Public Policy Institute of California (PPIC).</td>
<td><a href="https://cepa.stanford.edu/sites/default/files/Local%20Revenue.pdf">Link</a></td>
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<td>Martin, Boser, &amp; Benner (2018)</td>
<td>K-12 education finance</td>
<td>Recommends that school funding systems ensure equal access to core educational services based on a weighted student funding formula (for low-income, high-need students) and fund programs to increase teacher quality. This should also be inclusive of equitable access to early childhood programs and other child care programs.</td>
<td>Martin, C., Boser, U., Benner, M. (2018). A Quality Approach to School Funding: Lessons Learned From School Finance</td>
<td><a href="https://www.americanprogress.org/issues/education-k-12/reports/2018/11/13/460397/#">Link</a></td>
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<td>Melnick et al. (2018)</td>
<td>Early care and education finance</td>
<td>Recommends that California: 1) fully fund Local Child Care and Development Planning Councils, 2) over time implement a sliding fee model in which families pay progressively more with greater incomes, which requires a smaller state investment by capitalizing on both public and private funding from high-income families. Also suggests increased funding for the Revolving Loan Fund to support the purchase and renovation of facilities.</td>
<td>Melnick, H., Meloy, B., Gardner, M., Wechsler, M., Maier, A. (2018). <em>Building an Early Learning System That Works: Next Steps for California</em>. Learning Policy Institute.</td>
<td><a href="https://learningpolicyinstitute.org/sites/default/files/product-files/Building_Early_Learning_System_Works_CA_BRIEF.pdf">Link</a></td>
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<td>Murphy (2004)</td>
<td>Higher education finance</td>
<td>Proposes that instead of Program-Based Funding, community colleges be financed through a simplified allocation formula based on total enrollment that is adjusted for annual growth. This base funding would be supplemented by extra performance-based funds. Also suggests raising resident student tuition, offset by federal grants and tax credits.</td>
<td>Murphy, P.J. (2004). <em>Financing California's Community Colleges</em>. Public Policy Institute of California (PPIC).</td>
<td><a href="https://www.ppic.org/wp-content/uploads/report/R_104PMR.pdf">Link</a></td>
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<td>Murphy, Cook, Johnson, &amp; Weston (2014)</td>
<td>Higher education finance</td>
<td>Suggests that a performance-based funding model linked to goals and outcomes would institutionalize a focus on student performance. It should articulate clear goals and be built into a substantial portion of base funding. This linking of funding and outcomes should be based in the individual systems—UC, CSU, and the community colleges—with required regular reporting to the governor and legislature.</td>
<td>Murphy, P., Cook, K., Johnson, H., Weston, M. (2014). <em>Higher Education in California: Performance Budgeting</em>. Public Policy Institute of California.</td>
<td><a href="https://www.ppic.org/wp-content/uploads/R_1114PMR.pdf">Link</a></td>
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<td>Public Policy Institute of California (2001)</td>
<td>K-12 education finance</td>
<td>Suggests that the state develop a cost schedule and quality model for school spending to determine a base revenue, adjusted among school districts based on assessments of resource costs, making categorical programs unnecessary. In addition, school districts should generate local revenue more easily, through revamping the property tax and parcel taxes, as well as implementing a local income tax. A supplementary state aid program would make up the difference in local supplementary revenue, with limits on the supplementary tax rate.</td>
<td>Public Policy Institute of California. (2001). How Should California Finance Its Schools?</td>
<td><a href="https://www.ppic.org/wp-content/uploads/rs_archive/pubs/rb/RB_601JSRB.pdf">Link</a></td>
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<td>Public Policy Institute of California (2010)</td>
<td>K-12 education finance</td>
<td>Recommends the finance system: 1) be equitable, with additional resources given to high-need students, 2) properly structure incentives, based on measures that can’t be manipulated by districts and are highly correlated with achievement, 3) treat similar districts equitably, allocating money based on a statewide per-pupil rate, and 4) grant local districts and schools more authority.</td>
<td>Public Policy Institute of California. (2010). At Issue: School Finance Reform.</td>
<td><a href="https://www.ppic.org/wp-content/uploads/rs_archive/pubs/atissue/AI_1110MWAI.pdf">Link</a></td>
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<td>Petek (2019)</td>
<td>State finance</td>
<td>Offers criteria for the state to consider when evaluating the risk of a future proposed loan, including the size of the loan, the duration of the loan, the dependability of repayments, and fiscal benefit.</td>
<td>Petek, G. (2019). Managing California’s Cash. Legislative Analyst’s Office.</td>
<td><a href="https://lao.ca.gov/reports/2019/4092/managing-californias-cash-090319.pdf">Link</a></td>
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<td>Reuben &amp; Murray (2008)</td>
<td>K-12 and ECE education</td>
<td>Recommends school-based budgeting and funding mechanisms that allocate money per pupil and take into account the higher costs of educating certain students or schools. Also raises the idea of investing more money on early intervention and pre-kindergarten and pre-</td>
<td>Reuben, K., Murray, S. (2008). Racial Disparities in Education Finance: Going Beyond Equal Revenues. Urban-</td>
<td><a href="https://www.urban.org/sites/default/files/publication/32136/411785-Racial-Disparities-205.pdf">Link</a></td>
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<td>Rose, Sonsteile, &amp; Weston (2010)</td>
<td>on finance</td>
<td>kindergarten programs. Districts could also re-distribute teachers by targeting greater pay to high-quality teachers teaching in high-poverty or low-performing schools.</td>
<td>Brookings Tax Policy Center.</td>
<td>in-Education-Finance-Going-Beyond-Equal-Revenues.PDF</td>
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<td>Rose, Sonsteile, &amp; Weston (2010)</td>
<td>K-12 education finance</td>
<td>Outlined possibilities for the state to: 1) equalize funding rates for revenue limits, 2) simulate the process of turning the flex item in revenue into a source of unrestricted aid and equalizing funding rates over time, 3) increase the Economic Impact Aid funding rate, and 4) adjust program rates to account for regional cost differences.</td>
<td>Rose, H., Sonsteile, J., Weston, M (2010). <em>Pathways for School Finance in California</em>. Public Policy Institute of California (PPIC).</td>
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<td>Sargrad et al. (2020)</td>
<td>K-12 education finance</td>
<td>Proposes the Public Education Opportunity Grants, a new framework for federal investment in education. The four main goals are to: 1) dramatically increase funding for education, with a particular emphasis on correcting for systemic disinvestment in schools that primarily serve students from families with low incomes and nonwhite students, 2) target the distribution of new investments to districts with the highest poverty rates, 3) provide incentives for states and districts to improve their funding system, including increasing the amount of state and local money spent on education and reducing inequities in funding, and 4) improving equitable distribution resources across and within school districts by supporting states and districts in conducting resource allocation reviews.</td>
<td>Sargrad, S., Partelow, L., Yin, J., Harris, K. M. (2020). <em>Public Education Opportunity Grants: Increasing Funding and Equity in Federal K-12 Education Investments</em>. Center for American Progress.</td>
<td><a href="https://www.americanprogress.org/issues/education-k-12/reports/2020/10/08/491255/public-education-opportunity-grants/">https://www.americanprogress.org/issues/education-k-12/reports/2020/10/08/491255/public-education-opportunity-grants/</a></td>
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<td>Sonstelie (2001)</td>
<td>K-12 education finance</td>
<td>Proposes a model system of school finance with two levels of revenue: primary and secondary. Primary revenue is determined by a base level of funding per pupil sufficient to provide adequate resources to schools, and is pulled from a countywide primary fund financed by property tax rates and state primary aid. This may incorporate cost differences across districts and by socioeconomic status. Districts may also supplement revenue with a limited secondary tax rate, subject to district power equalization through a secondary state aid program.</td>
<td>Sonstelie, J. (2001). <em>Is There a Better Response to Serrano?</em> In Sonstelie, J., &amp; Richardson, P. (Eds.), <em>School Finance and California's Master Plan for Education</em> (155-185). Public Policy Institute of California.</td>
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<td>Ardon (2000)</td>
<td>on finance</td>
<td>resources according to need. On the other hand, under local control, school districts could raise their own revenue, with the state distributing aid so that similar tax rates would produce the same revenue per pupil.</td>
<td><em>School Finance Reform in California</em>. Public Policy Institute of California (PPIC).</td>
<td>s_archive/pubs/report/R_200JSR.pdf</td>
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<td>Taylor (2017)</td>
<td>K-12 education finance</td>
<td>Recommends that alternative education funding be allocated to districts that can develop local arrangements with county offices of education (COE) and that COEs receive funding directly for core oversight and state required activities. Also recommends shifting LCFF funding for COEs to allow districts to purchase services.</td>
<td>Taylor, M. (2017). <em>Re-Envisioning County Offices of Education: A Study of Their Mission and Funding</em>. Legislative Analyst's Office.</td>
<td><a href="https://lao.ca.gov/Publications/Report/3547#Recommendations">https://lao.ca.gov/Publications/Report/3547#Recommendations</a></td>
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<td>The Think Long Committee for California (2010)</td>
<td>Tax reform New revenue generation</td>
<td>Proposes broad-based reforms to the tax code, including implementing a new sales tax on services, and reducing Personal Income Tax deductions while lowering tax rates on the PIT, the corporation tax (Corp) and the sales tax on goods. Reforms also include requiring multi-state corporations to use the single sales factor formula in calculating tax liability, as well as maintain the progressive tax structure on personal income taxes, with the top 5 percent of earners paying 62 percent of all personal income tax. One of the main priorities of these increased revenues would be to fund K-14 education at $5 billion annually, and in exchange, eliminate the Proposition 98 maintenance factor. The Committee also proposes that funding be tied to school performance, including the evaluation of teachers.</td>
<td>The Think Long Committee for California. (2010). <em>A Blueprint to Renew California: Report and Recommendations Presented by the Think Long Committee for California</em>. Nicolas Berggruen Institute.</td>
<td><a href="https://36z59wrv543qd814533ma8z-wpengine.netdna-ssl.com/wp-content/uploads/2018/10/Blueprint_to_Renew_ca.pdf">https://36z59wrv543qd814533ma8z-wpengine.netdna-ssl.com/wp-content/uploads/2018/10/Blueprint_to_Renew_ca.pdf</a></td>
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<td>Thomas B. Fordham Institute (2006)</td>
<td>K-12 education finance</td>
<td>Makes the argument for weighted student funding, recommending that state money follow the child according to need, that districts allocate funding according to weighted student funding and provide funds as real dollars to allow school-level budget autonomy. On the federal level, the report also proposes amending funding allocation formulas that favor wealthier states, instead funding states with low wealth and a high spending “effort.” Federal funding should also allow for school autonomy, with fewer strings attached and reporting requirements.</td>
<td>Thomas B. Fordham Institute. (2006). <em>Fund the Child: Tackling Inequity &amp; Antiquity in School Finance</em>. Thomas B. Fordham Institute.</td>
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<td>Timar &amp; Roza (2010)</td>
<td>K-12 education finance</td>
<td>Argues that funding should be tied to the desirable organizational elements of schools (with accountability structures), assess the value of specific services, and prioritize non-formal qualities of educators and principal leadership. States should monitor the distribution of resources as it relates to students’ needs, provide seed funding for districts to pilot compensation structures, and open up the market to dictate the real value of those services that could otherwise be provided by other parties.</td>
<td>Timar, T. B., Roza, M. (2010). “A False Dilemma”: Should Decisions about Education Resource Use Be Made at the State or Local Level? <em>American Journal of Education</em>, 116(3), 397-422.</td>
<td><a href="https://www.journals.uchicago.edu/doi/abs/10.1086/651414?journalCode=aje">Link</a></td>
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Finance Appendix Text Box 1: Why fund public education?

States have a constitutional obligation to provide education, and this means states (and taxpayers) must finance public schools to provide for a system of schooling with equal opportunities for students to learn and achieve desired learning goals and outcomes, gain the skills necessary to enter the labor market, and navigate citizenship in American life. A well-funded early care and P-16 system has both direct benefits to students as well as indirect benefits to society.

Investments in high quality early childhood education have been found to be particularly impactful for later life outcomes. When students enroll in high quality pre-K programs, research has found that students have higher test scores, less need to repeat grades or enroll in special education, and are more likely to graduate from high school, go to college, and have increased life-long earnings (Heckman, 2011; Schweinhart & Weikart, 1993; Bakken, Brown, & Downing, 2017). Importantly, early learning programs begin to address achievement gaps between students before they even arrive in kindergarten, which can lead to greater cost-savings later on in the K-12 system (Schweinhart & Fulcher-Dawson, 2012). In California, early childhood programs have the indirect benefit of providing many working parents--especially those who are single--with childcare (Thorman & Danielson, 2019). And in longitudinal studies of preschool interventions, researchers have found that early childhood programs produce other indirect benefits such as long-term savings on crime, welfare, and create a stronger tax base (Schweinhart, Montie, Xiang, Barnett, Belfield & Nores, 2005).

There are many individual and collective benefits to investing in a K-12 education as well. Success in K-12 can predict students’ later life outcomes such as college attainment, adult employment, and physical and mental health (Heckman, Stixrud, & Urzua, 2006; Greenstone et al., 2012). Those with high school diplomas have been found to earn more in the labor market compared to those who do not graduate and this wage gap has widened in recent years (Heckman, Lochner, & Todd, 2008). There are important collective, societal benefits as well: those with at least a high school diploma are less dependent on social welfare programs, less likely to be incarcerated, and are less likely to engage in risky behaviors as adolescents; those with at least a high school education are also more likely to be married and to raise children outside of poverty (Greenstone et al., 2012).

Higher education serves multiple purposes in society. A well-educated populace is essential to the health of a democratic society, but also necessary for driving economic development--public investments in higher education literally pays off for the state and its residents. For example, Stiles, Hout, and Brady (2012) found that in California, college completion results in higher adult earnings of $206k in additional revenues over a lifetime relative to an individual with just a high school diploma. In total, the authors find that every dollar spent on higher
education in the state returns $4.50 back to state coffers. Using more recent data, Winters (2020) finds that California college graduates earn on average $108,932 versus $55,158 for high school graduates—a 97.5 percent advantage. Beyond earnings, college graduates generally have higher levels of employment, coverage in employer retirement plans, civic engagement, and better voter turnout, among other benefits (Ma, Pender, & Welch, 2019). Higher education in California also provides substantial returns from investments in research and technology that continue to benefit society by bringing research dollars, jobs, and advancements to the state that improve lives. Lastly, California’s system of higher education helps spark and sustain human capital development in the state. With some of the best universities in the world, California colleges help attract some of the best and brightest from across the country and world to its economy.
Finance Appendix Figures

Figure A1

Trends in K-12 State Revenues

FY 2002 to 2019 Change in Per Pupil State Revenues, Ranked by FY 2019 Spending (2019 Dollars)

Source: Census Bureau.
Figure A2

Trends in K-12 Federal Revenues
FY 2002 to 2019 Change in Per Pupil Federal Revenues, Ranked by FY 2019 Spending (2019 Dollars)

Source: Census Bureau.
**Figure A3**

**Trends in K-12 Local Revenues**

FY 2002 to 2019 Change in Per Pupil Local Revenues, Ranked by FY 2019 Spending (2019 Dollars)

Source: Census Bureau.
Figure A4

Trends in K-12 Property Tax Revenues
FY 2002 to 2019 Change in Per Pupil Property Tax Revenues, Ranked by FY 2019 Spending (2019 Dollars)

Source: Census Bureau.
Notes: Incomplete data for NC, MD, AK, VA, HI, MA, CT, and DC.
Figure A5

Trends in General Fund Expenditures since 1986


Source: LAO.
Figure A6

Trends in Higher Education Revenues since 2001
Revenues Per FTE (2017 Dollars), 2001-2017

Source: IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License.
Figure A7

Trends in Higher Education Expenditures since 2001
Aggregate Expenditures Per FTE (2017 Dollars), 2001-2017

Source: IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License.
Figure A8

Trends in General Fund Expenditures for Higher Ed

Source: Expenditure data from the Legislative Analyst’s Office and FTE data from IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License.
Sample: All UC’s, CSU’s, and CCC’s, with the exception of UC Hastings, and Madera Community College.
Figure A9

Change in Net Tuition vs State Appropriations
Revenue Source Per FTE Relative to FY 2002 (2020 Dollars)

Source: Data prior to 2019 from IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License, and post-2018 finance and FTE data from IPEDS.
Sample: All UC’s and CSU’s, with the exception of UC Hastings and UCSF.
Notes: Revenue from state appropriations excludes grants, contracts, and capital appropriations from the state. We further narrow the sample using listwise deletion to all schools with available tuition and FTE data.
Composition of Revenues
Revenues per FTE since 2003 (2017 Dollars)

University of California
- Net Tuition
- State Appropriations
- Private Gifts/Grants
- Investment Return
- Hospitals

California State University
- Local Appropriations
- Federal Grants/Contracts

CA Community College
- Other

Year

Source: IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License.
Sample: All UC's, CSU’s, and CCC's, with the exception of UCSF, UC Hastings, and Madera Community College.
Notes: Due to an anomaly for UC Davis where hospital revenue was captured under other operating revenue in 2006. To correct this, we replace UCD’s 2006 hospital revenues with the sum of its 2005 and 2006 hospital revenues, and subtract its 2005 hospital revenues from its 2006 'other' revenues. Other revenues includes federal appropriations, state grants/contracts, local grants/contracts, affiliated entities, educational sales/services, auxiliary enterprises (net), capital appropriations, capital grants/gifts, endowment additions, and miscellaneous.
Figure A11

Change in Composition of Revenues
Change in Revenues per FTE since 2003 (2017 Dollars)

Source: IPEDS, via Education Data Portal v. 0.14.0, Urban Institute, under ODC Attribution License.
Sample: All UC’s, CSU’s, and CCC’s, with the exception of UCSF, UC Hastings, and Madera Community College.
Notes: Due to an anomaly for UC Davis where hospital revenue was captured under other operating revenue in 2006. To correct this, we replace UCD’s 2006 hospital revenues with the sum of its 2005 and 2006 hospital revenues, and subtract its 2005 hospital revenues from its 2006 ‘other’ revenues. Other revenues includes federal appropriations, state grants/contracts, local grants/contracts, affiliated entities, educational sales/services, auxiliary enterprises (net), capital appropriations, capital grants/gifts, endowment additions, and miscellaneous.
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